GRANTING INTELLECTUAL PROPERTY RIGHTS ON LIFE FORMS AND PROCESSES: DOES IT ENSURE FOOD SECURITY? A DEVELOPING COUNTRY PERSPECTIVE.

ABEBE ABEBAYEHU CHEKOL

STUDENT NO: *****

A Mini-Thesis submitted in partial fulfilment of the requirements for the Degree of

Master of Law, (Mode II) in the Faculty of Law, University of the Western Cape.

Supervisor: Adv. Riekie Wandrag

May 2005

TABLE OF CONTENTS

TITLE PAGE 4

LIST OF ABBREVIATIONS AND ACRONYMS 5

ACKNOWLEDGEMENT 6

CHAPTER ONE

GENERAL INTRODUCTION

1.1. Background 7-10

1.2. Objectives of the Study 11

1.3. Significance of the Study 11-12

1.4. Scope of the Study 12

1.5. Methodologies and Chapter Overview 12-13

CHAPTER TWO

INTELLECTUAL PROPERTY RIGHTS ON LIFE FORMS AND PROCESSES: GENERAL OVERVIEW

2.1 Introduction 14-15

2.2 Historical Background 15-17

2.3 The Agreement on TRIPS 17-19

2.3.1 The Review Process on Art.27 .3(b) the Agreement on TRIPS 19-20

2.4 The UPOV Convention for the Protection of New Varieties of Plants 20- 23

2. 5 The African Model Law on PVP 23-25

2.6 Bilateral Agreements Granting IPRs on Life Forms and Processes 25-27

2.7 Debates Underlying IPRs on Life Forms and Processes 28-30

2.8 Conclusion 31-32

CHAPTER THREE

IPRs ON LIFE FORMS AND PROCESSES AND FOOD SECURITY: CONCEPTUALIZING THE LINKAGES

3.1 Introductory Remarks 33

3.2 Food Security Defined 34-35

3.3 Links between IPRs on Life Forms and Processes, and Food Security 35-39

3.4 Conclusion 39

CHAPTER FOUR

FOOD SECURITY AS A JUSTIFICATION FOR GRANTING IPRs ON LIFE FORMS AND PROCESSES?

4.1 Introduction 40-41

4.2 Restrictions on the Rights of Farmers to Save, Sell and Exchange Seed 42-48

4.3 Threatening Biodiversity 48-55

4.4 Biotechnology is not geared towards addressing the interests of Developing Countries. 55-57

4.5 The discovery and expansion of the 'Terminator' technology 58-60

4.6 Potential Loss of Market Share 60-61

4.7 Conclusion 61-62

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions 63-71

5.2 Recommendations 71-76

BIBILIOGRAPHY

Books 77-78

Journals 78-79

Papers/Working Papers/Reports 80-83

Legal Instruments 83-84

Others 84

APPENDIX 85

TITLE

GRANTING INTELLECTUAL PROPERTY RIGHTS ON LIFE FORMS AND PROCESSES: DOES IT ENSURE FOOD SECURITY? A DEVELOPING COUNTRY'S PERSPECTIVE

KEYWORDS

Life Forms- Plant Varieties-Food Security –Trade- Related Aspects of Intellectual Property (TRIPS)-Intellectual Property-GMOs-Biotechnology- Convention for the Protection of New Plant Varieties -Developing Countries-Life Forms and Processes.

LIST OF ABBREVIATIONS AND ACRONYMS

AU	African Union
EC	European Community
EU	European Union
FAO	Food and Agriculture Organisation
GM	Genetically Modified
GMOs	Genetically Modified Organisms
IP	Intellectual Property
IPR	Intellectual Property Right
IPRs	Intellectual Property Rights
IPs	Intellectual Properties
OAU	Organisation of African Unity
PVP	Plant Variety Protection
TRALAC	Trade Law Centre for Southern Africa
TRIPS	Agreement on Trade-Related Intellectual Property Rights
UNCHR	United Nations Commission for Human Rights
UPOV	Convention for the Protection of New Plant Varieties
WTO	World Trade Organisation

ACKNOWLEDGMENT

First of all, what shall I render unto the Lord for all his unspeakable benefits towards me? Praise be unto him for all He has done to me. He, through the intermediary of St. Virgin Mary, makes me things down to earth easy.

Let me use this brief opportunity to extend my heart-felt gratitude to my supervisor and the course coordinator, Adv. Riekie who made my stay in the University of Western Cape very pleasant. Thanks for always being only an e-mail away from me in extending your critical comments, ever since the work was in its infant stage.

My friends in the LLM trade programme all deserve a big "THANK YOU" for spicing up my academic stay and extra-curricular life in the UWC. The whole thing would be incomplete, if I fail to mention my Tutor Abdul Rashied for his selfless assistance he extended to me.

My indebtedness is in order for Misrak, who meticulously did the task of formatting this work.

Last , but not least, I am also grateful for the financial scholarship given by the Carnegie Foundation through the University of Pretoria and University of Western Cape which funded my LLM study.

Abebe Abebayehu Chekol

26 May 2005

CHAPTER ONE

GENERAL INTRODUCTION

1. 1 Background

> *Today, we are unfortunately aware of the fact that sending food to underprivileged countries is not enough to solve the problem of malnutrition in the world. The only sustainable solution is to give each and every country the means of taking on the responsibility themselves in order to produce more food, and better food, to feed their people. In this respect, biotechnology offers real solutions*.
>
> Posted by Monsanto in advertisements published in the French Press 1998, quoted in Robert Ali Brac de la Perriere and Franck Seuret: 2000:56

Indeed, many developing countries have been facing daunting social, economic, and health challenges.[1]Falling within the larger domain of economic challenges, achieving basic food security has been one of the central problems for many of them. Hence, food security, as component element of sustainable development, is prominent on the domestic, as well as the international agendas of many countries from the South.[2] The strong initiative to cut human suffering due to hunger and malnutrition in developing countries has therefore spawned a broad array of proposals. In the ongoing debate, thus, several strategies have been proposed for the achievement of food security in developing countries. It has been suggested that the path to sustainable food security in developing countries should emphasize, among other things, a transformation process that can move

[1] Taylor and Cayford (2003)" American Patent Policy, Biotechnology, and African Agriculture: The Case for Policy Change." Available at http://www.rff.org . Accessed on 9th Oct 2004.

[2] Amorim: 2000:95

agriculture from its subsistence level through improved traditional farming, market and cash oriented agriculture.[3] This approach subsumes, it is argued, the application of modern technology (biotechnology and genetic engineering) to the agricultural production process.[4] It is highly claimed that this, in turn, can only be done by enhancing IPRs on life forms and processes.[5] Accordingly, developing countries are being encouraged for the application of IPRs to life forms and processes, which is perceived to influence the pace and focus of advances in biotechnology, as a solution to their food security problems.[6] This assertion, however, has ignited lots of controversies in almost every corners of the globe.[7]

In the public debate about IPRs over life forms and processes, different parties have argued whether or not IPRs will help to reduce hunger and increase food security in developing countries.[8] On the one hand, there is this argument that well-harnessed IPRs over life forms and processes can solve the problem of famine and hunger in the developing world, by increasing yields and overcoming challenges of disease, pests, drought and nutrient deficiencies.[9] It will do so, it is argued, by enhancing biotechnology which is vital for engineering new products that can give high yield with less input. It is further claimed that enhancing biotechnology by stretching strong IPRs on life forms and processes will enable to produce seeds that are attuned to the needs of developing countries. Hence, developing countries are being urged to implement strong IPRs over life forms and processes in order to enable themselves to benefit out of the system.[10]

---

[3] Ekpere "Intellectual Property Rights and Food Security: Implications for Africa's Agriculture "Available at *http://www.iprsonline.Ekpere/docs.htm* . Accessed on 15 Jan 2005.

[4] Ibid

[5] Ibid

[6] Braga and Fink: 1998:554

[7] Pavoni : 2001:87

[8] Sharma (2003) "Patenting Forms of Life: A Protection of Intellectual Property or Bio piracy?" Available at *http://www.ewnw-hamburg.de/Inhalt/dasEWNW/WasserTagung/Devinder_Handout.pdf*. Accessed on 9th Oct 2004.

[9] Institute of Development Studies "Can Agricultural Biotechnology be Pro-Poor?" Available at *http://www.ids.ac.uk/biotech*. Accessed on 6th Oct 2004.

[10] Perriere and Seuret: 2000: 56

Contrary to the aforementioned argument, there exists a vociferous lobby of those who believe that IP over life forms and processes will rather breed food insecurity in developing countries. They argue that such protection reduces farmers' access and control over agricultural resources including seeds, which are essential to their food security.[11] Granting strong IPRs on life forms and processes will rather increase economic dependency and the price of seed – the ultimate symbol of food security.[12] On top of that, the trend so far has not proven true the heralded premise that biotechnology will produce products attuned to the needs of developing countries. Rather, emphasis has so far been ordained more to producing cash crops. It should also be noted that cheerleaders of biotechnology have crafted a system that can produce sterile seeds. They have thus managed to develop a technology which can generate seeds that may germinate only once. It is superfluous to say that the latest development of such a technology seriously threatens food security as it impairs seed saving and exchange among farmers. It is against the background of such a contentious and polarized debate that this research is done.

As pointed out earlier, IPRs over life forms and processes have been one of the most intensely debated subjects of our time. Indeed, in many ways, the debate becomes even more polarized when it takes on a 'food security' angle. Thus the rules in this area set out by the WTO Agreement on TRIPS have been fiercely debated.[13] Within Art.27 (3) b of the TRIPS, Members are free to exclude patents on plants, animals and essentially biological processes for the production of plants and animals. However, according to the aforementioned provision, they must provide some kind of legal protection for new plant varieties. It has also laid down that essentially non-biological processes for the production of plants and

[11] Sharma (2003) "Patenting Forms of Life: A Protection of Intellectual Property or Bio piracy?" Available at http://www.ewnw-hamburg.de/Inhalt/dasEWNW/WasserTagung/Devinder_Handout.pdf. Accessed on 9th Oct 2004.
[12] Shiva: 2001:69
[13] GRAIN (2003)" The TRIPS Review at a Turning Point?" Available at http://www.organicconsumers.org/corp/trips_review.cfm. Accessed on 15 Oct 2004.

animals should enjoy patent protection. Actually, this provision has been under review since 1999, although the review has not yet been finalized.[14]

At the time of the TRIPS negotiations, it was expected that a united pressure could be placed on developing countries by US, Europe and Japan for the acceptance of patenting on all eligible biotechnological inventions, including plants and animals.[15]Actually, the US had made preliminary proposals on the built-in-agenda in the WTO, including on TRIPS. In the context of biotechnology and TRIPS, these proposals call for an examination of the desirability of eliminating the exclusion for plants and animals.[16]

Even more disturbing, external bilateral political pressure has been very effective at getting developing country governments to introduce the option to patent plants and other biological inventions, or, in some of the cases, to join UPOV under the misguided justification that doing so would ensure food security.[17]

The assertion that the benefit of IPRs over life forms and processes can ensure food security is only a myth. The writer takes the position that harnessing IPRs on life forms and processes will not ensure sustained food security in developing countries. Viewed within the context of developing countries, granting strong IPRs on life forms and processes, as is the case in some developed countries, will rather go counter to the policy of ensuring food security. Arguably, doing so may enhance biotechnology, but will not be an answer to the food security needs of these countries. In stead, it will allow the concentration of the power to control the food system on the hands of a few companies. Accordingly, the writer argues that granting strong IPRs on life forms and processes impairs access to food, makes it impossible for farmers to save and exchange seeds and threatens biodiversity whose preservation is pivotal to ensure food security.

[14] Downes :2004:19
[15] Watal: 2001:180
[16] Ibid
[17] Oliva: 2003:56. See also UNCHR: 2000:7

1.2 Objectives of the Study

The study has the general objective of examining IPRs on life forms and processes in light of guaranteeing food security. It has the following as its specific objectives:

(a) Discussing the existing IPP on life forms and processes in the international regime;

(b) Examining the relationships between IPRs over life forms and processes, and food security;

(c) Discussing briefly the debate surrounding IPRs over life forms and processes;

(d) Analyzing the implications or significance, if any, of IPRs over life forms and processes to ensuring food security in developing countries;

(e) Giving recommendations on what position developing countries should take in the ongoing negotiations on Art.27 (3) b of TRIPS.

1.3 Significance of the Study

The significance of this study stems from the background stated above. It will thus contribute to an informed debate about the implications or significance, if any, of granting strong IPRs on life forms and processes to enabling developing countries ensure their food security. Important is to note that the life patenting provisions in Art. 27 of TRIPS are still a point of negotiation within the TRIPS Council. It is, accordingly, pertinent and timely to address these questions as the development round of trade negotiations launched by the WTO at Doha unfolds, and as the international debate heats up about the role of IPRs over life forms and processes in ensuring food security to developing countries.

This study will also stimulate thinking among policymakers, academics and stakeholders about how IPRs over life forms and processes may affect or, benefit food security in developing countries. It will also contribute towards informed policy decisions to deal effectively with the possible implications of plant variety protection (PVP) legislations and bilateral agreements relating to biotechnological inventions. Consequently, it will help in development and refinement of proposed

PVP legislations in developing countries and inform the implications of bilateral undertakings in these areas.

1.4 Scope of the Study

The scope of the study is limited in terms of volume. Thus, the study will only highlight and critically investigate the argument whether IPRs over life forms and processes would ensure food security. This discussion will only consider the issue from the perspective of developing countries, as they are the ones who are hardest hit by recurrent drought and food insecurity. Protections within TRIPS and debates underpinning it will form the essence of the research. Art 27(3) b of TRIPS will therefore be discussed thoroughly. The UPOV Convention and the African Model Legislation on the Protection of the Rights of Local Communities, Farmers, Breeders and the Regulation of Access to Biological Resources [hereinafter referred to as the Model Legislation] will also be briefly assessed to show where the trend may lead to and with a view to examining the debate about farmers' rights vs. breeders' rights.[18] A brief discussion on the relevant bilateral agreements covering IPRs on life forms and processes will also be made.

1.5 Methodologies and Chapters Overview

This study shall draw extensively on a critical review of the existing literature on IPRs over life forms and processes, and the lively debate on its role to ensuring food security to developing countries. The relevant provisions of the TRIPS Agreement, the UPOV Convention and the Model Legislation will be critically examined as primary sources. Relevant bilateral agreements in the field of IPRs will also be scrutinized in the utmost brief manner.

The study is divided into five chapters. The first chapter introduces the general background, statement of the problem and objectives of the research; the second chapter gives a cursory overview of IPRs on life forms and processes in light of relevant international instruments, namely, the TRIPS Agreement, the UPOV

[18] See the discussions made in Chapter two on each International document.

Convention and the African Model Legislation. Besides it sheds light on the positions taken by some developing countries in the bilateral agreements that they have signed on the subject at discussion. The chapter also highlights the growing debate underlying IPRs on life forms and processes. The third chapter conceptualizes the linkages underlying IPRs on life forms and processes, and food security. The fourth chapter is the marrow of the paper as it examines the issue if granting IPRs on life forms and processes could ensure food security in developing countries. Finally, the fifth chapter gives the synopsis of the issues addressed throughout the paper. Building on the analysis provided in the previous sections, it also further provides recommendations, which, in the judgment of the writer, are points worth praising.

CHAPTER TWO

IPRs ON LIFE FORMS AND PROCESSES: GENERAL OVERVIEW

2.1 Introduction

Indeed, there is a more vociferous lobby and global call for the protection of IPRs today than ever before. This seemingly stems from, *inter alia*, "… [the] growing recognition that IP is now known to be an important and effective policy instrument that advances various socio-economic, technological and political agendas."[19] Globalization in particular seems to have laid the fertile ground for the protection of IPRs, relatively, in an effective manner. In fact, the increase in the number of trade and investment instruments has been considered as a principal feature of globalization.[20] The adoption of TRIPS, for instance, can be mentioned as the outcome of this globalization.

Through TRIPS, countries at different levels have agreed to extend minimum protections to IPs that satisfy the necessary requirements as laid down in the instrument. The development of biotechnologies has, however, brought into attention a very controversial issue whether IP must be granted to life forms and the processes involved in producing same.

To pave the way for a better understanding of the debated issues, it is pertinent to provide first a glimpse overview of the system of IPP on life forms and processes. The discussion that follows therefore highlights the IPRs regime having a bearing on life forms and processes as is prevalent in the international plane, and evident in some of the bilateral undertakings. Nonetheless, due to the limited scope of the paper, the discussion will be confined to treating only the most relevant international instruments that are highly pertinent to the discussion at hand; namely, the TRIPS Agreement, the UOPV Convention and the Model Legislation. A few numbers of bilateral agreements involving IPRs as their

[19] Kwakwa :2002:55
[20] Sonarajah:2002:83

subject are also dealt with. This chapter tries also to give an insight to the surrounding debate concerning IPRs on life forms and processes.

2. 2 Historical Background

It is important to firstly provide a brief account of IPRs on life forms and processes so as to appreciate the system that is entrenched today. IPRs were for a long time underdeveloped in the context of life forms and processes.[21] It is evident that, until recently, many national patent laws explicitly excluded life forms and processes from protection. [22] This had to do with the fact that agricultural management was premised on the basis of the free exchange of germplasm and knowledge, a system wherein IPRs did not fit well.[23] Undoubtedly, prior to 1980, in most countries Plant Breeders' Rights and the PVP Act offered protection to plant breeders.[24]These rights safeguarded new crop varieties and protect breeders against the resale of seeds they laboured to develop. However, these rights were limited as another plant breeder could still use the seeds as parent material for future developments, and farmers were at liberty to store seed and sow it the following season.[25]

The US Supreme Court, however, came with a novel idea by ruling for the first time, in a case on bacteria that acquired the capacity to reduce hydrocarbons through genetic engineering that it is possible to patent living organisms.[26] This

[21] Cullet (2003) "Food Security and Intellectual Property Rights in Developing Countries ". Available at http://www.iprsonline.org/resources/docs/Pcull.Food_Sec_IPRS_7.11.03.pdf. Accessed on 27 Sept 2004.
[22] Braga and Fink: 1998:539
[23] Cullet (2003) "Food Security and Intellectual Property Rights in Developing Countries ". Available at http://www.iprsonline.org/resources/docs/Pcull.Food_Sec_IPRS_7.11.03.pdf. Accessed on 27 Sept 2004.
[24] Thomson: 2002: 108
[25] Ibid
[26] Perriere and Seuret: 2000:91

decision of the Court to treat life as an invention served as a breakthrough to grant IPRs on life forms. Since then, other countries have followed the US lead.[27]

A number of developed countries thus adopted over time a form of IPP for plant varieties- plant breeders' rights – which is derived from the patent model.[28] Likewise, the development of genetic engineering gave rise to the patenting of life forms and processes in the form of an incentive for the overall growth of agro-biotechnology.[29] It appears that one of the most significant developments associated with the advent of biotechnology has been the strengthening of IPP on life forms and processes. Developments in biotechnology and the recent commercial valuation of genetic resources are therefore putting pressure on governments around the world to ensure the protection of IPRs on life forms and processes.

This scenario has not changed by the adoption of the TRIPS Agreement. Indeed, the Agreement prescribes in its Art. 27.3(b) the possibility of excluding plants and animals from patentability. This however "… legalizes the patenting of life since it authorizes Member States to grant patents on plants and animals."[30] It in effect has conferred an unfettered power on countries to legitimately patent plants and animals. Consequently, the end of the twentieth century saw patents being granted on life forms and processes. Plants, animals and the process used to introduce novel genetic material into plants or animals have therefore been patented.

[27] Ibid. The European Union as well adopted a directive in 1998 on the protection of biotechnological inventions, thereby legalizing the patenting of living organisms. See Perriere and Seuret: 2000:93

[28] Cullet (2003) "Food Security and Intellectual Property Rights in Developing Countries ". Available at http://www.iprsonline.org/resources/docs/Pcull.Food_Sec_IPRS_7.11.03.pdf. Accessed on 27 Sept 2004.

[29] Dutefield :2003:6

[30] Perriere and Seuret: 2000:93

A serious attention has also been given towards complying with the PVP requirement prescribed within the TRIPS Agreement. It should however be reiterated that this provision has been a subject of review since 1999.[31]

2.3 The Agreement on TRIPS

TRIPS is one of those instruments which was signed to law in 1995, at the completion of the Uruguay Round. In the Uruguay Round, Members of the GATT undertook to make their domestic legislation conform to the TRIPS Agreement and therefore allow all inventions, with a few exceptions, to be patentable.[32] TRIPS requires Members to provide patent protection in all fields of technology. Thus, generally speaking, patent protection extends to all inventions whether they are products or processes. [33] By doing so, it is pointed out, "TRIPS has transformed the 'patent' into a critical issue that impinges upon the life of the common man."[34] This is mainly true because it has brought the universalisation of patents to cover almost all subject matters, including life forms. [35]

Article 27.3(b) of the TRIPS Agreement sets out the parameters for patenting of life forms and processes. Sure enough, this provision grants Members the possibility of excluding from patentability plants, animals and essentially biological processes. Patents must however be made available for microorganisms as products and for non-biological and microbiological processes that produce plants or animals. [36] This very Article 27.3(b) indeed forces Members to provide for the protection of plant varieties either by patents or by a *sui generis* system [meaning a system adapted to their own context] or by any combination thereof. In other words, any state is allowed to prohibit the patenting of a ' non-modified ' plant, or a naturally occurring one, but it absolutely must protect the IPRs of an inventor who has crafted a plant variety, by, for

[31] Downes : 2004 :19
[32] Ibid. 5
[33] Cullet: 2001:99
[34] Shiva: 2001:1
[35] Ibid. 3
[36] Dutifield: 2000:21

instance, inserting a foreign gene into a plant. [37] It is worthwhile to note here that PVP through IPRs have been a contentious issue for a long time and plant varieties were traditionally excluded from patentability at the international level.[38]Nonetheless, the first part of Article 27.3(b) of TRIPS requires that Member States allow patenting of plants produced through 'non-biological 'and 'microbiological' processes. The reference here quite evidently covers the new biotechnologies of genetic engineering, which produce the so-called GMOs.[39]

As noted earlier, although TRIPS allows the exclusion of plants and animals from patenting, it has not made it mandatory doing so. In other words, Members are free to patent plants and animals and seek protection only at home, if they wish to do so. Therefore, when it comes to life forms, genetic scientists are being granted patents on plants and animals into which they have introduced a new gene. The patent confers upon them the right to exclude others from making, using, or selling such a plant or an animal, unless they pay royalties to the patent owners.[40] As such, currently, hundreds of genetically engineered animals and plants are figuratively standing in line to be patented by a variety of researchers and corporations.[41]

The processes which are used to introduce novel genetic material into crop plants or animals have also been patented.[42] Various companies have been assigned these patents, which broadly also cover an exclusive right on plants or animals that may be produced using these processes or methods.[43]

TRIPS recognizes also, in its Art.27.3 (b), plant breeders' rights when it entitles to protection a new plant variety which has not occurred naturally. Accordingly, by virtue of Art.27.3 (b) of the TRIPS Agreement, new plant varieties are to be

[37] Perriere and Seuret: 2000:94
[38] Cullet: 2001:98
[39] Perriere and Seuret: 2000:94
[40] Shiva: 2001:41
[41] Ibid
[42] Thomson: 2002:110
[43] Ibid

protected under a patent or under a country's effective *sui generis* system, or a combination thereof. However, the TRIPS Agreement does not define clearly what kind of protection it envisages when it says effective *sui generis* system. This has left the debate wide open entertaining different arguments as to what constitutes an effective *sui generis* system.[44] The question also arises of how 'plant varieties' can be distinguished from 'plants'; and this becomes all the more pertinent given the increased application of genetic engineering to crop research.[45]

Article 27.3(b) of the TRIPS Agreement never existed unchallenged for granting IPRs on life forms and processes. Rather, the challenge has been there ever since its inception. As such, it has constituted one of the most contentious principles that underpin the multilateral trading system. From the very beginning, the provisions about patents on life forms and processes in the TRIPS Agreement were only agreed upon on condition that they would be reviewed before they came into force in developing countries in 2000. This begs the query whether the review on Article 27.3(b) has already been finalized as forecasted. The next section is ordained to grappling with this issue.

2.3.1 The Review Process on Article 27.3(b) of the Agreement on TRIPS

Admittedly, Article 27.3(b) of TRIPS provides for a review of its terms four years after the date of entry into force of the WTO i.e., any time after 1999. The review period thus commenced in 1999, though it has not specified an end date.[46] But more fundamentally, a significant coalition of interests is calling for a substantive review of TRIPS' application to life forms and processes.[47]

Nonetheless, what has happened so far is that Article 27.3(b) has still not been fully reviewed, mainly due to the contrasting positions taken on it by developed

[44] Dutifield:2000:21
[45] Ibid
[46] Mae-Wan Ho and Traayik" Why Patents on Life Forms and Living Processes should be Rejected". Available at http://www.twnside.org.sg/title/trips99-cn.htm. Accessed on 10 Oct 2004.
[47] Ibid

and developing countries. [48] One bold move came at the beginning of the review from the Africa Group, which said that all patenting of living matters should be banned worldwide under TRIPS.[49] Another bold move came from the United States, which proposed that no kind of inventions at all should be excluded from patenting, not even plants and animals.[50] Along these lines, it was inevitable that a stalemate would result. Yet, discussions are underway within the WTO TRIPS Council on Article 27.3(b) of the TRIPS Agreement. It appears that new interests are being entertained within the discussions. For instance, developing countries are asking for the inclusion of protection to farmers' rights and traditional knowledge.[51] In short, there has been little progress in the mandated review of Article 27.3 (b) of the TRIPS Agreement.

Even the Fourth WTO Ministerial Meeting in Doha paid scant attention to the life patenting issues of TRIPS, only noting that review of Article 27.3b is to go a head.[52] Be that as it may, two questions will be at the heart of the debate; first, excluding or allowing the possibility of patenting living organisms; second, a more precise definition of the *sui generis* system.

2.4 The UPOV Convention for the Protection of New Varieties of Plants

The TRIPS Agreement is not the sole international instrument propagating for the protection of IPRs on life forms. There are some other instruments too, that prescribe for protection of IPRs on life forms. The UPOV Convention is a moving example in that regard.

As mentioned in the foregoing discussions, Article 27(3) b of TRIPS requires members to provide for the protection of plant varieties. A similar requirement is

---

[48] Downes: 2004: 19

[49] GRAIN (2003)" The TRIPS Review at a Turning Point?" Available at http://www.organicconsumers.org/corp/trips_review.cfm. Accessed on 15 Oct 2004.

[50] Ibid

[51] Kuyek, D (2001) "Intellectual Property Rights: Ultimate Control of Agricultural Research and Development in Asia. Available at *http://www.grain.org/briefings/?id=35* . Accessed on 13 Apr 2005.

[52] UNCHR: 2000:7

laid down within the UPOV Convention that stipulates for the protection of plant varieties. The UPOV Convention was signed in Paris in 1961 and entered into force in 1968. It was then subsequently revised in Geneva in 1972, 1978 and 1991.[53] The Convention sought to set common rules for the recognition and protection of intellectual property over new plant varieties obtained by plant breeders.[54]

Through the subsequent revisions undertook on UPOV, it is evident that the Convention has strengthened the exclusive rights of the breeders. Specifically, the 1991 Act is closer to the patent system.[55]

In order to benefit from UPOV, a plant variety should fulfil the following three conditions:

-it should be distinct from all other varieties;

- present the same characteristics in all successive generations; and

-all concerned plants should have the same uniform characteristics. [56]

As with TRIPS, UPOV intends to harmonize or unify the laws of member states with respect to legal protections given to a breeder of new plant variety.[57] Once a protection is granted to a breeder on a certain plant variety, then prior authorization must be secured from him for any '' production '' or ''reproduction ''or any '' stocking'' for the purpose of production or reproduction of that variety.[58] However, this right of the breeder is not an absolute one. Rather, there are certain limitations and exceptions to this right. Acts done for private and non-commercial purposes, for experimental, and for the purpose of breeding and exploiting other varieties fall within the ambit of the exceptions to the right. [59] Thus, a farmer may not, for instance, be required to seek the authorization of the

[53] kongolo:2001:351
[54] Downes :2004:33
[55] Kongolo: 2001:351. See also Perriere and Seuret :2000:99
[56] Perriere and Seuret :2000:99
[57] Nwabueze :2003:611
[58] Ibid
[59] Art.15 of the UPOV Convention , 1991 Text

breeder to save seeds from his harvest and replant them in the next season. Yet this right of the farmer is confined only to a private use. [60]

The UPOV Convention has been touted as a solution to the obligations that Member States face with respect to PVP under Article 27.3(b) of the TRIPS Agreement, particularly with regard to implementing a sui generis regime for PVP. [61] However, this view has faced a strong opposition by a number of developing countries that argue that the UPOV Convention has strengthened the exclusive rights of the breeder against farmers' rights. This debate was in particular carried out under the auspices of the TRIPS Council, which finally concluded that the sui generis system referred to within TRIPS does not necessarily have to be the UPOV *sui generis* one.[62] However, there is this trend of bilateral pressure on developing countries to adopt UPOV as a means of implementing the plant variety provisions of TRIPS.[63]

At this juncture, it is worthwhile to point out the two serious criticisms levelled against the UPOV Convention based on the requirement that the protected varieties must be distinct, stable, uniform, and novel. The first concerns the uniformity /homogeneity and stability requirements, the second is based on the distinctness and novelty criteria.[64]

First, the uniformity/ homogeneity and stability requirement (that is there must be sufficient uniformity having regard to the particular features of the variety's propagation) makes it very unlikely for local communities to acquire protection for they are only rich in intra-varietals genetic diversity. Second, there is this growing fear that the distinctness and novelty standards are too low posing the concrete

[60] Ibid
[61] Downes:2004:33
[62] Kongolo :2001
[63] Sreenivasan and Christie (2002) "Intellectual Property, Biodiversity, and the Rights of the Poor". Available at http://www.gefoodalert.org/library/admin/uploadedfiles/showfile. Accessed on 20 Oct 2004.
[64] Dutifiled :2000:50

danger of misappropriation of traditional cultivars with a very minimal modification.[65]

2.5 The African Model Law on PVP

The obligation to introduce PVP as required by the TRIPS Agreement has elicited attention from African countries, albeit the introduction of PVP in these countries is a novelty for all but a few states.[66] In fact, "[the introduction of plant variety protection] constitutes a significant departure from previous practice which generally emphasized the free sharing of knowledge at all levels."[67]Having a regard to this, seemingly, the Organization of African Unity ("OAU") (now called the African Union) adopted Model Legislation on the Protection of the Rights of Local Communities, Farmers, Breeders and the Regulation of Access to Biological Resources to guide African countries on the issues it has covered. Thus, the OAU Heads of States, in July 1998, endorsed the Model Law and recommended that it become the basis of all national laws on the matter across Africa.[68]

As the title it self indicates, the Model Legislation deals, *inter alia*, with biodiversity, protection to plant varieties including farmers' rights and breeders' rights, and genetic resources access and community rights. This Model Legislation is described as involving "...a hybrid system combining biodiversity protection and plant varieties."[69]

In relation to IPRs on life forms and processes, the Model Legislation is premised on the rejection of patents of life or the exclusive appropriation of any life form,

---

[65] Ibid
[66] Cullet:2001:97
[67] Ibid
[68] Singh (2002) " Emerging Plant Vareity Legislation and Their Implications for Decveloping Countries : Experiences from India and Africa " Available at http://www.iprsonline.org/ictsd/docs/ResourcesTRIPSharbir_singh.doc. Accessed on 25 Sept 2004.
[69] Kongolo: 2004:582

including derivatives.[70] Accordingly, it recognizes that all forms of life are the basis for human survival, and, therefore, patenting of life or the exclusive appropriation of any life should not be upheld.

The Model Legislation has set out one cardinal objective:

> *The main aim of the Legislation shall be to ensure the conservation, evaluation and sustainable use of biological resources, including agricultural genetic resources, and knowledge and technologies in order to maintain and improve their diversity as a means of sustaining the life support systems*.[71]

Within the framework of this cardinal objective, there are other specific objectives that are called upon to be addressed. It should be noted that, unlike the two instruments that are discussed earlier, the Model Legislation sets out "... to recognize, protect and support the inalienable rights of local communities including farming communities over their biological resources and crop varieties, knowledge and technologies."[72] To that end, it stipulates that local communities have the right to prohibit any access to their biological resources, innovations, practices, knowledge and technologies where such access will be detrimental to the integrity of their natural or cultural heritage. [73] Informed consent and written permission of the concerned community has therefore been made to be a *sine quanon* condition to any access to the biological resources of local communities.[74] Parallel to this, the Model Legislation aims also to recognize and protect the rights of breeders over the varieties developed by them.

The inclusion of farmers' rights in the Model Legislation in particular is a noble idea and deserves to be praised. These rights include, among other things, the protection of their traditional knowledge relevant to plant and animal genetic

[70] Cullet: 2001:103
[71] See Part I of The Model Legislation
[72] Part I of The Model Legislation
[73] Art.5 of The Model Legislation
[74] Ibid

resources; equitable share of benefits from the use of genetic resources; and the right to save, use, exchange and sell farm-saved seed.[75]

As marked earlier, so as to enable countries to implement the PVP requirement of TRIPS, the Model Legislation prescribes plant breeders' rights. These rights "...stem from the efforts and investments made by persons / institutions for the development of new varieties of plants,...."[76] A breeder is thus bestowed with the exclusive rights to sell and to produce plants or propagating material of the variety for sale. Although the Model Legislation entitles a breeder for these exclusive rights,"... [they] are conditional on the farmers' rights."[77] Put differently, breeders' rights are subordinate to farmers' rights. By so doing, the Model Legislation succinctly puts it that the recipients of biological resources or related knowledge cannot apply for any IPR of exclusionary nature. [78]

Finally, it should be pointed out that the Model Legislation is not binding on AU Member States, although it can serve as an authoritative reference when designing new laws relating to the matters covered in the Legislation. Indeed, "[t]his system has the merit of balancing the interests of all players." [79]Hence, it would be of a great importance for African Countries to design their plant variety protection laws in accordance with this Model Legislation.

2.6 Bilateral Agreements Granting IPRs on Life Forms and Processes

In addition to those international instruments that have been discussed so far, a large number of bilateral agreements that allow IPRs on life forms and processes have come in to being. Developing countries are thus urged to sign these undertakings with the developed countries of the North. Many of the bilateral agreements to which developing countries are a party to have virtually imposed TRIPS plus obligations, as discussed below. To easily appreciate the wave and

[75] Art.26 of The Model Legislation
[76] Kongolo :2001:369
[77] Ibid
[78] Cullet :2001:103
[79] Kongolo :2001:371

the trend that is being pursued, it is of a high importance to briefly demonstrate what form and range these agreements have taken.

Among African countries, some of them have fallen prey to these moves of the developed world. There are particular instances where some developing African countries have assumed the duty to become a Member to the UPOV Convention. A case in point is the Free Trade Area Agreement that was signed between Morocco and the EU wherein Morocco assumed the duty to join the UPOV Convention.[80] A similar obligation has been assumed by Algeria in the bilateral agreement it signed with the EU. In the treaty that came into force in 2002, Algeria took the obligation to accede and implement UPOV (1991 Act). [81] The EU also made an identical arrangement with Egypt in the Free Trade Agreement they signed between them in 2001. [82]

The EU followed a different arrangement in the bilateral agreement it signed with the Republic of South Africa. The Agreement requires South Africa, among a host of other things, "… to ensure adequate and effective protection for patents on biotechnological inventions."[83] It follows that South Africa must grant IPRs on products or processes involving biotechnologies in the form of patents. As products of biotechnologies, therefore, a patent has to be made available on

[80] Art1 of the Euro-Mediterranean Agreement establishing an association between the European Communities and their Member States, on the one part, and the Kingdom of Morocco, on the other part (2000). Available at http://www.bilaterals.org/article.php3?id_article=415. Accessed on 12 Apr 2005.

[81] Article 3 of the Euro-Mediterranean Agreement establishing an Association between the European Community and its Member States, on the one part, and the People's Democratic Republic of Algeria, on the other part (2002). Available at http://www.bilaterals.org/article.php3?id_article=413 . Accessed on 12 Apr 2005

[82] Art 37 of the Euro-Mediterranean Association Agreement between the European Community and its Member States, on the one part, and the Arab Republic of Egypt, on the other part, (2001). Available at http://www.bilaterals.org/article.php3?id_article=408 . Accessed on 12 Apr 2005.

[83] Art.46 of the Agreement on Trade, Development and Cooperation between the European Community and its Member States, on the one part, and the Republic of South Africa, on the other part (1999). Available at http://www.bilaterals.org/article.php3?id_article=419. Accessed on 12 Apr 2005.

GMOs. Surprising, as it may seem, by virtue of this treaty, South Africa must also implement "highest international standards" of IPR protection and undertake to go beyond TRIPS standards of IPR protection.[84]

USA too is engaged in similar bilateral undertakings with their developing partners in the South. To mention but only a few, Costa Rica, Dominican Republic, El Salvador, Guatemala, Honduras and Nicaragua are required through a bilateral agreement with USA to join UPOV (1991 Act) or provide patents on plants.[85] The Agreement requires those countries that do not provide patents on plants to make "all reasonable efforts" to do so. On the other hand, those that have provided patents on plants are required to maintain that policy.[86] Needless to say, such an agreement requires TRIPS plus obligations as the latter gives the option to exclude plants and animals from patenting.

By a similar fashion, USA has also signed an agreement with Chile and Nicaragua prescribing that patent protections must be made available to plant varieties. [87] In effect, USA and the EU are leading the rush to practically ensure that patent protections are made available in all fields of technology without any exception. The Agreements spotlighted above all safely show this trend.

[84] Art.46 of the Agreement on Trade, Development and Cooperation between the European Community and its Member States, on the one part, and the Republic of South Africa, on the other part (1999). Available at http://www.bilaterals.org/article.php3?id_article=419. Accessed on 12 Apr 2005.

[85] Art.15 of the Central American Free Trade Agreement (2004). Available at http://www.ustr.gov/Trade_Agreements/ Bilateral/DR-CAFTA/Section_Index.html. Accessed on 12 Apr 2005.

[86] Ibid

[87] See Art 17 of the US-Chile Free Trade Agreement (2003). Available at http://www.ustr.gov/Trade_Agreements/ Bilateral/Chile_FTA/Section_Index.html, and Art 6 of the *Agreement between the Government of the United States of America and the Government of Ecuador Concerning the Protection and Enforcement of Intellectual Property Rights.* Available at http://www.bilaterals.org/article.php3?id_article=384. Accessed on 12 Apr 2005.

2.7 Debates Underlying IPRs on Life Forms and Processes

IPRs on life forms and processes ignited a lot of controversies and debates. Granting of IPRs on life forms and processes has thus been accompanied by a wide controversy.[88] This subject, so to speak, has placed the industrialized nations and the developing countries at loggerheads with each other.[89]

On the one hand, opponents of IPRs on life forms and processes have directed a barrage of criticisms against the granting of IPRs on life forms and processes. They argue that granting IPRs on life forms and processes and the positioning of man as an inventor of other beings have tremendous economic and ecological implications, apart from ethical problems. [90]To begin with, according to the views of the critics, life forms and processes do not qualify the term invention and hence may not be protected.[91] They substantiate their position saying that such processes or activities are tantamount only to discovery, and not inventions.[92] Besides, it is strongly argued that granting IPRS on life forms and processes frustrate the idea that life forms are sacred, as individuals claim the role of a creator. [93]

Opposition against IPRs on life forms and processes has also been justified by many from an economic point of view. It is emphatically submitted that granting IPRs on life forms and processes and thereby allowing monopolization will give rise to greater economic dependency as well as food insecurity. True, many of the patent holders on the subject are big companies who more often than not are guided only by business interests.[94] Thus, once an IPR is granted to such a company, for instance, on a certain plant variety or modified crop, free exchange

---

[88] Pavoni :2001:87
[89] Shiva: 2001:42
[90] Shiva: 2001:42
[91] Perriere and Seuret: 2000:8
[92] Gebre Egzihaber " The Inappropratenes of the Patent System for Life Forms and Processes". Availble at http://www.twnside.org.sg/title/gebre.htm . Accessed on 25 Feb 2005.
[93] Comstock: 2000: 163
[94] Maskus and Reichman: 2004:283

of this variety or crop among farmers will be impaired as they have to seek authorization from the right holder upon payment of a royalty.[95]

Ecologically too, opponents vehemently argue that IPRs on life forms have major implications for the conservation of biodiversity and its sustainable use.[96] Because, they say that IPRs on life forms intensify monoculture to the demise of biodiversity, and allow bio piracy.[97] It is further pointed out that allowing introduction of GMOs through IPP will bring about the modification of the genetic structure of local varieties. [98] Hence patenting of GMOs has been opposed on the ground that their release may cause ecological damage and even be prejudicial to human health or animal welfare.[99] In other words, the manipulation of life through genetic engineering may generate a number of hitherto unimaginable products.[100]

Farmers and indigenous people in developing countries are also outraged that plants and the traditional knowledge applied to use them are being' hijacked' by companies who have sought IPRs on life forms and processes.[101] This opposition is caused due to the fact that companies are being granted patents for products and technologies that make use of the genetic materials, plants and other biological resources that have long been identified, developed and used by farmers and indigenous peoples, mainly in countries of the South.[102] Hence, opposition against IPRs on life forms and processes is rapidly building up to prevent the massive bio piracy that potentially occurs in developing countries.

---

[95] Shiva: 2001:69
[96] Ibid. 42
[97] Perriere and Seuret: 2000:44
[98] Ibid. 45
[99] Thomson: 2002:106. See also Hart: 2004:3
[100] Shiva: 2001:42
[101] Khor "A Worldwide Fight against Bio piracy and Patents on Life". Available at http://www.twnside.org.sg/title/pat-ch-htm. Accessed on 25 Apr 2005.
[102] Ibid

All these have given rise to a growing opposition to the granting of IPRs on biological materials such as genes, plants and animals.[103] These are some of the arguments invoked against IPRs on life forms and processes.

Proponents, on the other hand, argue that plant breeders as well as those engaged in introducing GMOs through biotechnology need incentive by means of IPP, to engage in such activities that involve lots of time, and cost a lot of money.[104] As such these individuals are believed to have a moral right to recoup their investment and profit from their inventions.[105] The argument in short is that IPP enables, and indeed drives, large private sector investments into biotechnology research.[106]

The western patents lobby holds further that granting IPRs on life forms and processes is vital for biotechnology transfer from North to South.[107] Biotechnology, in turn, is claimed to contribute a lot to production of more food on small area of land, thereby reducing pressure to expand into wilderness, rainforests or marginal lands which support biodiversity.[108] This, in turn, it is argued, will be pivotal in ensuring food security for developing countries. It has therefore been strongly claimed that IPRs on life forms and processes are essential assets to ensuring food security.[109] This brings in to light the crux of the issue to be addressed in this paper: is it really concrete to say that strong IPRs on life forms and processes will ensure food security? This question is thoroughly and critically examined from a developing country's perspective in chapter four.

[103] Ibid
[104] Nwabueze : 2003:611
[105] Ibid
[106] Thomson: 2002:106
[107] Shiva: 2001:4
[108] Perriere and Seuret :2000:57
[109] Ibid. 94

2.8 Conclusion

In conclusion, the foregoing chapter tried to give a brief note on IPRs over life forms and processes and the underpinning debate. Although TRIPS allows Members to exclude plants and animals from the realm of patenting, patents are being granted in these subjects. Basically, the TRIPS Agreement requires protection to be made available on new plant varieties in the form of patents, sui generis, or a combination of both. This provision has been a subject of review since 1999, albeit the review has not been finalized.

Despite all the challenges levelled against the TRIPS Agreement on the subject of discussion, members are designing a system that would satisfy the requirements laid down within TRIPS. In particular, the UPOV Convention is being seen by many as a solution to satisfy the PVP requirements of TRIPS. The UPOV has incorporated plant breeders' rights. Accordingly, a plant variety that is stable, unique, and homogenous enjoys the protection available within UPOV. The protection prescribed under UPOV has been considered by developing countries as only safeguarding the interests of commercial breeders without recognizing farmers' and community rights.

The Model Legislation was thus developed by OAU to serve for African countries as a guideline while designing, among other things, PVP legislations. The legislation attempts to strike a balance between farmers' and breeders' rights.

As negotiations within the TRIPS Council looses steam, the developed countries of the North, particularly the US and EU, have spotlighted bilateral pressure as a means to secure effective IPP on life forms and processes. Some of the developing countries have easily fallen prey to this desire of the developed north.

The granting of IPRs on life forms and processes, however, has been hotly debated upon. Critics are of the view that harnessing strong IPRs on life forms and processes will give rise to an excessive monopolization of genetic resources.

Such forms of protection have therefore been challenged by many from ethical, economical and biodiversity perspective. Proponents, on the other hand, counter saying that IPRs on life forms and processes must be recognized as doing so facilitates the pace of biotechnology transfer, which is critical to ensure food security.

CHAPTER THREE

IPRS ON LIFE FORMS AND PROCESSES, AND FOOD SECURITY: CONCEPTUALIZING THE LINKAGES

3.1 Introductory Remarks

At the start of this research it was pointed out that developing countries overwhelmingly face daunting social, economic and political problems. Being within the larger domain of economic problems, food insecurity represents one of the most serious and recurrent challenges encountered by them. Admittedly, food insecurity is a major problem through out the South. In fact, it is a concern at all levels, from individuals to states. [110]Since food security is directly linked to the survival of human being, its critical importance can never be overemphasized.

Today, policy makers and ordinary people are increasingly turning to technology in order to address the world's socio-economic and development problems. Hence, to sustainably ensure food security, developing countries are strongly urged, among a host of other things, to extend IPRs on life forms and processes and thereby enhance biotechnology.[111] The whole point is that through granting IPRs on life forms and processes developing countries can pave the way to enhancing biotechnology, which is claimed by many as constituting the solution for food security.

Before any attempt to critically examine the misrepresented facts about IPRs on life forms and processes, it is pertinent to show first the nexus between IPRs on life forms and processes, and food security.

---

[110] Cullet (2003) "Food Security and Intellectual Property Rights in Developing Countries ". Available at http://www.iprsonline.org/resources/docs/Pcull.Food_Sec_IPRS_7.11.03.pdf. Accessed on 27 Sept 2004.

[111] Perriere and Seuret : 2000: 94

3.2 Food Security Defined

For one to easily grasp the relationship that exists between IPRs and food security it is worthwhile to give a glimpse an overview of what food security constitutes.

Indeed, there have been various attempts at the international level to define food security. However, none has yet been given befitting a universal application.[112]

At present, the most widely accepted definition is the one adopted at the 1996 World Food Summit. It defines food security as physical and economic access to sufficient, safe and nutritious food by all people to meet their dietary needs and food preferences for an active and healthy life.[113] This definition openly acknowledges that meeting food security objectives implies improving access to food which in itself is linked to poverty eradication.[114]

In brief terms, food security can be defined as more than simply ensuring that there is an adequate amount of food cultivated or available in the market. It also encompasses the question of whether people are able to purchase enough food to satisfy their basic nutritional requirements. [115] From the definition given, one can easily infer that ensuring a mere physical or even economic access never constitutes as guarantying food security. Rather, the access, which must be both physical and economic, should also be to a safe and nutritious as well as sufficient food, and also that the food should meet people's dietary needs as well as their food preferences for an active and healthy life.[116]

---

[112] Cullet (2003) "Food Security and Intellectual Property Rights in Developing Countries ". Available at http://www.iprsonline.org/resources/docs/Pcull.Food_Sec_IPRS_7.11.03.pdf. Accessed on 27 Sept 2004.

[113] World Food Summit , Plan of Action , Rome , 17 Nov. 1996

[114] Cullet (2003) "Food Security and Intellectual Property Rights in Developing Countries ". Available at http://www.iprsonline.org/resources/docs/Pcull.Food_Sec_IPRS_7.11.03.pdf. Accessed on 27 Sept 2004.

[115] Ibid

[116] FAO "Food Security and the WTO Trade Negotiations : Key Issues Raised by the World Food Summit". Available at www.fao.org/docrep/003/x4829e/x482e00.htm . Accessed on 27 Jan 2005. See also FAO (2003) " Rome Declaraion on Food Security ". Available

In conclusion, food security is characterized by four principal features:
(i) adequacy of food supply or availability; (ii) stability of supply, without fluctuations or shortages from season to season or from year to year ;(iii) accessibility to food or affordability; and (iv) quality and safety of food.[117] It follows that achieving food security means ensuring that sufficient food is available, both in quantity and quality, that supplies are stable and that every one can obtain food.

True, no definition is perfect, but the above one gives a helpful basis for policy.[118] Throughout this paper, therefore, food security shall be understood to mean the meaning attributed above. Examined in light of this definition, there is a gloomy picture of food insecurity in the majority of the South. Thus, despite economic development and food supplies in today's world, about 840 million people still suffer from hunger and malnutrition, with 790 million living in developing countries.[119] Given this real picture, there is the growing lobby advocating for IPRs on life forms and processes as a tool for making food security a reality.

3.3 Links between IPRs on Life Forms and Processes, and Food Security

The linking of concepts related to food security and the conceptual underpinnings of IPRs has particular practical implications for the understanding of the debate in this study. It is therefore necessary to put these two concepts into context and examine their relationship at this level before proceeding to deal with the debate on food security and IPRs on life forms and processes. That actually would be informative of the premises for the implementation of food security through biotechnology.

---

at
http://www.fao.org/documents/show_cdr.asp?url_file=/DOCRCP/003/W3613E/W3613E00.HTM.
Accessed on 25 Feb 2005.

[117] Zhang :2004: 566

[118] Ibid

[119] Ibid

In the world that we live today, there are a large number of international instruments that are set to achieve various objectives. It is clear that some of these international regimes may affect food security. [120] This is partly caused due to the fact that food security is a complicated issue involved with both economic and non-economic factors.[121]

As can be gleaned from the foregoing discussions, food insecurity represents one of the serious challenges to the developing world. It is even said that many developing countries will face more food difficulties than before, at least in the short term.[122] Hence, biotechnology is being seen as a neat, science based and a definite solution to this unfolding scenario. The argument being that well-harnessed new technologies can solve the problems of famine and hunger in the developing world, by increasing yields and overcoming challenges of disease, pests, drought and nutrient deficiencies. [123] Examples are tolerance of weed-killing herbicides, resistance to insects, improvements in taste and lengthened shelf –life.[124] Tomatoes, for instance, are sensitive to frost that shortens their growing season. Fish, on the other hand, can survive in very cold water. Genetic engineers have been able to identify the particular gene, which enables a flounder to resist cold, and they have inserted this "anti-freeze "gene into tomatoes, thereby extending their growing season.[125] Besides, although very few, there is also a generation of GMOs that could provide medical or nutritional benefits to consumers such as foods with less saturated fat and more vitamin and nutritional value.[126]

A number of justifications have been offered for the introduction of IPRs with a view to foster food security in developing countries. In fact there are a number of

[120] Zhang :2004: 566
[121] Ibid
[122] Ibid
[123] Lopez :2004:.374
[124] Schoenbaum: 2001: 28
[125] Kennet (2004) "EC-GMOs Implications for Africa on Biotechnology." Available at www.tralac.org. Accessed on 17 Oct 2004.
[126] Schoenbaum :2001: 28

links between IPRs and food security. In general, it is said that IPRs such as patents or plant breeders' rights seek to give incentives, mainly to private sector actors, to develop seeds that either produce higher yields or have specific characteristics which will improve food security. [127] So what are the advocates of IPRs on life forms and processes assuming when they argue for the importance of seeing the granting of IP as the solution to the global food securing problems?

At the heart of this conception there is this assumption that substantial improvement in agricultural productivity is essential for achieving sustainable food security and chronic rural poverty in many developing countries.[128] For this to happen, the private sector has to be involved in agro-biotechnology, which, in turn, can only be achieved by according incentives in the form of IPRs. Biotechnology companies have therefore been at the forefront of campaigning for stronger IPRs arguing that this is necessary to recoup their research and development investments. [129]

True, the development of new genetic technologies, stimulated, in part, by IPP, has led to the commercial introduction of biotechnological products for agriculture.[130] Proponents of the gene protection technology claim that, if the private sector is able to protect its research investment, it will spur investment in plant breeding for many of the world's most important crops.[131] The key contribution of biotechnology is deemed to be several-fold: producing more food on the same area of land, thereby reducing pressure to expand into wilderness, reducing post-harvest loss of food(caused by disease, pests and decay) and

[127] Lopez: 2004: 374
[128] Taylor and Cayford (2003)" American Patent Policy, Biotechnology, and African Agriculture: The Case for Policy Change." Available at http://www.rff.org . Accessed on 9th Oct 2004.
[129] Yamin (2003) "Intellectual Property Rights, Biotechnology and Food Security." Available at www.ids.ac.uk/biotech . Accessed on 9th Oct 2004.
[130] The Crusible II :2000 :5
[131] Ibid. 36

improving the quality of fresh and processed foods , thus boosting the realized nutritional yield' per acre.[132]

Of course, the manipulation of genetic traits of agricultural plants is not new. Natural selection and breeding techniques have been used to develop favourable plant varieties. What is new is that through genetic bioengineering desirable traits can now be directly implanted from genes derived from totally different varieties of living organisms.[133]

Indeed, the use of biotechnology in sectors such as agriculture has produced a growing number of GMOs and products derived from them. Changing the characteristics of organisms may provide benefits to society including enhanced plant varieties and food.[134] The broader and long -term perceived benefits of GMOs would however be, it is argued, more sustainable agriculture and better food security that would benefit everybody, and especially the net-food-importing developing countries.[135] To achieve this, as pointed at out earlier, biotechnology companies argue that IPRs provide a vital incentive for investment in expensive biotechnological research and development, and provide the necessary safeguards to encourage them to commercialise their genetically engineered products in developing countries. Shortly put, IPRs are primordial in ensuring the participation of the private sector in the development of improved food availability.[136]

From a food security point of view, agro-biotechnology promises also the possibility to modify varieties to improve their nutritional value.[137] Be that as it

---

[132] Perriere and Seuret: 2000:57
[133] Baum: 2001:27
[134] Zarilli: 2001:41
[135] Zarilli: 2001: 42
[136] Cullet (2003) "Food Security and Intellectual Property Rights in Developing Countries ". Available at http://www.iprsonline.org/resources/docs/Pcull.Food_Sec_IPRS_7.11.03.pdf. Accessed on 27 Sept 2004.
[137] Ibid.

may, for the IPRs regime to adequately address the problem of food security, it must adequately address the tripartite issues of food availability, both in quality and quantity, access and stability of supply. The IPR system can only marginally assume provision of food through the availability of improved seed and production techniques. There is, however, very little conclusive evidence that IPRs has led to increased food production in developing countries. [138]

3.4 Conclusion

Achieving food security is a great concern for many of the developing countries. Although enough food is produced globally, the number of malnourished people in developing countries keeps rising. Thus, many proposals have been proposed towards ensuring food security. In this study food security is taken to mean access by all people at all times to a nutritious and adequate food.[139]

Having the definition provided above, food security is intended to be achieved through advancing the pace and focus of biotechnology. Biotechnology, combined with an effective protection of IPRs on life forms and processes, is perceived to generate products or processes that are effective in addressing the needs of developing countries; and ultimately it will ensure food security.

Whatever form the rhetoric might take, the likelihood that strong IPRs on life forms and processes will respond to the food security needs of poor farmers in the developing world is very slim, as shall be demonstrated in the next chapter.

---

[138] Ekpere "Intellectual Property Rights and Food Security: Implications for Africa's Agriculture "Available at *http://www.iprsonline.Ekpere/docs.htm* . Accessed on 15 Jan 2005.

[139] This definition was offered by the World Food Summit , Plan of Action , Rome , 17 Nov. 1996

CHAPTER FOUR

FOOD SECURITY AS A JUSTIFICATION FOR GRANTING IPRs ON LIFE FORMS AND PROCESSES?

4.1 Introduction

Indisputably, farmers in developing countries often live on the edge of food security. [140] Indeed, it is taken for granted that allowing IPRs on life forms and processes will change this picture by enhancing biotechnology, which is claimed by many as a solution to food security problems. In fact, one of the most significant developments associated with the advent of biotechnology has been the strengthening of IPP for biological inventions. Developing countries have thus been confronted with the difficult choice of application of IPRs on life forms and processes to their food security problem. [141]

Contrary to the enthusiastic claims of some of the biotechnology's cheerleaders, stretching strong IPRs on life forms and processes are likely to have adverse effects which outweigh the perceived benefits on developing countries. The greatest danger to food security in developing countries may therefore come from the implementation of strong IPRs protection on life forms and processes.[142] Arguably, biotechnology may increase the amount of food produced at a global level, but it is only a myth saying that it would ensure food security by alleviating the key problem of unequal access to food.

As marked at the start of this paper, the problem of food security is complex and does not solely depend on the amount of food produced. Currently, enough food is produced globally to feed all its inhabitants. Nevertheless, around a quarter of them are undernourished. Allowing or granting IPRs on life forms, as is the case

---

[140] Comstock : 2000: 155

[141] Ekpere "Intellectual Property Rights and Food Security: Implications for Africa's Agriculture "Available at http://www.iprsonline.Ekpere/docs.htm . Accessed on 15 Jan 2005

[142] Downes :2004: 6

today, will never be an answer for the age's question of food security. Underlying the legal framework for IPRs is the basic objective to create a business environment where those involved in investment and trade can readily predict the vagaries of the future and be reasonably assured of continued research and development in the filed. True, companies have rushed to take part in the exponentially expanding business of biotechnology in search of primarily, if not solely, profit. That being the principal agenda, they assert that their venturing in the business would alleviate the world's problem of food security.[143] The reality is that, this advocacy never hold true upon a closer scrutiny.

Instead, allowing monopoly over certain products through IPRs would create harsh problem and may rather breed food insecurity. There is ample evidence that the expansion of IPRs on life forms and processes in most developing counties is not likely to result in increased food output and substantial improvement in food security. Rather, it has been suggested that it would generate higher production cost, and it could make poverty more difficult and food security more problematic.[144] This chapter takes a critical examination of this thesis thereby giving the real picture of IPRs on life forms and processes as applied to developing countries. The basic question to be answered here is whether biotechnology is indeed a solution to world hunger.

Related to the above is the question of cost accompanying the granting of IPRs on life forms and processes that most often out weighs the claimed benefits accruing thereof. There are enormous implications that this will ultimately bring to developing countries, specially the net-food importing ones, as are dealt with herein under.

---

[143] Braga and Fink: 1998:554

[144] Ekpere "Intellectual Property Rights and Food Security: Implications for Africa's Agriculture "Available at *http://www.iprsonline.Ekpere/docs.htm* . Accessed on 15 Jan 2005.

4.2 Restrictions on the Rights' of Farmers to Save, Sell and Exchange Seed

Although the impacts of allowing the exercising of strong IPRs on life forms and processes could be many, its restriction on the rights' of farmers to save, sell and exchange seed can be cited as the most serious one. In the discussion on IPRs on life forms and processes, a note was made that a number of domestic and international instruments have recognized IPRs on seeds. More specifically, TRIPS requires Members to allow IPRs on plant varieties and non-biological processes. A note was also made that TRIPS does not prohibit the patenting of plants and animals *per se*. This has thus given the latitude for countries to patent even plants and animals, if they prefer doing so. Consequently, as pointed out earlier, some countries are according patents on plants and animals through national commitments or international ones in the form of bilateral undertakings.

PVP is also sought within UPOV as well as the African Model Legislation. These have given the appropriate forum for the protection of genetic engineering products, i.e., GMOs. Since these are products of non-biological processes, IPRs have been granted on them. There is this growing assumption that allowing genetic engineering would solve the problem of hunger and malnutrition thereby ensuring food security. To achieve this, it is argued, companies need and deserve the incentive in the form of IP that allows them to exercise control over the process and the products thereof. Hence, increasingly, the standards for national IPR legislation for plant varieties are being linked to the UPOV.[145] This link is sometimes created through bilateral agreements, which are mainly pressurised by the developed nations of the North.

It is superfluous to say that control of plants and animals, whatever form of modification they might undergo, through IP will largely determine who controls

[145] Sreenivasan and Christie (2002) "Intellectual Property, Biodiversity, and the Rights of the Poor". Available at http://www.gefoodalert.org/library/admin/uploadedfiles/showfile. Accessed on 20 Oct 2004.

the food systems.[146] This is evidently true because patenting of life forms and processes has the damaging impact of appropriating common resources and heritage into the private domain of the few.[147] Despite that, in a multitude of secretive bilateral treaties and regional agreements, a significant number of developing countries have been urged to grant patent on plants or adopt the provisions of the UPOV Convention which is very stringent in terms of what farmers are permitted to save and exchange from their harvests.[148] This coupled with the fact that almost one and a half billion farmers depend on the saving of 'across-the-fence' sale and exchange of seed for their livelihood, puts in concrete danger the food security of the developing countries, rather than ensuring it.[149] Accordingly, maintaining their ability to save seed from their harvest so that they could use it as planting material can keep production reliable and costs low.

On the contrary, UPOV IPR standards extend the breeder's monopoly to the harvest of the farmer's crop, with few exemptions. This means that farmers using the patented or UPOV-protected plant varieties cannot sell or share seeds from their harvest without being in breach of IPRs. In many developing countries, however, farmers' sale and exchange of seed is a historic and critical element in food security and livelihood.[150] Allowing IPRs means that many farmers will no longer be able to continue these practices. In terms of food security, the termination of such practices will be catastrophic.[151] In short, it is detrimental to poor farmers to restrict their rights to retain the seeds on which the following year's harvest is dependant.[152]

---

[146] Keeley (2003) "Democratizing biotechnology: An Overview." Available at www.ids.ac.uk/biotech. Accessed on 25 Oct 2004.
[147] Ibid
[148] Oliva: 2003: 54
[149] Downes: 2004: 4
[150] Sreenivasan and Christie (2002) "Intellectual Property, Biodiversity, and the Rights of the Poor". Available at http://www.gefoodalert.org/library/admin/uploadedfiles/showfile. Accessed on 20 Oct 2004.
[151] Downes: 2004: 5
[152] Ibid. 6

Traditionally, farmers save their seeds after each harvest and replant them the following year. Many farmers particularly those in developing countries trade and exchange seeds locally with other farmers.[153] Such practices of on-farm experimentation and conservation form the basis of food security and livelihood for communities throughout the developing world.[154] Indeed, this age-old practice of seed saving enables hundreds of millions of resource poor farmers and farming communities to subsist.[155] For, seed saving has the advantage of lowering costs. Research has succinctly shown that there is a wide gap between new seed prices and the cost of seed- saving.[156] Therefore seed saving serves as a check against seed price increases. Indeed, farm-saved seeds account for about 80 per cent of farmers' total seed requirements in Africa.[157] This figure reaches 90 percent in India.[158] All these safely show how tremendous the importance of seed saving is.

It must be noted that the granting of a patent, or any form of IPRs locally entails a prohibition of the use of a patented material in countries where the rights have been recognized.[159] True, given the territoriality of patent rights, the titleholder cannot exercise his/her rights outside the jurisdiction where the patent has been registered. But he/she can prevent the importation of products made elsewhere containing the invention.[160] This makes it difficult to freely circulate and market the product, making it impotent the whole idea of ensuring food security.

As noted in the earlier discussion, with regard to the patenting of a process used to produce a plant, provision for which is made in Article 27.3(b) of TRIPS, an

---

[153] Dutifield : 2000: 52
[154] Ibid. See also Downes: 2004: 7. Specialists estimate that in developing countries about 80 percent of the seeds used come from farmers' fields. See Perriere and Seuret: 2000: 11
[155] Dutifield: 2000: 52
[156] Ibid. 54 and 55
[157] Cullet: 2001: 106
[158] Tripathi (2000) "Implications of TRIPS on Livelihoods of Poor Farmers in Developing Countries." Available at http://www.eftafairtrade.org/pdf/berne- TRIPS.doc. Accessed on 25 Sept 2004.
[159] Correa : 2000: 176
[160] Ibid

owner of that patent is entitled to exclusive rights over the patents obtained using that process.[161]Farmers hence may not be allowed to use any seeds emanating from a plant derived using a patented process. Also, if a process used to produce a plant is patented, and then the patent holder has exclusive IPRs to any further plants obtained using that process.[162]

Using the freedom that TRIPS, UPOV and IPR standards set in bilateral agreements, today a few biotechnology companies control almost 100 percent of the transgenic seeds market.[163] By controlling the supply, they also have the means of controlling the prices of such products. To increase their profits they can increase the prices of such products. As a result, the price of patented seed compared to other seeds has increased, as has the dependency of farmers on private firms.[164] In Mexico research was carried out showing evidently that the cost of transgenic varieties is prohibitive for farmers concerned.[165] A similar study by the World Bank pointed out that in Argentina, Chile, and Uruguay, the introduction of plant breeders' rights protection improved the ability of private breeders to control local seed markets and prevent unauthorized trade in protected plant varieties.[166] In consequence, seed prices appeared to have risen, although it was not reported by how much.[167] This is principally because biotechnology's evolution will be driven largely by the decisions of company directors and research scientists in the private sectors who are preoccupied with corporate profitability and competitiveness rather than the problem of poverty, food security and economic development in poor countries.[168]

---

[161] Correa : 2000: 176
[162] Correa: 2000: 176
[163] Perriere and Seuret: 2000:11
[164] CIDSE, (2001) "FAQ on Food Security, Bio patenting and TRIPS." Available at http://www.cidse.org/pubs/tqlfaq.htm . Accessed on 27 Sept 2004.
[165] Perriere and Seuret: 2000:58
[166] Tripathi (2000) "Implications of TRIPS on Livelihoods of Poor Farmers in Developing Countries." Available at *http://www.eftafairtrade.org/pdf/berne-_TRIPS.doc*. Accessed on 25 Sept 2004.
[167] Ibid
[168] Keeley (2003) "Democratizing biotechnology: An Overview." Available at *www.ids.ac.uk/biotech*. Accessed on 25 Oct 2004.

Legislations required under TRIPS are evidently leading to the consolidation of the seed market in certain countries. For example, Monsanto and DuPont now control 75% of the Brazilian corn market. Since 1997, Monsanto's share of the Brazilian maize seed market went from 0% in 1997 to 60% two years later by acquiring small local firms. That is keeping the prices of seed much higher than should be the case.[169]

The danger looms large when viewed within the context of the ones which are net-food importers. Indeed, as plants or GMOs get IP protection in the form of patents or the kind of one provided through UPOV, the price of these products is likely to increase.[170]This easily put the products beyond the reach of these importing countries. In the event it is imported, the price locally will be prohibitively expensive making itself in accessible to the poor.

In practical terms, allowing IP in the field of agriculture will encourage monopoly control of plant material by western transnational corporations. This in turn will make farmers dependent on corporations for the most critical input in agriculture, i.e. seed.[171] In the developing world, where the majority of farmers depend on farm-saved seed as their primary seed source, the notion of legal prohibitions on seed saving is perceived as life threatening.[172]

Some believe that restrictions on seed saving will act as an incentive for the private sector to invest in developing world in crops that yield high production,

---

[169] Downes: 2004: 5

[170] Shiva: 2001: 79. The UK Commission on IP pointed it out that systems of PVP such as provided for in the UPOV CONVENTION pose a threat to the practices of many farmers in developing countries of reusing, exchanging and informally selling seeds, and may not be appropriate in developing countries without significant commercial agriculture. See Commission on Intellectual Property Rights (2002) "Integrating Intellectual Property Rights and Development Policy (Report of the [UK] Commission on Intellectual Property Rights: Executive Summary ". Available at http://www.iprcommission.org/papers/text/final_report/execsumhtmfinal.htm. Accessed on 27 Sept 2004

[171] Shiva :2001: 78

[172] The Crusible II :2000: 21

and thereby contributing to food security.[173] It must however be emphatically pointed out that only producing more food cannot ensure food security. In countries like India, overall food availability has been more than sufficient for a number of years but the number of undernourished keep rising. [174] In short, unavailability of foodstuffs is not a major concern since the world produces enough food for its present population. At present, however, the problem of lack of access to food looms large than the problem of unavailability.[175] Accessibility refers to the ability of people within a particular country or region to actually receive or gain access to the food (for example, by having the financial means to purchase adequate food).[176] Simply expanding food availability through large-scale, capital intensive farming will therefore do little to ensure food security.

Admittedly, production of more food may guarantee one of the three pillars of food security –availability. Nonetheless, food security requires more than that. If, for example, people cannot afford the food that is available, they will not have food security. That is basically because; food security is determined, among other things, by purchasing power. Stated differently, the royalty payment puts the seeds beyond the reach of the people who may need them, thereby frustrating food security.

Accordingly, farmers in developing countries should not at all be encouraged to use patented seeds. Arguably, such seeds may be beneficial on short-term but when the farmers begin to realize that they are being ripped off by a handful of companies, it would be too late as they would have stopped conserving the local breeds. Emphasis needs to be made to the fact that the control of essential

[173] Ibid
[174] FAO, (2002) "The State of Food Insecurity in the World." Rome: FAO.
[175] Cullet (2003) "Food Security and Intellectual Property Rights in Developing Countries ". Available at http://www.iprsonline.org/resources/docs/Pcull.Food_Sec_IPRS_7.11.03.pdf. Accessed on 27 Sept 2004.
[176] Asia- Pacific Centre For Security Studies (1998) "Food Security and Political Stability in the Asia-Pacific Region. " Available at *http://www.apcss.org/Publications/Report_Food_Security_98.html*. Accessed on 20 Apr 2005.

resources such as seeds, and food ultimately results in food insecurity. The payment of forms of IPR royalties combined with restrictions on farmers' ability to save and sell seeds from IPR protected plants could undermine rather than ensure the food security of developing countries.[177]

Any thing that is primarily aimed at driving down the costs of seeds, on the other hand, will in all likelihood improve access to food by the poor while maintaining incentives to farmers, traders, and processors to increase production. Thus, reducing the real cost of food should be a major part in any strategy aimed at broad-based poverty alleviation and cutting hunger in developing countries.

4. 3 Threatening Biodiversity

True, no one may dispute the fact that developing countries in general are very rich in terms of biological diversity and genetic resources.[178] With the growing expansion of biotechnology, developing countries are seen as a paradise by different institutions or enterprises that exploit or utilize their resources without any return to them. [179]

During the past two decades, the rapid progress made by biotechnology has thus raised the piquant problem of extending IPRs to products or processes based on genetic resources and traditional knowledge at the merciless prejudice of biodiversity.[180] There is no point to go to a greater distance to show where the link falls between biodiversity and food security. The FAO had even once coined the slogan "Biodiversity for Food Security" "profoundly showing the significance of preserving biodiversity for achieving food security.[181] Although known is the fact that preserving biodiversity is one of the factors which is crucial to ensure

---

[177] Yamin (2003) "Intellectual Property Rights, Biotechnology and Food Security." Available at www.ids.ac.uk/biotech . Accessed on 9 Oct 2005.
[178] Kongolo : 2002 :579
[179] Ibid
[180] Dhar and Anuradah: 2004 :600
[181] Dhakal (2004) "Biodiversity for Security". Available at *http://www.nepalnews.com/contents/englishweekly/spotlight/2004/nov/nov26/national3.htm* . Accessed on 15 Apr 2005.

food security, it appears that this fact is highly overlooked. Thus, countries are experiencing loss of biodiversity. Partly, this is caused due to the IP system implemented by countries. Speaking on this point, Ratnakar Adhikary, the executive director of the South Asia Watch on Trade, Economics and Environment, was once quoted saying:

> "Unfortunately, among various factors contributing to this trend, protection accorded to [IP] is one. Paradoxical as it may sound, the global race for the protection of [IP] has led to and will continue to lead to loss of biodiversity. Due to the advent of biotechnology and global patent regime exclusively securing the rights of inventors, the threat to bio-resources is mounting,"[182]

It has repeatedly been pointed out that the TRIPS Agreement, the UPOV Convention, the African Model Legislation and some of the bilateral agreements that have come into being all extend IPRs on plant varieties. The Model Legislation being an exception, the remaining ones do so even without any attempt to strike a balance between the rights of the traditional community and the IPR holders. Within TRIPS, IPP is also sought on non-biological processes. Not only these, TRIPS leaves up to the Members the option of either excluding the patenting of plants and animals or, if they wish so, allowing same. It therefore impliedly allows even the patenting of plants and animals.

Briefly put, the UPOV Convention, the TRIPS Agreement and some of the bilateral agreements discussing IPRs impose exclusively private IPRs on biodiversity which fail to recognize the collective rights of rural communities to this plant heritage, despite the fact that these communities are the main contributors to this heritage.[183] TRIPS and UPOV allow the exercising of strong

---

[182] Dhakal (2004) "Biodiversity for Security". Available at *http://www.nepalnews.com/contents/englishweekly/spotlight/2004/nov/nov26/national3.htm* . Accessed on 15 Apr 2005.

[183] Perriere and Seuret :2000:101

IPRs on plant varieties. Like wise, some of the bilateral trade agreements that have been signed by developing countries covers IPRs, and have laid down patent protections to be granted on all biological inventions, or to provide UPOV type PVP.[184] These all cumulatively have contributed to trends that threaten biodiversity, on which the poor in developing countries depend so vitally.[185] By giving the freedom to patent plants and animals the different IPRs regimes strengthen the incentives and protection for high-tech industrial agriculture.[186] Encouraging such form of agriculture facilitates the penetration of external seed varieties in southern markets and field by displacing traditional ones, which play tremendous roles in local food strategies.[187] Hence allowing the exercising of strong IPRs on life forms and processes will ultimately have far-reaching implications for the developing world in agriculture, particularly in the sphere of biodiversity.[188] It will hurt the control of local communities over their surrounding biodiversity in different forms. Stated differently, people in developing countries are missing the financial benefits that should rightfully come from the exploitation of their sovereign resources and the commercialization of their indigenous knowledge. They are also being pressed into a system that forces them to pay royalties and monopoly prices for access to the pirated bio –resources.[189]

The patenting of genetic resources, particularly those used in GMOs, will also glaringly lead to the replacement of local and traditional varieties of crops by high-tech seeds and the spread of mono cropping in agriculture.[190] The danger of mono cropping to biodiversity can easily be appreciated. When a farmer changes from planting ten or more crop varieties in an area to one or two, the diversity of

[184] See discussions made in chapter two on bilateral agreements.
[185] Shiva :2001: 76
[186] Sreenivasan and Grinspun (2002) "Intellectual Property, Biodiversity, and the Rights of the Poor". Available at http://www.gefoodalert.org/library/admin/uploadedfiles/showfile.Efm? Accessed on 20 Oct 2004.
[187] Ibid
[188] Smith: 2003: 7
[189] Singh "Rampant Bio Piracy of the Biodiversity of the South". Available at http://www.twnside.org.sg/title/rampant.htm . Accessed on 15 Apr 2005.
[190] Downes: 2004:13. See also Shiva: 2001: 79

local varieties is quickly lost.[191] The other most obvious danger of mono cropping is that the practice can be catastrophic if the crop is afflicted by disease.[192] Secondly, with a strong IP system put in place, it is likely that traditional varieties of plants and crops will be usurped by GMOs, thereby prejudicing biodiversity.[193] On the contrary, sustainable food security can only be achieved on the basis of ecological balance.[194] Ecological balance presupposes the preservation of biodiversity. It follows that food security is deeply connected with environmental protection.[195]

The other point worth noting which is more related to biodiversity is that the exercising of IP on products based on genetic resources is giving rise to a massive and ongoing bio piracy.[196] Bio -piracy occurs when foreign corporations take indigenous seeds, herbs or traditional medicinal or pesticidal processes from developing countries and seek to patent them as the property of the company. Sadly, it appears that the TRIPS Agreement and the UPOV Convention, to mention only the two, allow the recognition of ''inventions'' based on traditional knowledge and genetic resources. IPRs are thus being granted on Indigenous plants, despite that they have been in traditional use for generations and are not "novel", which is supposed to be one of the criteria for receiving a patent.

To get the protection, thus, companies claim that they have slightly altered the plant, even if the alteration does not make any meaningful change to the plant or process. Consequently, multinational companies to can slightly modify the native species and then patent it securing their exclusive rights over them. Once a plant is protected through IPRs, traditional users must pay a fee and any revenue from sales of the good goes to the patent holder, not the community from where

[191] Comstock : 2000 : 162
[192] Downes: 2004:16
[193] Downes: 2004: 18
[194] Zhang :2004: 566
[195] Ibid
[196] Smith: 2003: 236

it was stolen.[197] To cite some among the many, India is the biggest producer and exporter of superfine aromatic rice-basmati. In 1997, Texas-based Rice TEC. INC. was granted patent on the rice lines and grains. It thus automatically covers farmers' varieties and when enforced, farmers will not be able to grow these varieties without getting permission for and paying royalty to the patent holder. [198]

There are also other instances witnessing the fact that the broad scope of patent protections on life forms and processes has created a serious bio piracy problem that further disadvantages farmers in the developing world. Thailand has been particularly hard-hit by bio piracy, losing the rights to a traditional plant-based ulcer cure to a Japanese company, and currently struggling to protect its right to market jasmine rice against a U.S. rice product called "*Jasmati*."[199] Like wise, in the U.S., a Colorado farmer secured a patent for the common Mexican yellow bean, claiming that he had modified the bean he called the *enola* bean in some way; and this has caused a massive and abrupt decline in Mexican production of this type of common bean.[200]And in some cases, as in Mexico, farmers are being shut out from the US market for apparently infringing patent rights of a small US seed company, which took the germplasm from Mexico in the first place.[201]

A similar case of bio piracy occurred in South Africa. *Hoodia* is a succulent plant that grows throughout the semi-arid areas of Southern Africa. The San have traditionally used *Hoodia* stems to stave off hunger and thirst when on long journeys, as it acts as an appetite suppressant.[202] Now, the active ingredient in

---

[197] Global Trade Watch "The WTO on Agriculture: Food as a Commodity, Not a Right." Available at ***http://www.citizen.org/trade/wto/articles.cfm?ID=10393*** . Accessed on 15 Jan 2005

[198] Shiva : 2001: 56 and 57

[199] Global Trade Watch " The WTO on Agriculture: Food as a Commodity, Not a Right" Available at ***http://www.citizen.org/trade/wto/articles.cfm?ID=10393*** . Accessed on 15 Jan 2005.

[200] Ibid

[201] Singh "Rampant Bio Piracy of the Biodiversity of the South". Available at *http://www.twnside.org.sg/title/rampant.htm* . Accessed on 15 Apr 2005.

[202] Action Aid (2001) "TRIPS on Trial: The Impact of WTO's Patent Regime on the World's Farmers, the Poor and Developing Countries". Available at *www.actionaid.org* . Accessed on 23 Jan 2005.

Hoodia is being developed by a British company who enjoys a patent on it.[203] All these evidently depict the profound implications of IPRs on life forms and processes on the rights of local farmers and communities in the South. Such blatant cases of bio piracy evidently illustrate the inadequacy and inequities of existing IP in protecting the rights of farmers and indigenous peoples over their knowledge and biodiversity. Indeed, the current systems do not protect the interests of community innovators, and, on the contrary, ultimately threaten conservation and improvement of biodiversity worldwide.

The appropriation of genetic resources is not an exclusive business worked upon plants only. The plunder and patenting of marine life also has not abated.[204] Coral and sea creatures throughout the tropics have therefore continued to prove profitable for many patent seekers.[205] Most of these marine collections are taking place within the sovereign territory of developing countries, often without proper authorization being sought.

Large multinationals are generally seeking access to local, indigenous plants and the traditional knowledge and practices of local communities for the use of indigenous plants. Moreover, it is observed that biotechnology relies on native resources as the source material for scientific advances and new product developments.[206] New plant varieties are therefore being developed by multi nationals using germplasm obtained from developing countries. These new plant varieties may be sold back to these countries resulting in royalty (revenue) out flow from the south to the north in relation to products that would not have been possible without the contribution of the south.[207] In this case, globally harmonized IPR regimes have major implications for access and equitable sharing of benefit.

---

[203] Ibid

[204] Singh "Rampant Bio Piracy of the Biodiversity of the South". Available at http://www.twnside.org.sg/title/rampant.htm . Accessed on 15 Apr 2005.

[205] Ibid

[206] Smith :2003: 236

[207] Ekpere "Intellectual Property Rights and Food Security: Implications for Africa's Agriculture "Available at http://www.iprsonline.Ekpere/docs.htm . Accessed on 15 Jan 2005.

The reason being that such forms of genetic resources and traditional knowledge appropriation are extensively carried out without ensuring benefit sharing to the concerned communities. [208]

The concern with inventions based on biological resources that has been expressed in the developing world is not therefore only about the tangible physical resources alone, but also about the intangible information-base associated with that resource.[209] Although biotechnology companies may rely on the knowledge of the community that is traditionally owned to develop plant varieties, holders of such knowledge stand to benefit nothing. Developing countries are not therefore benefiting from their tremendous asset of biological resources and traditional knowledge.

Put in a nutshell, it can only be said that harnessing IPRs on life forms and processes threatens the preservation of biodiversity and leaves the door wide open for bio piracy. The loss of diversity, on the other hand, could make the local environment more ecologically unstable; adversely affect sustainable food production, local community control and access to genetic resources.[210] The loss of biodiversity in general is going to have a serious consequence on food security matters.

Africa's access to food at all time for an active and healthy life, for instance, is currently provided through small farmers who practice customary rain-fed farming of multiple cropping with farm saved seeds and on – farm crop selection. For most communities, locally produced biological resources provided over 95% of their requirement for survival.[211] Hence, biological diversity is essential for sustainable food production and food security. On the contrary, the loss of diversity could make the local environment more ecologically unstable; adversely

[208] Kongolo : 2004 :258
[209] Dhar and Anuradah : 2004 : 601
[210] Ekpere, "The OAU Model Law and Africa's Common Position on the TRIPS Review Process." Available at www.ictsd.org/dlogue/2001-07-30/Ekpere.pdf . Accessed on 15 Dec 2004.
[211] Ibid

affect sustainable food production, local community control and access to genetic resources.[212]

Consequently, the strategy for the struggle against the problem of hunger should fit in with the logic of sustainable development, which mainly includes preserving biodiversity.[213] Farmers in developing countries are more likely to be able to meet their family's food needs when they rely on local gardens, the plots of their own households and those of their neighbours.[214] IPRs on life forms and processes as are entrenched today, on the other hand, impair these practices, greatly prejudicing food security. Finally, it is worth noting that without preserving biodiversity and farmers' rights, it is hardly possible to limit monopolies in agriculture and the inevitable consequences of displacement, hunger and famine that will follow total monopoly control over food production and consumption through monopoly ownership.215 For, eroding diversity contrasts starkly with the policy of ensuring food security.

4.4 Biotechnology is not geared towards addressing the interests of Developing Countries.

It is a tremendous task identifying if biotechnology has so far proven to be proactive in developing crops or GMOs that are staple food or ones of primary concern to developing countries. Answering this in the positive may push one to recommend that biotechnology is indeed meant to ensure food security. Glaringly, however, the dominant transgenic crops grown in the developing world continue to be herbicide-resistant soybeans and maize, whereas those staple foods such as sorghum, cassava and other root crops are rarely grown.[216] The benefit of biotechnological innovations in the form of staple food crops for developing countries is by no means assured even over the long term.[217]

---

[212] Ekpere, "The OAU Model Law and Africa's Common Position on the TRIPS Review Process." Available at *www.ictsd.org/dlogue/2001-07-30/Ekpere.pdf* . Accessed on 15 Dec 2004.
[213] Perriere and Seuret :2000:59
[214] Comstock : 2000 : 155
[215] Shiva: 2001:85
[216] Downes: 2004: 43
[217] Ibid

Admittedly, very few of the newly engineered seeds on the market or in production are designed to enhance the productivity of smallholder families.[218] Yet, the overwhelming majority of the transgenic varieties being marketed today were rather mainly designed to meet the agricultural needs of developed, and not developing, countries.[219] For instance, a research conducted in 1998 has shown that 71% of the transgenic plants contained a herbicide-resistant gene, which is far from being a priority for farmers in countries of the South.[220]

Even worse, non-food GMOs are indeed going a head, despite all the rhetoric promise of biotechnology to ensuring food security.[221] All these are indicia of the fact that biotechnology is not eschewed towards addressing the food needs of developing countries. This principally stems from the shift in terms of research and control of technology from public to private sectors. Needless to say, the privatization of research affects the kinds of research done and products developed.[222] Today, private companies invest heavily in the technology to bring new products or to design an improved process and bring to the market. It is thus impossible for farmers and even small seed producers to take up such activities, which, therefore, remain the prerogative of large multinational companies to undertake this business.[223]

This economic reality creates a problem because"…private-sector holders of biotechnology patents have little or no economic incentive to use the laboratory tools or gene traits they own to develop solutions to developing country

[218] Downes: 2004:14 and 15
[219] Perriere and Seuret: 2000: 57. See also Shiva: 2001:79
[220] Ibid
[221] The Economist :2004 :71
[222] Taylor and Cayford (2003)" American Patent Policy, Biotechnology, and African Agriculture: The Case for Policy Change." Available at *http://www.rff.org* . Accessed on 9th Oct 2004.
[223] Perriere and Seuret: 2000:9. For instance, South Africa is the only African country which grows GM crops. Other African countries have been less enthusiastic about GMOs. It has been suggested that this is due to the fear of loosing market access opportunities in the EC. See Kennet (2004) "EC-GMOs Implications for Africa on Biotechnology". Available at www.tralac.org . Accessed on 17 Dec 2004.

agricultural problems."[224]In those few instances where staple food items are engineered to meet the demands of the majority of the South, the products are generally proprietary and may not be accessible to the poor or to those who need them.[225] If the products or processes are not readily accessible by all, allowing IPRs on them serves no guarantee to ensure food security.

Furthermore, there is the growing tendency for seed/chemical package. Most of the GMO seeds, nearly 70 percent, contain a gene that is resistant to a particular herbicide.[226] The whole thing is a plot to sell this herbicide, by hooking the farmer on crops modified so that they can be safely sprayed with it, but with nothing else.[227] Farmers are then forced to buy this chemical product because of which they incur extra costs in addition to that of the seeds.[228] Take, for instance, Soya, the world's main GM crop, which is nearly all modified to be herbicide-tolerant.[229] Surely, the poorest are unlikely to be able to afford a functioning 'seed/chemical package', and hence may not have access to it.[230]

To finalize, with the advent of biotechnology and the exceedingly rush to control the business, research priorities overall will be increasingly less relevant to the needs of poor farmers in developing countries.[231] Rather, companies seek access to the biodiversity of developing countries merely for the purpose of developing profitable products, not staple food items. No matter convincing the rhetoric might look, ensuring food security is not in the menu of the companies' interest.

---

[224] Taylor and Cayford (2003)" American Patent Policy, Biotechnology, and African Agriculture: The Case for Policy Change." Available at *http://www.rff.org* . Accessed on 9th Oct 2004.

[225] The Crusible II :2000:14

[226] Perriere and Seuret: 2000: 13

[227] The Economist :2004: 72

[228] Perriere and Seuret: 2000 :13

[229] The Economist :2004: .72

[230] McCrea and Mayer (1999) "AstraZaneca and Its Genetic Research: Feeding the World or Fuelling Public Hunger?" Available at *www.actionaid.org.uk/contentdocument.asp?doc* . Accessed on 25 Oct 2004.

[231] Commission on Intellectual Property Rights (2002) "Integrating Intellectual Property Rights and Development Policy (Report of the [UK] Commission on Intellectual Property Rights: Executive Summary ". Available at *http://www.iprcommission.org/papers/text/final_report/execsumhtmfinal.htm*. Accessed on 27 Sept 2004

4. 5 The discovery and expansion of the 'Terminator' technology

As highlighted in the foregoing discussions, to a seed company, farm-saved seed means loss of potential benefits. This has resulted in the excessive desire by companies who want farmers to buy patented seeds every year, instead of using a saved seed. Finding new ways to ensure that farmers return to the company each year is therefore a highly prized goal.[232] One way of achieving this is through sterile seeds. Stated differently, the latest discovery in the seed business brought about the development of plant varieties that are unable to reproduce.[233] This technology has been described by some as the 'Terminator'- which can be construed contextually to mean: terminating the practice of seed saving or replanting.[234] In short, the technology is genetically engineered to make a plant's seed sterile and thereby making it impossible for farmers to save, replant or sell seed. Consequently, farmers will have to purchase seeds at the start of each growing season.[235]

Indeed, the development of this technology reflects the increased determination of the private sector to eliminate the replanting of proprietary seeds, which is also reflected in licensing agreements that forbid customers to save and replant their patent-protected seeds.[236]Today, thus, virtually all-major seed and agrochemical corporations are conducting research and development of genetic use restriction technologies or 'Terminator'. Accordingly, all the giant companies developing GM crops and dominating the global seed market have applied patents on their own 'Terminator' technologies.[237] Armed with this technology, the agro-chemical giants have finally found the best and effective way of forcing farmers to buy new seeds each year, since the seeds that they harvest would be sterile.[238]

---

[232] McCrea and Mayer (1999) "AstraZaneca and Its Genetic Research: Feeding the World or Fuelling Public Hunger?" Available at *www.actionaid.org.uk/contentdocument.asp?doc* . Accessed on 25 Oct 2004.
[233] Perriere and Seuret: 2000:12
[234] Pendleton :20004 :56
[235] Ibid
[236] Dutifield :2000:51
[237] The Crusible II :2000: 35
[238] Shiva:2001: 24

Undoubtedly, this technology has far-reaching and negative implications for farmers and food security, as it cripples the age-old practice of seed saving which enables hundreds of millions of farmers to subsist.[239] It does so by allowing an unprecedented level of control over seed behaviour and productivity to the biotechnology companies. At a time when commercial seed companies dominate seed supply in the North and are increasing their activities in the South, companies armed with this technology can easily eliminate the age-old practice of seed saving which enables hundreds of millions of resource-poor farmers and farming communities to subsist.[240]

At this juncture, it is worth considering if IPRs are needed to be accorded on these sterile seeds. Related to the above is the issue whether the production of sterile seeds would make food security a reality to developing countries. Obviously, the answers for both questions posed is emphatically no. Evidently because, firstly, the very product itself naturally gives the protection against sell of saved seeds or replanting of saved seeds. From the out set, emphasis deems proper to the fact that the behaviour of this technology would eventually render regulatory activities in the form of IPRs redundant, for the companies engaged in this business are now well advanced in using the technology to genetically alter a plant so that the seeds it produces are sterile. The whole point is that the nature of the technology would lead one to say that it puts a checking mechanism against sell of saved seeds by its own.

Secondly, although sterile seeds can be planted once and may, arguably, give a better yield, royalty payments and non-continuation of seed saving will still go counter to food security policies. One can therefore safely conclude that allowing the exercising of IPRs on sterile seeds will hardly have any benefit towards

[239] Dutifield :2000: 52
[240] Ibid

ensuring food security in developing countries, although it is widely practiced in some countries.

4.6 Potential Loss of Market Share

True, it is the interest of every nation that products leaving its territory freely circulate in the world market. It is equally true that countries want it very much that their products be competitive ones in the global market. For this to happen, however, the products under consideration must be risk-free for consumers to demand more of them. Today, biotechnology has flooded the world market with products which many people are cynic about. GM crops are thus grown in a large scale with the growing assumption that they give better yields, and nutritious value. Yet, biotechnology companies claim IPR to actively engage in producing more of the GMOs.

If developing countries are to ensure their food security, they must produce agricultural products that are competitive in the world market. Enhancing the production of GMOs through granting strong IP will ultimately be repugnant to this policy. Actually, almost all African countries, South Africa being an exception, have refrained from growing such products in fear of reduced exports to Europe.[241] There is also emerging evidence of health and environmental risks that has produced deep-seated popular resistance to GMOs in many other countries. [242]

Arguably, enhancing biotechnology through IPRs may be so critical to overcoming shortage of production. However, the lack of effective and fair markets for surplus food production could be the greatest obstacle to improving agriculture and food security in developing countries. [243] It is therefore important

---

[241] The TRALAC Newsletter of 08 March 2005, available at http://www.tralac.org/newsletter/08mar2005.html. Accessed on 10 Mar 2005.

[242] Global Trade Watch "The WTO on Agriculture: Food as a Commodity, Not a Right" ***http://www.citizen.org/trade/wto/articles.cfm?ID=10393***. Accessed on 15 Jan 2005.

[243] Taylor and Cayford (2003)" American Patent Policy, Biotechnology, and African Agriculture:

that policy responses of developing countries to enhance food security through granting IPRs on life forms and processes must contend with continuing uncertainties, such as potential loss of market share.

4.7 Conclusion

In this chapter an attempt has been made to vividly show the implications of allowing strong IPRs on life forms and processes. As such, a note has been made that, although misrepresented, the potential implications of granting IPRs on life forms and processes outweigh the accruing benefit thereof.

Granting exclusive and monopoly rights on life forms and processes through IPRs can restrict the practice of seed saving, exchanging or selling by farmers in developing countries. This practice is indeed vital for achieving food security in developing countries and needs to be preserved, not crippled through IPRs. Allowing IPRs on life forms and processes is also giving to a rise in prices of seeds, making them inaccessible by the poor. By prejudicing the access element, allowing the exercise of strong IPRs threatens food security.

According IPRs on life forms and processes can also impair biodiversity, whose preservation is critical for food security, as it intensifies mono cropping. It is also evidently shown that this results in an intensified form of bio piracy; as claims are being brought on products whose origin are the genetic resources of the South.

As shown in this study, biotechnology has not so far been eschewed towards addressing the interests of developing countries. Thus, the products or processes developed are more attuned to the needs of the developed world.
Many of the biotechnology companies have also devised a technology that generates sterile seeds, making it unnecessary the whole idea of granting IPRs.

The Case for Policy Change." Available at *http://www.rff.org* . Accessed on 9th Oct 2004.

Furthermore, granting IPRs on life forms and processes and encouraging the production of GMOs locally will cause loss of market share, as many consumers, particularly in Europe, are suspicious about GM food.

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

Despite economic development and plentiful food supplies in today's world, it is a concrete reality that poverty and food insecurity still lingers in many corners of the globe, and, in many cases, is becoming even worse. Thus, millions on earth are still suffering from hunger and poverty. Ensuring food security has therefore remained to be a serious challenge obsessing developing countries. Various proposals have been suggested as constituting immediate solutions to improving food security. From among the many, the lobby appears strong for advancing biotechnology as a response to the gloomy picture of food insecurity.

Biotechnology is considered as an instrument enabling effective utilization of genetic engineering. Through the manipulation of genetic traits, biotechnology is perceived to bring seeds and animals which are productive both in terms of amount and nutritional requirement. As the ones who are hardest hit by food insecurity, developing countries are highly recommended to apply this highly acclaimed science-based technology and thereby ensure food security.
This technology is deemed to efficiently work, however, only when, inter alia, strong and effective IP system that accords IPRs on the products or processes, which this technology may generate, is stretched. This brought in to the fore the hotly debated issue whether or not strong IPRs must be granted on life forms and processes.

In the current regime of globalization, various international instruments have recognized IPRs on life forms and processes. The TRIPS Agreement is a notable instrument in that regard. Using TRIPS and other legal instruments, domestic as well as international, as backing tools, IPRs are granted virtually in all forms of inventions in all fields of technology. The TRIPS Agreement prescribes that

patent protection must be made available to non-biological processes. It also recognizes effective protection on new plant varieties by demanding Members to protect new plant varieties through patent, a sui generis system or a combination of both. By virtue of Art.27.3 (b) of TRIPS, Members to the WTO assume the duty to recognize all these rights and hence have to make available the legal protection locally.

However, TRIPS gives the option to Members to exclude plants and animals from the array of patenting. Yet, as an instrument that only sets minimum protections, it does not prohibit perse the patenting of plants and animals. Countries are thus at liberty to accord more protections locally and enforce same in their jurisdiction.

The TRIPS Agreement lays down these controversial requirements in its Art. 27(3) b. Obvious is the fact that this provision has been under review since 1999. However the negotiation on the review has been at a stalemate; with little progress being made since the review process started.[244]

To be TRIPS compatible, Members are contemplating to adopt PVP legislations. The UPOV Convention is thus seen by many as 'ready made' option to satisfy PVP requirement that is laid by TRIPS. This idea has never been universally welcomed, though. Many developing countries in particular are against the idea of adopting UPOV as a sui generis PVP instrument, since the requirements laid down within UPOV are closer to the patent system; and hence it would put the farmers in a tight corner by prohibiting the sale or exchange of protected seeds.

Be that as it may, another sui generis option has also been tabled by the then OAU to serve as a national guide to African Countries. This Model Legislation differs from the above two instruments to a great deal. Unlike TRIPS and UPOV, the Model Legislation strikes a balance between farmers' rights and breeders'

[244] Downes : 2004:19

rights. The Model legislation expressly recognizes the historic rights of farmers to save and exchange seeds. Not only this, in its Art.5, the Model Legislation has enshrined in the idea of benefit sharing and prior informed consent of the communities while accessing genetic resources.

In addition to the multilateral agreements, bilateral treaties have also recognized monopoly rights on life forms and processes. Some of these treaties even go far beyond what is required within TRIPS. Such forms of bilateral arrangements are commonly carried out by the US and EU with their developing partners in the South.[245]

Allowing the exercising of IPRs on life forms and process as with the TRIPS Agreement and the UPOV Convention never existed without any challenge. Ever since its inception, the idea has been marked by controversies; arguments being forwarded for and against it. Indeed, in the wider debate abut globalization, this has formed one of the areas of considerable controversies.

Opponents vehemently object to the idea of granting IPRs on life forms and processes arguing that this would mean, among other things, tempering with nature which is not ethical. Hence, critics say that life forms and processes must not be viewed as inventions.[246] From economic point of view also, allowing the exercising of IPR on life forms and processes is criticized for conferring a huge power on the IP holders and thereby threatening the poor in developing countries. Critics challenge the idea also from the angle of preserving biodiversity. They are of the view that allowing the exercising of IPRs on life forms and processes would intensify the use of GMOs, which, in turn, will lead to monocropping at the prejudice of biodiversity.[247] Proponents on the other hand

[245] See the discussions in Chapter two under the heading " Bilateral Agreements Allowing IP on Life Forms and Processes.
[246] Gebre Egzihaber " The Inappropriateness of the Patent System for Life Forms and Processes". Availble at http://www.twnside.org.sg/title/gebre.htm . Accessed on 25 Feb 2005.
[247] Shiva :2001:42

justify it saying that allowing the exercising of IPRs on life forms and processes would enable the ones engaged in the business to recoup their investment.[248] In doing so, it is deemed to facilitate the transfer and efficiency of biotechnology- an effective instrument for the production of essential crops and processes that are attuned to the needs of developing countries. Through generating essential crops that are highly productive and resistant to droughts or insects, biotechnology is considered as an essential tool to ensure food security in developing countries.

In this study, the specific links that underlie IPRs on life forms and processes, and food security have been identified. The FAO in its Rome Declaration on Food Security defined food security in terms of food that is available at all times, all persons should have the means of accessing it, it is nutritional adequate in quantity, quality and variety, and it is acceptable within a given culture. It is through applying these yardsticks that an attempt was made to examine if biotechnology is really the answer. Serving the grand purpose of encouraging the advance of biotechnology, IPRs on life forms and processes are taken to be instrumental. Biotechnology promises to generate crops or GMOs that best meet the demands of developing countries. Through the scientific manipulation of nature, biotechnology can bring products that can resist droughts or give high yields, both in quantity and nutrition. This is taken to ultimately ensure food security in developing countries.

Despite what has been asserted by the biotechnology supporters which regard it as a tool to help solve the food security problem of developing countries, the implications of IPRs on life forms and processes have been emphatically pointed out. More significantly, it has to be stressed out that the implications of strong IPRs on life forms and processes are immense. Regrettably, however, some countries have rushed doing that.

[248] Nwabueze : 2003:611

Notwithstanding, all the rhetoric sales pitch that have been advanced by interest groups, IPRs on life forms and processes, as granted today, may not bring sustainable food security to DC. Food security would rather be severely affected in a number of ways, if a strong IP system is entrenched on life forms and processes. Today, however, it appears that the backlash of the system is often forgotten and misrepresented. True, such a system could enhance the functioning of biotechnologies. However, the negative impacts of enhancing biotechnology through strong IPRs far outweigh the accruing benefits thereof; and they need to be more carefully considered.

First, according strong IPRs on life forms and processes will ultimately change the nature, structure and ownership of food production systems. It will do so by strictly prohibiting the historic practice of farmers to save, sell and exchange seeds. Once an exclusive monopoly right is granted to a person, natural or artificial, the holder will have the right to prohibit the selling, saving or exchanging of seeds that an IPR has been conferred upon. The consequence of this prohibition is fatal in prejudicing food security. Enjoying monopoly right on a product or process can enable the right holder to fix the price as he/she may wish. This ultimately puts the product or the process beyond the reach of ordinary people. Indeed researches showing this have been pointed out in this study. Unless the results of the technology are easily accessed by all, the whole idea of ensuring food security will end up in futility. While biotechnology is often promoted by agri-business as an answer to the world's food problems, real food security problems are caused not by food shortages, but by inequity, poverty and the concentration of food production.

Unless carefully regulated, IPRs on life forms and processes are likely to further consolidate control in the hands of a few large firms. Allowing the exercising of strong IPRs on life forms and processes can push many to the edge of survival by allowing the few to exercise control on the food system and genetic resources without thereby sharing the benefits to farmers in developing countries. Without

any protection being reserved to the local communities, as is today in many countries, smallholder farmers could be blocked from continuing their traditional practices of breeding, saving and exchanging the seeds that they have been growing for generations. This would likely compel them to renew their stocks every year upon payment of a royalty. This practice, viewed in simple economics, raises the prices of food in food-importing countries. It will therefore be the haves who will have access to it. By no stretch of the imagination, this may qualify to be food security for the latter can only be said to have been attained when, among other things, every one has the access to food.

It must be emphatically pointed out that food security is almost a matter of "access" instead of "availability". In other words, food is often available – and the global agricultural system is capable of assuring this availability- but people cannot always get access for various reasons: mainly, economic.[249] Accessibility refers to the ability of people within a particular country or region to actually receive or gain access to the food (for example, by having the financial means to purchase adequate food).[250] In fact, the basic cause of chronic malnourishment is not the lack of food in the world, but the fact that the food is not getting to the people who need it most. Access to food is largely shaped by economic forces that prevent the food from getting where it is most needed, principally by purchasing power. Thus, the availability of food does not necessarily address the problem of accessibility to food; famines occur—and have occurred—in countries in which food is readily available and plentiful.[251]

It should therefore be understood that food security is much more than food quantity. For instance, the green revolution which was thought to solve the problem of food insecurity by overcoming food shortages has not ended the

[249] Asia- Pacific Centre For Security Studies (1998) "Food Security and Political Stability in the Asia-Pacific Region. " Available at *http://www.apcss.org/Publications/Report_Food_Security_98.html*. Accessed on 20 Apr 2005.
[250] Ibid
[251] Ibid

recurring problems of starvation and malnutrition encountered in many parts of the world, and in particular developing countries.[252] Far beyond availability, access to food needs to be continuous, adapted in quantity and quality to the needs and the traditions of the different members of a population so that food security is ensured.[253]

For persons living in developing countries, food access hinges primarily on the household's ability to purchase food.[254] The poor are often prone to food insecurity as they do not have the resources or living conditions which permit them to purchase and store large quantities of food at home.[255] Purchasing power is therefore the key to attain food security in the household level. Simply making food available is not enough; one must also be able to purchase it, especially the low-income households. When access to seed is restricted through IP then the poor farmers will have little access to food, either produced or purchased.

Second, enhancing the operation of biotechnology to generate GMOs could affect biodiversity. As the operation of biotechnologies is intensified, monocropping will inevitably occur. This threatens the safe preservation of biodiversity, which is vital for ensuring food security in the South. Related to this is the fact that allowing IPRs, particularly patents, on life forms and processes is seriously giving rise to the misappropriation of genetic resources and traditional knowledge of developing countries. Today, thus, the genetic resources of developing countries and the traditional knowledge of their communities are being eroded without ensuring any sort of benefit sharing. This again affects the observance of food security.

---

[252] Asia- Pacific Centre For Security Studies (1998) "Food Security and Political Stability in the Asia-Pacific Region. " Available at http://www.apcss.org/Publications/Report_Food_Security_98.html. Accessed on 20 Apr 2005.
[253] Ibid
[254] Abdullahi : 1999: 9
[255] Ibid

Third new technologies such as 'terminator technology', which renders a crop's seeds sterile, easily renders impossible the practice of seed saving, albeit seed saving forms the ultimate symbol of food security in developing countries. Many of the biotechnology companies have rushed to apply this technology on their products. The latest development of this technology therefore makes it worthless to allow the exercising of IPRs on life forms. The reason is that the technology itself restricts effectively the practice of seed saving as it produces sterile seeds that can only germinate once.

No less important to note is that biotechnology has not indeed been attuned to the needs of developing countries. Instead of 'inventing' crops or GMOs that are staple foods in developing countries, the rush so far has been towards cash crops and GMOs that are of interest to the developed nations. This is basically because, the ones engaged in the business are more focused to addressing their profit desire, not food security of the developing world.

Improving the efficiency of biotechnology companies through IPRs so that they could produce more of the GMOs is likely to bring loss of market share. As the consumers get cynic about GMOs, countries, particularly African countries, are refraining from sowing GMOs so that they may not loose market shares. Production of more food by applying genetic engineering may thus reduce the market share of the products produced, which, in turn, affects negatively food security.

The writer never dares to deny the importance of IPRs. However, viewed within the context of food security to developing countries, granting monopoly rights without ensuring benefit sharing is not a praised idea for that will have enormous implications. The way IPRs on life forms and processes have impinged in the last two decades has been, however, markedly to the disadvantage of developing countries. The words of Kuyek, D best summarize the discussion made herein above:

Patent proponents keep banging on about the importance of IPR for access and innovation. But this is a smokescreen. If access was the issue, then the evidence stands against IPR: it restricts the flow of germplasm, reduces sharing between breeders, erodes genetic diversity, and, all in all, stifles research. What is actually at issue is the question of whose interests' agricultural research and development should serve. IPRs are suited to the profit strategies of the global seed conglomerates that want to dominate agricultural production worldwide. The transnational seed companies are building vast industrial breeding networks in all major crops and, with their economies of scale and ownership over technology through IPR, they will shut local private and public breeders out of the commercial market. For them, IPR is simply a means for controlling the market and extracting more profit from it.[256]

5.2 Recommendations

In this study, a note has been made that tinkering with IPRs on life forms and processes will not ensure food security in developing countries. Having demonstrated the potential implications of granting strong IPRs on life forms and processes on attaining food security, it is crucial and appropriate to provide recommendations on what position developing countries should take.

Indeed, ensuring that the benefits of the IP system are best harnessed towards achieving food security and pitfalls avoided will require significant steps.

Less arguable is the fact that IP serves to provide an incentive for authors and inventors to create intellectual works and make them available to the public. Actually, this is done by putting restrictions and granting a limited monopoly to the holder. The existence of the limited monopolies and restrictions presented by IP can only be justified, however, if their contribution to society outweighs their

[256] Kuyek, D (2001) " Intellectual Property Rights: Ultimate Control of Agricultural Research and Development in Asia ". Available at http://www.grain.org/briefings/?id=35 . Accessed on 13 Apr 2005

social cost, and it is evident that increased IP protection on life forms and processes does not meet this criterion.

Thus, the writer argues for a system that encourages and stresses publicly owned knowledge. If ever biotechnology is perceived to be the real solution, it must be a business exclusively left to the public. Stated differently, if the benefits of cutting-edge advances in seed technology are to reach the vast majority of developing countries, it will have to occur only through public channels. Because, only then the benefits will be available to all. As things stand, the public sector is poorly equipped to address the needs of poor farmers, and companies will continue to concentrate on high-value proprietary GM technologies, attuned to the needs of wealthy markets in developed countries.

Stated differently, if at all genetic engineering is touted as a solution to food security, a concerted effort needs to be made to ensure that the benefits it may generate reach the ordinary people. As things stand now, however, only the haves will have access to biotechnology products as the price of these products is prohibitively expensive. Royalty payments coupled with the restrictions on seed saving makes the products the least important. Developing countries could, however, enhance the distribution of the benefits that may be attained from researches on biotechnology only when they own institutes designed to that end. If such is done, then the state can make freely available the products such institutes may generate thereby ensuring access by all. In doing so, the state can also prevent such prohibitions as seed saving, exchanging and selling for its interest would not be driven chiefly for profit. Even then, it would be appropriate not to intensify mono cropping, at the prejudice of biodiversity.

Proposals to consider IPRs on life forms and processes at the WTO must be viewed in their broader context, including the need for strong regulation to protect a range of non-trade concerns. It has been almost 7 years since the process

leading to the reform of TRIPS Art. 27(3) was initiated. However, as noted in this study, the review has not yet been finalized.

Developing countries need to know that once an agreement is reached without seriously considering the adverse effects; such effects may not easily be shaken off like a dog coming out of water. Actually, they should take a lesson out of the trouble they were into in accessing necessary drugs as arising out of the limitations imposed upon by the TRIPS Agreement. Countries have to be aware that what they do today will change the future. Accordingly, before things lead into an inglorious din of cross-criticism and finger pointing, the review process on Art.27 (3) b should be carefully considered.

Indeed, the mandated review of Article 27.3(b) represents perhaps the only real opportunity to change this provision that allows for patents to be granted on life forms. Such a review, if it is properly done, has the advantage of being more focused towards considering the interests of developing countries.
In the review process thus developing countries should opt for an IP system that ensures a coherent access regime which guarantees proper management and promotes the conservation and sustainable utilization of genetic resources and ensure adequate protection of local community knowledge and innovation. The main areas of their focus in the review process should be identifying and advocating legal reform to ensure a supportive legal framework for the protection and promotion of farmers' rights and traditional knowledge in the context of PVP legislations.[257]
More importantly, a clear provision should be reserved excluding plants and animals from the sphere of patent; otherwise the developed countries would continue rushing for patenting. In other words, TRIPS must not only provide the possibility of excluding from patentability plants and animals, it should strictly prohibit the patenting of life for all Members. The TRIPS Agreement should also be reviewed to explicitly allow farmers to save, re-use and possibly even sell and

[257] Kongolo :2004: 262

exchange harvested seeds; and allow access to protected varieties for further research and breeding; It is therefore crucial that developing countries around the world mobilise to pressure WTO Members to break the stalemate in the TRIPS Council, and press for a revision of Art.27 .3(b).[258]

At the national level, developing countries are working to establish appropriate sui generis systems of IPP for plant and genetic resources.[259] Since the TRIPS Agreement itself does not specify what constitutes an ''effective'' sui generis system, these countries have to use the flexibilities to protect their interests. Shortly put, developing countries should tailor their IPR regimes to their national circumstances and developmental priorities, taking full advantage of the flexibilities the TRIPS Agreement allows.

In particular the trend of bilateral pressure on developing countries to adopt UPOV bodes poorly for poverty eradication and biodiversity concerns. Not the least because the UPOV Convention severely limits the freedom of farmers to sell and exchange seeds, so much because it does not recognize benefit sharing and informed consent as conditions for the protection of IP on new plant varieties developed. Developing countries should therefore refrain from joining the UPOV agreement, which will trigger the loss of farmers' rights. Rather, they should devise their own PVP legislations.

While preparing PVP legislations, developing countries should recognize expressly the rights of farmers to save, sell and exchange seeds; and of no less importance is to put in place benefit sharing and prior informed consent as conditions for getting any form of protection that may be sought. Recognizing the rights of farmers and traditional seed saving and exchanging, in particular, as the formal instrument of orderly change in food security, plays a vital role, even though this role has not always been readily recognized.[260]

[258] See Shiva :2001: 70-74
[259] UNCHR: 2000: 8
[260] Shiva : 2001:76

As multilateralism loses steam, alternative avenues of trade negotiations, such as bilateral and regional trade agreements, seem to be spotlighted. The prospect of these types of agreements appears even more likely considering an ongoing series of bilateral trade agreements that the US, EU, and other countries from the North have recently completed or worked on with many trading partners.[261] If engaged in such forms of negotiations relating to IPRs, developing countries should have to be careful not to sign an agreement that allows exclusive monopoly rights on life forms and processes, like patents.

Finally, it is worth noting that in viewing the problem of food security purely in terms of inefficient productivity, countries are ignoring what is probably a more important part of the equation, namely, lack of access to food that unfortunately has tended to receive scant attention. It is, therefore, a matter of great satisfaction to all of us concerned with the problem of food sufficiency to see that access to food in the over all scheme of things is recognized. Enhancing access to food must be embraced and adopted wholeheartedly because it holds the key to food security on a sustained basis. Within this context, it must be noted that improving the productivity of farmers is not by itself the solution to food security. For, food security depends mainly on, among other things, having financial, physical and social access as distinct from mere availability. Having a national per capita estimate of food availability thus says nothing about the individual household access to food. It has to be born in mind that while food availability is important; it is not the only factor. In their efforts to achieve a sustainable food security, developing countries have to therefore implement or devise programmes that address all key underlying causes of food insecurity, not solely food shortage. The writer wishes to re-emphasize the fact that food insecurity has multiple causes and a well-guided analysis in each situation will help in programming efforts. Particularly, proper attention must be given towards resolving constraints on access to food and continuing inadequacy of household and national incomes to purchase food.

[261] See the Bilateral Agreements discussed in this study, for instance.

To wind up, developing countries should be careful in any decision relating to granting IPRs on life forms and processes. They must be vigilant that all the rhetoric advanced in favour of IPRs on life forms and processes is only a myth. Granting strong IPRs on life forms and processes would rather restrict access to seed; and impair biodiversity both of which are pivotal towards attaining food security. Further more, biotechnology has not so far been focused to address the food security needs of developing countries. As such, it is important to note that allowing the exercising of IPRs on life forms and processes will never be an answer to their food security needs. On the contrary, as shown in this study, doing so will greatly prejudice the food security of the South.

BIBLIOGRAPHY

Books

Abdullahi, A. (1999) *Food Policy and Food Security in Nigeria*, Nigeria: Kaduna.

Comstock, G.L (2000) Vexing Nature? *On the Ethical Case Against Agricultural Biotechnology*, the Netherlands: Kluwer Academic.

Correa, C.M (2000) *Intellectual Property Rights, the WTO and Developing Countries: The TRIPS Agreement and Policy Options*, London: Third World Network.

Dutifield, G (2000) *Intellectual Property Rights, Trade and Biodiversity: Seeds and Plant Varieties*, London: Earthscan Publications Ltd

Dutifield, G (2003) *Intellectual Property Rights and the Life Sciences Industries: A Twentieth Century History*, Aldershot: Ashagate Publishing.

Kwakwa, E, (2002) "Institutional Perspectives of Economic Law", in Asif Qureshi (ed.) *Perspectives in International Economic Law*45-62, the Netherlands: Kluwer.

Pavoni, R (2001) "Biosafety and Intellectual Property Rights: Balancing Trade and Environmental Security "in Francesco Francioni (ed) (2001) *Environment, Human Rights and International Trade*, US: Hart Publishing.

Schoenbaum, T.J (2001) "International Trade in Living Modified Organisms "in Francesco Francioni (ed) (2001) *Environment, Human Rights and International Trade*, US: Hart Publishing.

Seuret, F and Perriere, R.A (2000) *Brave New Seeds: The Threat of GM Crops to Farmers,* Australia: Pluto Press.

Shiva, V (2001) *Protect or Plunder? Understanding Intellectual Property Rights*, Bangladesh: University Press

Sornarajah, M, (2002) '' A Developing Country Perspective of International Economic Law", in Asif Qureshi (ed.) (2002) *Perspectives in International Economic Law*83-110, the Netherlands: Kluwer.

The Crucible II, (2000) *Seeding Solutions: Policy Options for Genetic Resources*, Canada: International Development Research.

Thomson, J.A (2002) *Genes for Africa: Genetically Modified Crops in the Developing World*, Cape Town: UCT Press.

UNCHR (2000) *Resolution on IP and Human Rights*, Washington: UNCHR.

Watal, J (2001) *Intellectual Property Rights in the WTO and Developing Countries*, Oxford, Oxford University Press.

Zarrilli, S (2001) "International Trade in Genetically Modified Organisms and Multilateral Negotiations: A New Dilemma for Developing Countries ", in Francesco Francioni (ed) (2001) *Environment, Human Rights and International Trade*, US: Hart Publishing.

Journals

Amorim, C.L (2000) '' The WTO from the Perspective of a Developing Country" 24 *Fordham International Law Journal* 95-106.

Bluemel, E.B (2004) "Substance without Process: Analyzing TRIPS Participatory Guarantees in Light of Protected Indigenous Rights "86 *Journal of the Patent and Trademark Office Society* 671-713

Braga, C.P and Fink, C (1998) "Reforming Intellectual Property Rights Regimes: Challenges for Developing Countries ", 1 *Journal of International Economic Law* 537-554.

Cullet, P (2001) "Plant Variety Protection in Africa: Towards Compliance with the TRIPS Agreement "45 Journal of African Law 97-122

Darch, C (2004) "Digital Divide or Unequal Exchange? How the Northern Intellectual Property Rights Regime Threatens the South" 32 *International Journal of Legal Information* 488-501

Dhar, B and Anuradha, R.V (2002) "Access, Benefit- Sharing and Intellectual Property Rights "7 *The Journal of World Intellectual Property* 597-639

Downes, G (2004) "TRIPS and Food Security: Implications of the WTO's TRIPS

Agreement for Food Security in the Developing World," 106 *British Food Journal* 1-.35

Hart, K (2004) "Symposium: An Introduction to Genetically Modified Foods "10 *Richmond Journal of Law and Technology* 1-7

Kongolo, T (2001) "New Options for African Countries Regarding Protection for New Varieties of Plants "4 *The Journal of World Intellectual Property* 349- 371.

Kongolo, T (2002) "Biodiversity and African Countries "24 *European Intellectual Property Review* 579-584

Kongolo, T (2004) "Panorama of the Most Controversial Intellectual Property Issues in Developing Countries" 26 *European Intellectual Property Review* 258-262

Lopez, C .S (2004) "Intellectual Property Reform for Genetically Modified Crops: A Legal Imperative" 20 *Journal of Contemporary Health Law and Policy Summer* 367-418

Maskus, K.E and Reichman, J.H (2004) "The Globalization of Private Knowledge Goods and the Privatization of Global Public Goods " 7*Journal of International Economic Law* 279-317

Oliva, M. J (2003)" Intellectual Property in the FTAA: Little Opportunity and Much Risk "19 *American University International Law Review* 45-67

Pendleton, C.N (2004) "The Peculiar Case of ''Terminator" Technology: Agricultural Biotechnology and Intellectual Property Protection at the Crossroads of the Third Green Revolution "23 *Biotechnology Law Report* 1-28.

Smith, J (2003) 25 *European Intellectual Property Review* 235-236

Zhang, R (2004) "Food Security: Food Trade Regime and Food Aid Regime," 7 *Journal of International Economic Law 565-584*

Papers/Working Papers/Reports/

Action Aid (2001) "TRIPS on Trial: The Impact of WTO's Patent Regime on the World's Farmers, the Poor and Developing Countries". Available at www.actionaid.org . Accessed on 23 Jan 2005.

Asia-Pacific Center for Security Studies (1998) "Food Security and Political Stability in the Asia- Pacific Region." Available at http://www.apcss.org/Publications/Report_Food_Security_98.html. Accessed on 20 Apr 2005.

CIDSE, (2001) "FAQ on Food Security, Bio patenting and TRIPS." Available at *http://www.cidse.org/pubs/tglfaq.htm*. Accessed on 27 Sept 2004.

Commission on Intellectual Property Rights (2002) "Integrating Intellectual Property Rights and Development Policy (Report of the [UK] Commission on Intellectual Property Rights: Executive Summary ".Available at *http://www.iprcommission.org/papers/text/final_report/execsumhtmfinal.htm*. Accessed on 27 Sept 2004

Cullet, P (2002) Food Security and Intellectual Property Rights in Developing Countries. Available at *http://www.iprsonline.org/resources/docs/Pcull.Food_Sec_IPRS_7.11.03.pdf*. Accessed on 27 Sept 2004.

Dhakal, S. (2004) "Biodiversity for Security ". Available at *http://www.nepalnews.com/contents/englishweekly/spotlight/2004/nov/nov26/national3.htm*. Accessed on 15 Apr 2005.

Dillen, B, Leen, M (eds) (2002) Bio patenting and the Threat to Food Security. Available at *http://www.cidse.org/pubs/tg1ppack.htm*. Accessed on 8 Oct 2004.

Ekpere, "The OAU Model Law and Africa's Common Position on the TRIPS Review Process." Available at *www.ictsd.org/dlogue/2001-07-30/Ekpere.pdf*. Accessed on 15 Dec 2004

Ekpere J. A (2002) "IPRs and Food Security: Implications for Africa's Agriculture" Available at *http://www.iprsonline.Ekpere/docs.htm* . Accessed on

15 Jan 2005.

FAO, “Food Security and the WTO Trade Negotations: Key Issues Raised by the World Food Summit”. Available at *www.fao.org/docrep/003/x4829e/x482e00.htm*. Accessed on 27 Jan 2005.

FAO, (2002) “The State of Food Insecurity in the World.” Rome: FAO

FAO (2003) “Rome Declaration on World Food Security.” Available at *http://www.fao.org/documents/show_cdr.asp?url_file=/DOCRCP/003/W3613E/W3613E00.HTM*. Accessed on 25 Feb 2005.

Gebre Egziabher " The Inappropriateness of the Patent System for Life Forms and Processes”Available at *http://www.twnside.org.sg/title/gebre.htm*. Accessed on 25 Feb 2004.

Global Trade Watch “The WTO on Agriculture: Food as a Commodity, Not a Right” http://www.citizen.org/trade/wto/articles.cfm?ID=10393. Accessed on 15 Jan 2005

GRAIN (2003) " The TRIPS Review at a turning point?". Available at *http://www.organicconsumers.org/corp/trips_review.cfm*. Accessed on 15 Oct 2004

Institute of Development Studies, Can Agricultural Biotechnology be Pro-poor? Available at *www.ids.ac.uk/biotech*. Accessed on 6 Oct 2004

Keeley (2003) “Democratizing biotechnology: An Overview.” Available at *www.ids.ac.uk/biotech*. Accessed on 25 Oct 2004

Kennet, M (2004) “EC-GMOs Implications for Africa on Biotechnology”. Available at www.tralac.org. Accessed on 17 Dec 2004.

Khor, “A Worldwide Fight against Bio piracy and Patents on Life”. Available at *http://www.twnside.org.sg/title/pat-ch-htm*. Accessed on 25 Apr 2005.

Kuyek, D (2001) “Intellectual Property Rights: Ultimate Control of Agricultural Research and Development in Asia.
Available at *http://www.grain.org/briefings/?id=35* . Accessed on 13 Apr 2005.

Mae-Wan Ho and Traavik , T" Why Patents on Life Forms and Living Processes Should be Rejected" Available at *http://www.twnside.org.sg/title/trips99-cn.htm*. Accessed on 10 Oct 2004.

McCrea, I and Mayer, S (1999) "AstraZaneca and Its Genetic Research: Feeding the World or Fueling Public Hunger?" Available at *www.actionaid.org.uk/contentdocument.asp?doc*. Accessed on 25 Oct 2004

Sharma, D (2003) Patenting Forms of Life: A protection of Intellectual Property Or Bio piracy? Available at *http://www.ewnw-hamburg.de/Inhalt/dasEWNW/WasserTagung/Devinder_Handout.pdf*. Accessed on 9 Oct 2004.

Singh , H (2002) "Emerging Plant Variety Legislation and Their Implications for Developing Countries : Experiences from India and Africa". Available at *http://www.iprsonline.org/ictsd/docs/ResourcesTRIPSharbir_singh.doc*. Accessed on 25 Sept 2004.

Singh, S "Rampant Biodiversity of the South's Biodiversity ". Available at *http://www.twnside.org.sg/title/rampant.htm*. Accessed on 15 Apr 2005.

Sreenivasan, G and Christie, J (2002) "Intellectual Property, Biodiversity, and the Rights of the Poor". Available at *http://www.gefoodalert.org/library/admin/uploadedfiles/showfile.Efm*? Accessed on 20 Oct 2004.

Taylor and Jerry Cayford (2003), "American Pate nt Policy , Biotechnology , and African Agriculture : The Case for Policy Change ". Available at *www.rff.org* Accessed on 9th Oct 2004.

The TRALAC Newsletter of 08 March 2005, available at *http://www.tralac.org/newsletter/08mar2005.html*. Accessed on 10 Mar 2005.

Tripathi, R (2000) "Implications of TRIPS on Livelihoods of Poor Farmers in Developing Countries." Available at http://www.eftafairtrade.org/pdf/berne-TRIPS.doc. Accessed on 25 Sept 2004.

Yamin (2003) "Intellectual Property Rights, Biotechnology and Food Security." Available at http://www.ids.ac.uk/biotech. Accessed on 9 Oct 2004

Legal Instruments

The African Model Legislation on the Protection of the Rights of Local Communities, Farmers, Breeders and the Regulation of Access to Biological Resources (1998).

The Agreement between the Government of the United States of America and the Government of Ecuador Concerning the Protection and Enforcement of Intellectual Property Rights. Available at http://www.bilaterals.org/article.php3?id_article=384. Accessed on 12 Apr 2005.

The Agreement on Trade, Development and Cooperation between the European Community and its Member States, on the one part, and the Republic of South Africa, on the other part (1999). Available at http://www.bilaterals.org/article.php3?id_article=419. Accessed on 12 Apr 2005.

The Central American Free Trade Agreement (2004). Available at http://www.ustr.gov/Trade_Agreements/Bilateral/DR-CAFTA/SectionIndex.html Accessed on 12 Apr 2005.

The Euro-Mediterranean Association Agreement between the European Community and its Member States, on the one part, and the Arab Republic of Egypt, on the other part (2001). Available at http://www.bilaterals.org/article.php3?id_article=408 . Accessed on 12 Apr 2005.

The Euro-Mediterranean Agreement establishing an Association between the European Community and its Member States, on the one part, and the People's Democratic Republic of Algeria, on the other part (2002). Available at *http://www.bilaterals.org/article.php3?id_article=413* . Accessed on 12 Apr 2005.

The International Convention for the Protection of New Varieties of Plants (1991)

The US-Chile Free Trade Agreement (2003). Available at *http://www.ustr.gov/Trade_Agreements/ bilateral/Chile_FTA/Section_Index.html* Accessed on 12 Apr 2005.

WTO Agreement on Trade-Related Aspects of Intellectual Property Rights, (1995.)

Others

The Economist (October 9th 2004) “Special Report: Non-food GM, the Men in White Coats are Wining Slowly “.

World Food Summit Plan of Action, Rome, 17 Nov 1996

APPENDIX

Agreement on Trade-Related Aspects of Intellectual Property Rights

Article 27

Patentable Subject Matter

1. Subject to the provisions of paragraphs 2 and 3, patents shall be available for any inventions, whether products or processes, in all fields of technology, provided that they are new, involve an inventive step and are capable of industrial application. (**5**) Subject to paragraph 4 of Article 65, paragraph 8 of Article 70 and paragraph 3 of this Article, patents shall be available and patent rights enjoyable without discrimination as to the place of invention, the field of technology and whether products are imported or locally produced.

2. Members may exclude from patentability inventions, the prevention within their territory of the commercial exploitation of which is necessary to protect *ordre* public or morality, including to protect human, animal or plant life or health or to avoid serious prejudice to the environment, provided that such exclusion is not made merely because the exploitation is prohibited by their law.

3. Members may also exclude from patentability:

(a) diagnostic, therapeutic and surgical methods for the treatment of humans or animals;

(b) plants and animals other than micro-organisms, and essentially biological processes for the production of plants or animals other than non-biological and microbiological processes. However, Members shall provide for the protection of plant varieties either by patents or by an effective *sui generis* system or by any

combination thereof. The provisions of this subparagraph shall be reviewed four years after the date of entry into force of the WTO Agreement.

Signature Not Verified

Digitally signed by UWC
DN: cn=UWC, o=Library, ou=LICT, c=ZA
Date: 2006.03.28 09:01:56 Z
Reason: Document is released