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INTERNATIONAL REGULATION FOR GENETIC RESOURCES AND DEVELOPING COUNTRIES

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Abstract

As far as the applications of modern biotechnology methods to agricultural sector increase over the last 20 years, discussions over the regulation of plant genetic resources have become an important issue. The centre of violent disputes between developed and developing countries is intellectual property rights, recently regulated by the TRIP agreement of GATT. This article aims to tackle with this dispute by examining the global regulation of plant genetic resources from a different perspective. Giving a special emphasis not only to global intellectual property rights regime but also to access regime to genetic resources, this study investigates the valorisation of plant genetic resources. Drawing upon the institutional framework of Regulation School, it tackles with the effects of these regimes on the national-innovation capacity of developing countries and on the loss of bio-diversity. To this end, it attempts to show that these regimes have accelerated the loss of bio-diversity and they have no positive effect on the national-innovation capacity of developing countries.

INTRODUCTION

Issues concerning property rights on global biological resources are becoming increasingly important to international policy, as the negotiations on the UN Convention on Biological Diversity and the GATT agreement on Trade Related Aspects of Intellectual Property Rights (TRIPs) have demonstrated.

Genetic resources are particularly important for the economic process of research, development and production in the pharmaceutical and agricultural industries. Especially, the increasing applications of modern biotechnology methods to agricultural sector over the last 20 years have increased the significance of plant genetic resources. (Falkner, 2000: 300.) This is because plant genetic resources are

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one of the most important raw materials for pharmaceutical and agricultural biotechnology industries.

There are various international règimes that deal with plant genetic resources. However, the intellectual property rights are the foremost important contentious issues existing between developed and developing countries. The TRIP agreement of GATT proposed the establishment of global intellectual property rights (IPR) for technology involving all forms of life-plant, animals, and micro-organisms. This proposal to introduce IPR into the GATT framework has evoked resistance from many developing countries. (World Trade Organisation, 1995). They claim that conferring IPRs on genetic resources will have adverse economic results for the preservation of biological diversity and development in agriculture. (Bhat, 1996: 205.)

On the other hand, proponents of strong global IPR règime rely on two important arguments that are opposed to the fears of developing countries. First, they claim that "strengthening intellectual property rights would increase the flow of technologies and products from developed to developing countries, as well as providing new incentives for local research and innovations." (Brenner, 1998: 9) Secondly, the complete privatisation and commercialisation of biological diversity would ensure its preservation even without regulatory state intervention. (Moran and Pearce, 1994; Frisvold and Condon, 1998).

Economically, these arguments in favour of global IPR règime for plant genetic resources are based on "Caose Theorem". According to this theorem, "the social desirability of the outcome was invariant to the initial distribution of property rights, so long as the various participants in an industry were able to contract with one another to move property rights to their most efficient location." (Swanson and Göschl, 2000:76).

Accordingly, the complete privatisation and commercialisation of genetic resources would offer a substantial solution to the loss of biodiversity and would increase the flow of technologies and products from developed to developing countries (Liodakis, 2000: 42). As well as the efficient property rights règime would provide incentives for local innovation and research.

On the other hand, it is submitted that the major problem of these arguments stems from the exclusion of other important international règime dealing with plant genetic resources. By focusing merely on global IPR règime, these arguments do not take into account the significant effects of access règime on the genetic resources. In opposition to these arguments, this study will concentrate on IPR règime as well as access règime to genetic resources. It is suggested that, these two règimes are highly related and constituted the two pillars of international regulation that aim to commercialisation of genetic resources.

After providing the methodological difference of this study from others, I can clearly put my research question. In this study, I will endeavour to analyse how international regulation for genetic resources has affected and will affect the biodiversity conservation and local research-innovation capacity of developing countries.

I prefer to focus on this question so as to analyse whether the arguments in favour of global property rights règime reflect the actual effects of IPRs on developing countries. Putting initially, in opposition to these arguments international regulation for genetic resources has accelerated the loss of biodiversity. Moreover, there is no positive effect of IPRs on the local innovation-research capacity of developing countries. Rather, the actual winners of this regulation are multinational corporations dealing with biotechnology.

The problem of assessing the effects of international regulation related to the genetic resources and access règime on the economy and society is very complex, because it is very hard to isolate the phenomenon as an object of study, and separate it from the extremely broad context of economic, technological, sectoral, agricultural, science and technology policy. Hence, I will take the international regulation as an explanatory variable and deal with its effect on developing countries conceiving other variables as constant.

Another problem is the novelty of phenomenon. There are very limited developing countries that adopted property rights règime and access règime. For this reason, there is not adequate amount of empirical analysis assessing the effects of international regulation on developing countries. In this respect, I will try to prove my argument on very limited cases. It should be emphasised initially that we do not have a chance to conduct inferences from these limited empirical results. Rather, it is only possible to indicate tendencies on this issue.

In the next section, I will focus on the international regulation for plant genetic resources. The political regulation and its direct result of societal regulation will be analysed distinctively. The second section will investigate the effects of international regulation on developing countries. In this part, I will concentrate on its effect both on biodiversity and local research-innovation capacity of developing countries. I will also indicate the actual winners of this regulation, namely MNCs.

PART I: INTERNATIONAL REGULATION for GENETIC RESOURCES

As I have emphasised above access règime to genetic resources and global IPR règime introduced by TRIP agreement of GATT constitute two pillars of international regulation for genetic resources. In this section, I will analyse these règimes and indicate their social results in developing countries. Before investigating these règimes, we must look into the ways in which the term regulation is used.

I am using this term in line with “French Regulation School”. “On the basis of regulation theory the fundamental question can, first of all, be transcended: as an institutional theory, it turns the basic political-economic theme of the embedding of market processes in the supporting political, economic and cultural framework into an examination of the historical phases of capitalism”(Görg and Brand, 2000: 374). Regulation theory assumes the existence of an imperative of accumulation, a compulsion to expand and subsume spheres of life under the capital relation that lies in the structures of capitalist socialisation (Yaghmaian, 1998: 244-245).

The way incorporating the regulation theory into my analysis is directly connected with the institutional perspective of it. In other words, regulation theory is aware of the significance of institutions for the stabilisation of capitalist accumulation (Noel, 1987: 311-312). Here, I will apply this theoretical framework for analysing the international institutions for the regulation of genetic resources though the starting point of regulation theory is national unit (Yaghmaian, 1998: 245).

It is contended that what is at stake for genetic resources are the capitalist valorisation, the expansion of the features of capitalism to these spheres that have been under pre-capitalist condition in general. As the imperative of international competitiveness set out by powerful interests becomes ever stronger, access to nature as a resource, i.e. its valorisation, is increasingly subjected to the profitability considerations of capital. This valorisation aims at the constitution of genetic resources as an element of capitalist production and re-production. However, only international IPR and access règime can realise this. These international institutions set out the pre-conditions for valorisation by introducing private property rights and by making it possible to private access to these resources. Accordingly, the institutional perspective of regulation theory provides a convenient theoretical framework for analysing the valorisation of genetic resources.

A) POLITICAL REGULATION

In this part, I am dealing with two institutional règimes in terms of genetic resources. Though they seem to deal with different règimes, the consequence is to "establish markets with political efforts" for genetic resources.

Property Rights

The 1993 round of the General Agreements on the Tariffs and Trade (GATT) negotiation proposed the establishment of intellectual property rights (IPR) globally in the field of technology involving all forms of life – plant, animals, and micro-organisms. This global framework for IPR calls for a major change in the patent laws existing throughout the world today (Bhat, 1996: 205).

The GATT creates minimum standards for the protection of IPRs, including the intellectual property protection over commercially developed seeds and plant varieties (Frisvold and Condon, 1998: 537).

The Article 27, 3(b) states that "Members shall provide for the protection of plant varieties either by patens or by an effective ***sui generis*** system or by any combination thereof" (Frisvold and Condon, 1998: 537).

The existing sui generis system is a system of plant breeder's rights (PBR), which was constituted by "International Union for the Protection of New Varieties of Plants" (UPOV) (Bhat, 1996: 205).

As a means of protecting plant breeder's rights at the international level, UPOV, an inter-governmental organisation, established the International Convention for the protection of New Plant Varieties of Plants (known as the UPOV convention) in 1961.

Under the UPOV convention, a breeder may obtain exclusive rights to a novel plant variety if it is distinctive, uniform and stable. (Rose, 1995: 165). However, these exclusive rights are not complete as in the patent rights. Two exceptions to the exclusive exploitation rights are constituted the difference between PBRs and patent rights, which provide the perfect exclusive rights.

The first one is known as farmer's privilege whereby the farmer may reuse as seed part of the harvest obtained with the protected variety without having to pay royalties to the breeder.

The second one is known as breeders' exemption: a breeder may make use of the protected variety as an institutional source for the development of new varieties. These two exceptions are internationally guaranteed by adherence to the 1978 version of UPOV (Solleiro, 1997: 572).

On the other hand, in response to the demands to strengthen the protection provided by the UPOV system, a conference was called for in 1991. "The resulting convention reflected the wishes of the large companies with a sizeable research and development capacity in that protection tends to be same as the level of protection granted by patents." (Solleiro, 1997: 572). Thus, in the 1991 act, the scope of the protection was specified, and third parties were prevented from the reproduction or multiplication of the plant variety with commercial ends. It also prohibits preparation of the material in order to carry out any of the acts reserved to the titleholders.

Accordingly, what is introduced by the WTO in terms of the protection of developed seeds and plant varieties strengthens the intellectual property rights internationally. Both the patent rights and sui generis system (plant breeders' rights) granted the intellectual private property rights.

Access Règime

The access règime to the genetic resources is recently regulated by United Nations Convention on Biological Diversity (CBD). It came into existence in 1993. The originality of CBD lies in that it rejects the notion of genetic resources being a common good and Article 3 recognises a nation's sovereign right to exploit them as national resources (Rose, 1995: 148). In other words, "with the CBD the system of free access to genetic resources, which was long regarded by international law (International Undertaking on Plant Genetic Resources) as the so-called common heritage of humankind, has been replaced by a system of regulated access." (Görg and Brand, 2000: 384). This system gives states the rights to prescribe political regulations for access to genetic resources.

On the other hand with the Article 22, CBD is harmonised with the TRIPS provisions of the WTO. Since this article states that " The provisions of this Convenience shall not be affect the rights and obligations of any Contracting Party deriving from any existing international agreements except where the exercise of those rights and obligations would cause a serious damage and threat to biological diversity."(World Trade Organisation, 2001).

However, the common heritage principle has long been applied to the collection and storage of plant germplasm in seed banks. Seed banks are giant

iceboxes where seeds are stored under cold, dry conditions and periodically grown out. Many national agricultural institutions maintain extensive seed collections; altogether, seed banks hold some 4.35 million crop accessions. Sixteen International Agricultural Research Centres (IARCs) supported by the Consultative Group on International Agricultural Research (CGIAR) collect wild and crop germplasm, including varieties of wheat, corn, rice, potatoes, and livestock (Rose, 1995: 158). Seed banks and gene banks collect Southern germplasm and distribute it to gene-poor Northern countries; thus a large proportion of commercially used genetic materials moves to the Northern countries via the IARCs and CGIAR and freely available to plant breeders (Arriaza, 1996: 929-931).

All in all, the international property rights règime, regulated by WTO and UPOV, and access règime to the genetic resources, regulated by CBD and seed banks, constituted the two pillar of international regulation on genetic resources. Next, the consequences of this regulation will be assessed.

B) SOCIETAL REGULATION

So far, this paper has focused on the institutional frameworks regulating both the intellectual property rights and access règime to the third world's genetic resources. Though they seem to be regulating two different areas, the direct result of them is the capitalist valorisation of genetic resources for the benefit of Multinational Corporations.

What is at stake here is not the complete privatisation and commercialisation of biological diversity. Rather, it means the expansion of the structural characteristics of capitalist accumulation to the third world genetic resources through political efforts and institutions. The intellectual property rights règime and access règime to the genetic resources precipitate the capitalist socialisation, which have in part been subject to other forms of property and use until now.

This is a complex process comprising several phases. Görg and Brand defines four phases for the valorisation of natural resources: The identification of useable resources, their isolation from the surrounding ecological system, followed by their commodification, and finally their monetarisation (Görg and Brand, 2000: 375). All these phases in the case of genetic resources have been realised by the international institutions and Multinational Corporations.

The identification and isolation of useable genetic resources are conducted by International Gene Banks with the aid of free access règime. Gene banks provide these resources to private firms, especially to MNCs, without any payments. For commodication of genetic resources, TRIP and UPOV enforce private property rights. By the means of intellectual property rights, private firms can acquire exclusive rights on genetic resources. Then, they commercialise these resources. To exemplify this pattern, I will investigate two cases.

For thousands of years, indigenous farmers in India have used the leaves and seeds of the neem tree as a natural insecticide without any commercial ends. However, the U.S. based MNC, W.C. Grace, has now been granted patent on neem plant. This firm acquired this plant from CGIAR without any payments and

conducted some genetic manipulation on it. Although there is not so much difference between genetically modified product and original neem tree, W.C. Grace has adopted exclusive rights on this plant with the claims of novelty. Grace has set about manufacturing and commercialising its products by establishing a base in India. The company approached several Indian manufacturers with proposal to buy up their technology or to convince them to stop producing value-added products and instead supply Grace with raw material (Shiva, 1997: 70).

The most important point here is that intellectual property rights give the MNCs exclusive rights to prevent other parties from reproduction or multiplication of the plant varieties with commercial ends. They also prohibit preparation of the material in order to carry out any of the acts reserved to the titleholders. On the other hand, private firms do not pay any fee for the use of genetic resources. Therefore, by the international regulation, Indians are prevented from the application of their traditional use of neems. The obvious result of the international regulation is the collapse of the traditional property rights and their substitution with the private property rights.

Similarly, the University of California and Lucy Biotech, a Japanese corporation, were recently granted property rights for the sweetening proteins naturally derived from two African plants, "katampfe" and the "serendipity" berry. African people have long used these plants for their sweetening properties. Interestingly, no arrangements have been made to return part of MNCs benefits to the African communities (Arriaza, 1996: 923-924). As in the case of India, the provisions of international regulation entail African people's traditional property règime to be replaced by private property règime acquired by Lucy Biotech Company.

There are many other examples, which describe the valorisation of local communities' genetic resources by MNCs. The pattern here is the appropriation of genetic resources by the means of free access règime or International Gene Banks (identification of resources and their isolation from surrounding ecological system). Then MNCs are given property rights for the novelties (commodification). These property rights are internationalised by the means of TRIP agreement and UPOV règime.

PART 2: THE EFFECTS OF INTERNATIONAL REGULATION ON BIODIVERSITY CONSERVATION AND INNOVATION-RESEARCH CAPACITY OF DEVELOPING COUNTRIES

A) BIODIVERSITY CONSERVATION

As indicated in the introduction, the proponents of IPR règime claim that the strengthening of IPR will prevent the loss of genetic resources. They also claim that the complete privatisation and commercialisation of biological diversity would ensure its preservation even without regulatory state intervention

However, the reality does not fit these arguments. Indeed, the major problem of these arguments is that by focusing merely on the possible effects of global IPR

règime, they fail to recognise the importance of free access to genetic resources règime.

As mentioned in part 2, political regulation in terms of genetic resources contains two pillars: property rights règime and access règime. The logic of this regulation can be summarised as that while the producers do not have to pay any fee for genetic resources, they acquire the monopoly of the final products and reflect this monopoly to the price of their goods.

In other words, there is no price formation for the use of genetic resources. Then, a very important problem appears; that is, there is not any incentive for the effective preservation of genetic resources. Since the private firms acquire necessity resources via international gene banks, they do not have to preserve these resources. On the other hand, since the effects of political institutions undermines the traditional property règimes, it becomes impossible to protect these resources by the means of traditional methods. Therefore, the establishment of market in genetic resources through political institutions does not create any protective incentive for the genetic resources.

In fact, the existing IPR règime increases investments only in one sector of the plant varieties: plant-breeding sector. For example in the US, promulgation of the implementing legislation for UPOV occurred in 1970 and this year indicates a strong increase in R&D expenditure for plant varieties.

	1960	1965	***1970***	1975	1979	1991
Number of R& D programs	1	3	***6***	9	9	11
R& D Expenditure (1989, $1000)	31	1036	***3102***	6480	6937	4241
Source: Pray and Knudsen, (1994)						

Guaranteeing the monopoly rights for producers on their products, property rights règime gives incentive for increasing investment to the R&D expenditures. TRIP agreement guaranteed for producers to impose their monopoly rights to the whole world.

Conversely, existing access règime to genetic resources does not provide such an incentive for investment to the preservation of genetic resources. Besides, by undermining communal property rights, international regulation prevents traditional preservation methods.

Although there is very little precise information available, it is widely believed that this same period (1960-1990) has been an era during which plant diversity in agriculture has been in decline all over the developing world.

Crop	*Country*	*Number of Varieties*
Rice	Sri Lanka	From 2000 varieties in 1959 to five major varieties today. 75% of varieties descended from one maternal parent.
Rice	India	From 3000 varieties in 1959 to 75% of production from less than ten varieties.
Rice	Bangladesh	62% of varieties now descended from one maternal parent
Rice	Indonesia	74% of varieties now descended from one maternal parent.
Source: World Conservation Monitoring Center, (1992).		

Accordingly, international regulation of genetic resources is inadequate for the preservation of genetic resources. The institutions regulating access règimes (CBD, IARC, and CGIAR) have provided genetic resources to private firms freely, thus, do not concern with the conservation of these resources. As I indicated above, the commercialisation of genetic resources has been realised through the international institutions. Therefore, these resources are not privatised completely but provided to the firms via international institutions. Actually, this partial commercialisation without payments for the utilisation of genetic resources tends to lead to increasing loss of biodiversity. The proponents of strong global IPR règime fail to recognise this partiality, as well as, the significance of the global access règime.

B) PROMOTION of INNOVATION

In this part, I will try to assess international regulation's effect on developing countries' local research and innovation structure. According to the proponents of strong IPR règime, it provides new incentives for local research and innovations. They argue that lack of effective protection for innovations would inhibit the productive capacity of a country. Profiting from an innovative technology is possible only when its innovators or developers have exclusive monopoly rights to make, use, and sell product resulting from their developmental efforts (Bhat, 1996: 206). Governments grant these exclusive rights to allow the original innovator or right holder to receive adequate financial incentives for investing resources in the research, development, and commercialisation of that innovation for the common benefit of society. Hence, these guarantees have ability to promote local innovator.

As emphasised in the first part, the TRIP agreement binds all member countries of WTO to conform the certain standards regarding the availability scope and use of IPRs. Its stated objective is that the protection and enforcement of IPRs contribute to the promotion of technological innovation. (Brenner, 1998: 22). However, these arguments do not fit the reality. Whereas genetic resources that are found to have commercial prospects are commonly found in the wild lands of

developing countries, commercial manufacturers claiming intellectual property rights to these resources are generally multinational corporations.

Though there is very little precise information available for the impact of global IPR règime on developing countries, it is possible to evaluate the general pattern on this issue. This inadequacy stems from the novelty of phenomenon. Because, intellectual property rights règime of different nations on genetic resources are dependent on different historic and cultural assumptions about ownership of ideas (Bhat, 1996: 206). Before the TRIP agreement lots of developing country did not adopt any property right règime (namely UPOV) on genetic resources and biotechnology. However, this scene largely shifts after the TRIP agreement. Because, WTO has the ability to impose its central principles through trade and other kind of sanctions.

On the other hand, developed countries have adopted other kinds of sanctions for imposing IPR règime to developing countries. For example, in 1988 the US congress passed the Omnibus Trade and Competitiveness Act, which is known as Special Section 301. "Under the auspices of special 301, the US trade representatives drew up a "watch list" of countries whose intellectual property rights règime were not strong enough." (Purdue, 2000: 99). Brazil, India, Thailand, and China all faced US action over IPRs.

In this respect Mexico is an important country. External pressures have forced this country to adopt an effective IPR règime. According to Solleiro, US Trade and Tariff Act, and multilateral negotiations within GATT and NAFTA forced Mexico to adopt strong IPR règime. (Solleiro, 1995: 44).

A recent study on the possible impacts of the IPRs on Mexico indicates that the effects of property rights on Mexico's local innovation capacity are highly marginal (Solleiro, 1997: 574). A survey carried out among seed companies, plant breeders, public officials and non-governmental organisations shows that the introduction of IPR is not expected to provoke a significant increase in the private activity of plant breeding and research.

Also, the statistics on patents requested for biotechnology in Mexico indicate that protection for biotechnology is mainly a benefit to foreign companies. Patent applications from June 1991 to December 1994 shows that Mexican firms acquired only 6% of total biotechnology patents. On the other hand, USA firms acquired 57%, E.U 28%, and Japan 3%. (Solleiro, 1997: 575).

Another study assessing the impacts of IPR règimes on developing countries reflects a similar pattern as in the Mexico case (Swanson and Göschl, 2000: 87-88). This study conducted in countries that adopted UPOV règime: Chile, Argentina, and Uruguay.

Plant Breeder Titles Granted in Three Developing Countries (1968-1994)		
Nationality	Domestic	Foreign
Argentina	416	206
Chile	141	90
Uruguay	16	9
Source: Swanson & Göschl, (2000)		

This study demonstrates that the domestic plant-breeding sector in these countries is not really competing with the multinationals, but dealing in a completely distinct set of resources. The industry that uses modern agriculture and biotechnology methods continues to be the exclusive field of the MNCs. In each of the above countries, the market in hybrid varieties is dominated by MNCs while domestic firms dominate self-pollinating varieties. This situation also reflects to the R&D expenditures.

Average R&D Expenditure of Plant Breeding Companies in Argentina			
Specialisation of Firm	***1986***	***1992***	***%***
Hybrids	1286	1900	48
Self-Polliniating	180	186	3
Source: Swanson & Göschl, (2000)			

In hybrid varieties, which MNCs have dominated, R&D expenditure is high. Conversely, in self-pollinating varieties dominated by local firms R&D expenditure is very low. These results indicate that strengthening IPRs will not promote local innovators in developing countries. Rather, MNCs would be benefited from these rights by acquiring exclusive rights on their products.

These statistics strongly oppose to the assumptions supported by the proponents of global IPR règime. There is no tendency for the development of local innovation and research in developing countries that adopted global IPR règime. Conversely, the statistics indicate that MNCs are the most important actors dominating biotechnology sector. To a certain extent, these MNCs centre in developed countries.

ORIGINS OF PROPERTY RIGHTS IN BIOTECHNOLOGY		
Country of Origin	***Total per Country No***	***Total Per Country %***
United States	5775	35.4
Japan	5706	34.9
European Patent Office	2903	17.8
Rest of Europe	268	1.6
Australia	181	1.1
Canada	94	0.6
China	173	1.1
Israel	70	0.4
Republic of Korea	119	0.7
Other Countries	103	0.6
Source: FAO April 1999		

As it is indicated in the above table, around 35% of biotechnology patent originated in USA, in 1990-95, and a similar percentage from Japan. The European Union acquired 18% of patents in this period. Strikingly, other countries, including all developing countries, acquired only 6% of total patents. These results strongly oppose to the argument that IPR règime would promote the national innovation capacity of developing countries.

Conversely, a strong property rights règime on plants is a gain for MNCs, which dominated biotechnology sector. They are the most active applicants of property rights all over the world.

MOST ACTIVE APPLICANTS FOR PROPERTY RIGHTS ON PLANTS		
APPLICANT	***COUNTRY***	***NUMBER***
Pioneer	United States	70
Monsanto CO	United Kingdom	50
Zenecca/ICI	United States	28
Sandoz	Switzerland	24
Calgene	United States	23
Holden's Foundation	United States	23
Planck Gesellschaft	Germany	19
Ciba Geigy AG	Switzerland	17
Hokko Chemical	Japan	16
DuPont de Nemours	United States	15
Adapted from FAO April 1999		

The striking point here is that among the most active applicants of property rights, there is no private firm or public initiative originating from developing countries. In contrast, MNCs dominating the biotechnology industry acquire almost all property rights both in developed and developing countries. These statistics are consistent with the strong demands of MNCs for the realisation of intellectual property rights and free access règime to the third world's genetic resources. The major thrust for universalising the IPR règime and valorisation of genetic resources given by the MNCs. Two significant issues require further attention.

The framework for the TRIP's agreement was conceived and shaped by three organisations-the Intellectual Property Committee (IPC), Keidanren, and the Union for Industrial and Employees Confederations (UNICE). IPC is a coalition of 12 major U.S. corporations: Bristol Myers, Du Pont, General Electric, General Motors, Hewlett Packard, IBM, Johnson & Johnson, Merck, Monsanto, Pfizer, Rockwell, and Warner. Keidanren is a federation of economic organisations in Japan, and UNICE is recognised as the official spokesperson for European business and

industry. Evidently, biotechnology firms are very active in shaping TRIP agreement. This agreement largely reflects the demands of MNCs (Shiva, 1997: 81).

Other important point is the considerable pressure of biotechnology industry on the USA Administration during the CBD's negotiation process. This pressure exerted by The Industrial Biotechnology Association (IBA), representing 80 per cent of US biotech companies. The major demand of IBA was that CBD be made subordinate to the provisions of GATT, which provide the convenient ground for MNCs to acquire property rights for their product (Purdue, 1995: 102). The IBA as well as the Pharmaceutical Companies write to USA administration complaining that the drafts of CBD texts did not guarantee strong IPR to them. The result of this pressure is the Article 16. This article states that: In the case of technology subject to patents and other intellectual property rights, "such access and transfer shall be provided on terms which recognise and are consistent with the adequate and effective protection of intellectual property rights." (Purdue, 1995: 102). In other words, though CBD guaranteed developing countries to regulate their own access règime to the genetic resources, Article 16 forces developing countries not to prevent the access to genetic resources that are patented or given other property rights. All in all, the international regulation for genetic resources to a certain degree reflects the demands of MNCs.

So far, I have analysed the effects of international regulation on the developing countries. What is appeared from this analysis is that this regulation neither prevent the loss of biodiversity nor promote the local innovation structure. Rather, this regulation leads to the increasing loss of biodiversity. Additionally, the winners of this regulation are MNCs rather than developing countries. The commercialisation of genetic resources by the means of political institutions provides free access to genetic resources for the benefits of multinational corporations. They acquire exclusive rights on the third world's genetic resources through the intellectual property rights. These resources constitute approximately 35% of the inputs for the production of new varieties (Swanson and Brand, 2000: 89). MNCs acquire this significant input without any payment through free access règime to the genetic resources.

On the other hand, what remains to developing countries is increasing loss of biodiversity. Moreover international regulation does not promote their local innovations. While the valorisation of their genetic resources leads to overexploitation, they do not acquire anything from international regulation.

Nevertheless, I have reached to this conclusion by conceiving other variables as constant. In other words, this study has focused on the effects of international regulation on developing countries. Therefore, this paper has not dealt with other points such as the structural weaknesses of national innovation capacity and total R&D expenditures of developing countries. Certainly, they are very important determinants for assessing the impacts of international regulation on developing countries. However, in this study, I have tried to evaluate its impacts on third world under given conditions.

CONCLUSION

This paper has endeavoured to analyse international règimes and institutions dealing with genetic resources from the perspective of regulation theory. Although the major part of literature over genetic resources tackles largely with intellectual property rights règime regulated by recent TRIP agreement, this study has suggested that this règime should be considered with access règime. Since the latter is largely excluded by literature over genetic resources, the actual impacts of international regulation could not be analysed adequately. In this respect, I have urged that these two règimes are highly related and they prepare the ground for the valorisation of genetic resources, which have been under pre-capitalist condition in general. In other words, the consequence of these two règimes is to "establish markets with political efforts" for genetic resources. Regulation theory, therefore, provides very convenient framework for elaborating the institutions for genetic resources. This is because this theory takes in to account the significance of institutions for the stabilisation of capitalist accumulation. As indicated above, the valorisation of genetic resources are not complete in sense of complete privatisation and commercialisation. Rather, the expansion of the structural characteristics of capitalist accumulation to the third world genetic resources is realised by the means of political efforts and institutions.

Actually, this is one of the most important reasons as to why the loss of biodiversity can not be prevented with the existing regulation. First, since the private firms, especially MNCs, acquire genetic resources via international gene banks without any payments, they do not have to invest for the preservation of these resources. Second, international regulation undermines traditional conservation methods of local communities. The combining effects of these two are the lack of any incentive for the conservation of genetic resources. Therefore, the partial valorisation of genetic resources via international regulation is one of the most significant reasons of the increasing loss of biodiversity.

On the other hand, in opposition to the arguments of proponents for strong global IPR règime, it does not promote local innovation-research capacity of developing countries. This means that the promotion of local research-innovation capacity is determined not by IPR règime of a country. Other structural variables such as total R&D expenditures, public-private division in production, government policies in relation to production, capital flows so on are the actual determinants of local innovation-research capacity of a country. However, these determinants are beyond the scope of this study.

Taking everything into account what remains to developing countries as a result of international regulation for genetic resources is nothing but the overexploitation of their natural resources. They gain nothing from the IPR règime in terms of the promotion of local innovation-research capacity. Besides, they are not compensated for the utilisation of their resources. However, MNCs gain the monopoly on natural resources of third world via global IPR règime and acquire 35% of the inputs for the production of new varieties freely via access règime.

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