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STAFF PAPER

EQUITABLE PATENT PROTECTION FOR THE
DEVELOPING WORLD

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Preface

The papers presented herein were presented as "position papers" at the workshop "Equitable Patent Protection for the Developing World" held at Cornell University on October 2-3, 1989. The papers are intended to represent different opinions and approaches on the critical issues; economic considerations, legal issues, perspectives of business and perspectives of critics. While it is recognized no individual can express all the diverse perspectives in these areas, the papers did serve to establish the framework for the ensuing dialogue. The results of that discussion are being reported in a "primer" on the subject. This publication then serves as a vehicle for making the individual talks available to a wider audience than was able to participate in the workshop.

The participants were as follows:

R. Barker	Agricultural Economics, Cornell University
J. Barton	Law School, Stanford University
W.R. Coffman	Plant Breeding & Biometry, Cornell University
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J. Fessenden MacDonald	Cornell Biotechnology Program
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R. Hardy	President, Boyce Thompson Institute
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W. Lesser	Agricultural Economics, Cornell University
C. Pray	Cook College, Rutgers University
J. Putnam	Economic Growth Center, Yale University
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William Lesser
Workshop Organizer

AN ECONOMIC ASSESSMENT OF PATENT LAW APPLIED TO DEVELOPING NATIONS

William Lesser*

Although the response is often emotional, patents are in the main a tool of economic policy. They are, in the words of the US Constitution, intended "to promote the progress of science and useful arts" (Art.1 Sec.8) and as such are appropriate for economic analysis. The intent of this paper is to review what economic theory and analysis can say about the implications of patents for the developing world. From that review some implications about the need for and appropriate form of patent law can be drawn.

SOCIOECONOMIC IMPLICATIONS OF PATENTS

One of the oft-stated criticisms of patents is that they cannot be shown to increase social welfare. In a much quoted remark, Professor Machlup, a student and supporter of the US patent system, has said, "No economist, on the basis of present knowledge, can possibly state with certainty that the patent system, as it now operates, confers a net benefit or a net loss upon society." (p. 79). Critics attest what is true for the US is doubly so for the developing world with its inferior and dependent industrial system (e.g., UNCTAD, p. 63). A change in inventive activity such that, "Inventiveness is no longer the individual inventor's flash of genius, but now an institutional process" (Doyle, p.301), has also been used to raise questions about public benefits.

Implications for R & D: US Experience Under the PVPA

Thirty years later it remains difficult to determine the social implications of patents. Do they increase social welfare by fostering the development of new, efficient

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Paper presented at the Workshop on Equitable Patent Protection for the Developing World

products or do they raise costs through the conferrence of a temporary monopoly on the inventor? It is however possible to make a definitive statement about the investment-inducing effect of patents. The strongest evidence comes in the aftermath of the US Plant Variety Protection Act of 1970 (PVPA)(7 USC 2321 et seq.). The PVPA allows patent-like protection for sexually propagated plants and seeds heretofore excluded from protection. This law permits before and after analysis because prior to about 1967 (a time, arguably, when breeders anticipated its passage) there was essentially no private investment in breeding non-hybrids. Subsequently, surveys have shown 14 leading private plant breeding research firms increased total breeding expenditures (including hybrids) by four-fold in inflation-adjusted dollars from 1960-80. Numbers of private soybean breeders increased over 1966-84 from 2 to 63. Privately-bred soya bean and wheat varieties began to top lists of recommended varieties for farmers, and statistical analysis demonstrated a weak relationship between private varieties and yield (Butler and Marion; Brim; Perrin et al.). These findings are particularly significant because the PVPA provides less complete protection than does the US Patent Act (see Lesser 1986). Expenditures however have been spread highly unevenly across the crops with soya beans experiencing the largest gains.

The investment response to one law in the US does of course not prove anything about the effects of patent law in the developing world. What it does show is that patents can have the incentive effect predicted by economic theory. Lacking is any real evidence that patents do not have an incentive effect in developing countries.

Share of Patents Held by Nationals and Foreigners

Data show a very high proportion of patents in the developing world are held by foreigners, particularly those from the developed countries. Typically the level is placed at about 80-85 percent as shown in Table 1. The proportion "not worked" is estimated even higher, 90-95 percent. (For a more complete and up-to-date listing see Evenson, Evenson and Putnam, Table 19.2).

Table 1: Patent Holdings in Developing Countries by Ownership and Use, 1972

<i>Item</i>	<i>Number of patents held (in thousands)</i>	<i>Percentage distribution</i>
<i>World distribution:</i>		
Developed countries	3,300	94
Developing countries	200	6
	<hr/>	<hr/>
	TOTAL . . 3,500	100
<i>Distribution in developing countries:</i>		
Held by nationals	30	
Held by foreigners	170	
<i>of which:</i>		
used	10-20	5-10
not used	150-160	90-95

Source: UNCTAD, Table 12

These data are taken as evidence "... the patent system reserves Third World markets for foreigners. . . .In the ultimate analysis, the present patent system can be said to represent the most unequal and most unjust of all relationships between industrialized and third world countries." (Abraham, p.54). Greif however points out that a small proportion of domestic patents is not unique to the developing world (p. 207). He cites data showing foreign holdings of patents are in fact higher in smaller industrialized countries like Canada and Belgium (90%) than in some developing countries, e.g. Argentina at 65 percent. In fact, he shows for the developing world the proportion of foreign held patents rises with level of development, as measured by GNP (Figure 1). Rhetoric aside, what is seen is a commercial relationship in which foreigners patent in the more robust economies for they provide the stronger markets.

Figure 1: Patent Applications of Foreign Origin and Gross National Product

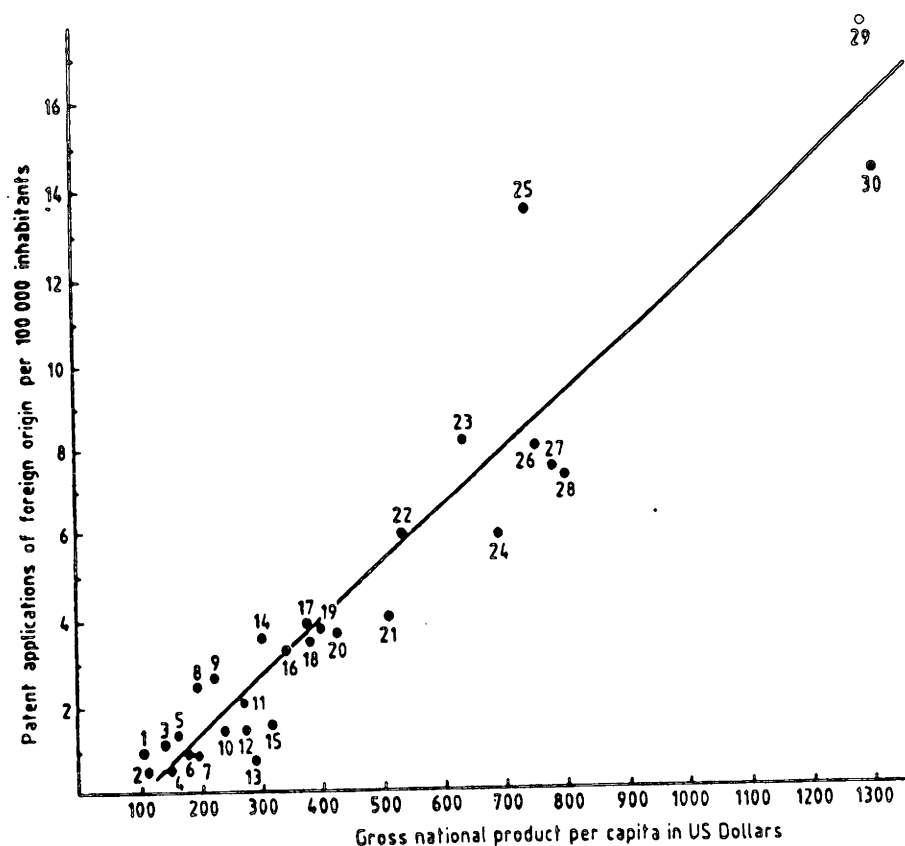


Figure 2: Patent Applications of Foreign Origin and Gross National Product

List of Countries (to Figure 2)

- | | | |
|-----------------|-----------------|----------------|
| 1. Sri Lanka | 11. Morocco | 21. Peru |
| 2. India | 12. Jordan | 22. Brazil |
| 3. Pakistan | 13. Ghana | 23. Costa Rica |
| 4. Uganda | 14. South Korea | 24. Lebanon |
| 5. Malawi | 15. Syria | 25. Mexico |
| 6. Kenya | 16. Ecuador | 26. Uruguay |
| 7. Sierra Leone | 17. Gambia | 27. Chile |
| 8. Bolivia | 18. Tunisia | 28. Jamaica |
| 9. Philippines | 19. Colombia | 29. Argentina |
| 10. Egypt | 20. Guatemala | 30. Singapore |

Source: Greif, Figure 2

The small portion of patents "worked" in a developing country - 5-10% - is interpreted as suggesting patents are sought as a means of maintaining an import monopoly. The low figure of working however comes from a particular definition of

that term. Working in that case means domestic production/use of a patented product/process. If the definition is expanded to include any utilization of the patent -- production or importation -- then, according to Greif, approximately 50-60 percent are not used at all (e.g. not produced or marketed) and 30 percent are used to protect imports. The UNCTAD report indicates use rates of 30 to 60 percent during the lifetime of the patent (p. 40). But these are nearly the same percentages as for developed countries (UNCTAD, p.207) and again suggest no discrimination under the patent laws against developing countries. Admittedly the data base for both of these positions is small and quite dated so more current work is called for.

Individual Inspiration vs. Corporate R&D

The suggestion that patents are no longer a valid incentive because invention has shifted from the inspired individual to the plodding corporation represents a misunderstanding of the role of patents. Economists have categorized the inventive process in three stages, often called "invention, innovation and diffusion." Invention is that flash of inspiration that something new will and can work (Jewkes, et al.). Studies of the inventive process have shown that major inventions tend not to be fostered by financial reward but rather stem from a creative drive. The following and necessary step is innovation, the reduction to practice referred to in patent discussions. This is typically expensive, exacting work, the "99 percent perspiration" Edison referred to when describing the inventive process. It is to compensate this endeavor, for which there is little but financial reward, that patents are directed. And because much of this work is highly detailed, it is often better suited to the corporation than the individual. This is also true for the developing world where much of the "inventive process" is indeed an adaptation of existing knowledge to a new environment (Evenson, Evenson and Putnam).

The existence of patents nonetheless may assist the individual making the base invention. The individual (or country) with a new concept but lacking the resources and/or interest in developing it fully risks its loss when discussing a joint arrangement with another party. A patent on the product provides a basis for protecting that

invention while revealing it to possible partners.

Monopoly of Patents

Several studies have expressed concern over the concentration of ownership of patents in developing countries. Vaitos for example quotes data from Columbia showing 60 percent of the patents in pharmaceuticals and chemicals were owned by 10 firms, all foreign (p. 76). This is cited as evidence that patents are used not to encourage inventive activity "... but to aid profit maximization through minimization of competitive forces." (p. 77).

The concentration of patent ownership is potentially a problem, especially in smaller economies which cannot support multiple competing firms. It is however important to recognize the inventive process itself does not inherently lead to concentration of ownership for while the patent may issue to the firm the invention did not necessarily initiate there. An in-depth study of 70 major 20th century inventions indicated that only 24 originated from corporate R&D. According to another study, DuPont's own labs provided only 10 of its 25 most important inventions (Jewkes, et al., Chps. 15 and 16; Mueller). The remaining inventions were licensed from other, often smaller firms, in a pattern of specialization between invention and innovation which is being repeated in much of the biotech industry today.

A second factor mitigating the concentrating effect of patents is the fact that R&D projects tend to be modest in size, with typical projects falling in the \$250,000 - 400,000 range, well within the financial scope of many corporations (Scherer, Chap. 15). But perhaps more significant, the financial ability to invent (as well as to absorb the risks of R&D investments) must be balanced with the incentive to invest in such uncertain ventures. Studies have shown that smaller firms often must innovate as a means of gaining access to an industry dominated by established firms. The established firms for their part may not feel the need to innovate to such a degree. Thus patenting, by providing a means of protection of innovation research, helps to provide some competitive dynamics in many industries.

Empirical analysis supports these theoretical projections. Expenditures (R&D/sales) tend to rise then fall off at modest firm sizes of \$250-400 million in sales. Both patenting rates and commercialization of patents follow a similar but more pronounced pattern (Scherer, pp.415-22; Greer, pp.582-83). This pattern of rising then falling inventive action is further reflected in the market control (concentration) of firms. Using four firm concentration, the share of sales of the largest four companies in an industry, inventive activity is limited below 15, then rises up to a peak at about 50-55 percent and falls again (Scherer, pp.433-37). A four firm concentration level of 55 is generally considered to be moderate to high. Firms of higher concentration levels likely have other means of protecting their market position than through innovation, or have become complacent and are in danger of losing their lead to more innovative rivals. Manufacturers of steam locomotives, for example, ignored the threat of diesel electric engines until it was too late.

Conclusions

Much is not known about the inventive process and the role of patents as part of corporate strategy. Economists are now beginning to turn their attention to firm behavior, of which a patenting strategy forms a part. Certainly many of the classical studies of patents are dated and in need of updating.

But much is known, at least enough to question the most extreme criticisms of the role of patents in developing countries. We have some evidence that patents do indeed promote investment in inventive activities. There is little evidence supporting the counter argument that they have no effect. The ownership and use of patents differs little between the developed and developing worlds. In particular, the ownership of patents does not appear to be excessively concentrated in a comparative sense in the developing countries. Patents do appear to be playing a role in making new technologies available to developing countries, even if they are less successful in the more demanding role of promoting domestic production.

ACCESS TO NEW TECHNOLOGIES

Evenson and Putnam have identified the following general objectives of a patent system (p. 26):

- * Stimulating national invention at the lowest cost;
- * Purchasing technology from abroad at the lowest possible cost;
- * Protecting the interests of its sellers of technology abroad.

Like most policy decisions, there are substantial trade-offs among these objectives. The achievement of the first two for example may be possible through a law biased to favor indigenous inventors, but that would likely confound the third objective. Indeed, it was to avoid just that situation the Paris Convention was adopted over a century ago with the principal provision that foreign applicants be treated the same under the patent law as national applicants. Today there are nearly 100 signatures to the Convention, including many developing countries.

Access in the Absence of Patent Laws

The balance among these objectives can be achieved through the form of the patent law. That issue is discussed below. Here the basic question of whether a country should have a patent law at all is addressed. Fundamental to this question is whether a country can free-ride on an invention elsewhere, that is, is access possible without the need to license and pay royalties? If indeed it is then a patent law may be difficult to justify.

Here we may recognize two classes of developing countries:

- 1) more industrially advanced countries like India which are able to adapt and utilize imported products and processes, and
- 2) less sophisticated countries which must import technical expertise along with the products.

Next one must consider the perspective of the patent holder; will he/she be willing to make the invention available in countries lacking patent protection, and can access be prevented anyway? Combined with the technological sophistication of the

recipient country, the result is a two by two "technology transfer matrix" (Figure 2).

Figure 2: Technology Transfer Matrix

Inventor Control Over Technology	Recipient Country Technical Sophistication	
	More Advanced	Less Advanced

Can Prevent Transfer	A	B
Cannot Prevent Transfer	C	D

Consider first the case of the less advanced countries. The foreign inventor would deny access when possible (case B) if there were risk of losing control of an invention or of stimulating competition in a third country (say by manufacture and export). An invention in this category might include a chemical product for which the country requires technical assistance for production and possibly assistance in the construction of a plant. With a close, ongoing relationship, the inventor could use other means such as a contract to control the use of the invention. In that case patent rights are not essential for access. A patent law may nonetheless have the benefit to the technology receiving country if it provided a less costly means for the inventor to protect the invention. But in general patents in this case are redundant; they provide but one means of controlling the use of an invention.

The situation under "D", a non-preventable transfer, is quite different. These inventions could include a genetically altered coffee plant with coffee berry disease resistance. Recognizing that a country could eventually get free access to the variety, the patent holder may likely make it available directly for a smaller fee than the patent license. This would be done on the principle that some remuneration is preferable to none. Here a patent law would be potentially more costly than no law. The benefit to the country would be limited to the speed of access. Certainly the patent holder would supply these lower priced markets last. In some cases the delay might not matter; in others such as for a major agricultural export like coffee the cost could be extremely

high. The prudent national government may wish to minimize access risk by having a patent law in place.

Alternatively, a firm from a third, more technologically advanced, country could provide the access. As a hypothetical example, a firm in South Korea could use a patent application to decipher an invention (say a new chemical compound) and provide that information with other technical assistance to a less developed nation. The cost would be expected to be below the full patent license rate because the technology-provider did not have to pay for the research and development expense. The actual fee would depend on the degree of competition among technology suppliers, the amount of effort involved in moving from a patent application to a product, and other factors. Recognizing the futility of preventing access altogether the inventor, as in the case of the coffee plant, could license the invention at below the full royalty rate. But this would be done last and only if the market were large enough to justify the cost and risk of alienating customers paying the full rate. That is, while the price is indeterminate, it is certain some considerable delays would be involved in accessing the invention.

Inventors are expected to take a very different attitude to the more advanced developing countries. Those countries (as with the hypothetical example above of South Korea) could present a threat to the patent holder by producing and exporting legally to third countries which also have no patent protection and possibly illegally to countries where patents are held. Release of an invention to these advanced countries then could lead to loss of sales in third markets and possibly to expensive infringement cases. Faced with these possible costs, firms can be expected to be very cautious about releasing inventions when preventable (case "A") to such countries as India, which precludes patents for a wide range of products, large as that market is. Even when access cannot practically be prevented (case "C") it will be delayed as vigorously and long as possible.

Conclusions

A comprehensive patent law is not the only means of gaining access to new technologies. Many countries can free-ride on the costs of the inventive process and

eventually access the technology at a lower or zero cost. The penalty for such an approach is a delay in acquisition. The delays are likely to be most extensive for the more technologically advanced countries and those with very small potential markets. The former can become a competitor of the patent holder while the latter group may not financially be worth the effort. At the other extreme are the least advanced countries which require extensive knowledge transfer along with new technologies. Patents in such cases can be readily substituted for other forms of contracts.

The principal uncertainty is the activity of firms in third countries which can recreate an invention from the patent application materials and provide it with other necessary technical support to developing countries. The number of firms in this category is unknown as are their fees and speed of technology transmission, but they will be slower than the inventor who has previously worked through most of the technical production issues.

The cost of a delay in acquisition will have to be determined by each country and for each technology group. In the area of plant and animal varieties, where technological advances appear to be accelerating and upon which many national economies are heavily dependent, the costs could be quite high.

FORM OF PATENT LAW

The issues of whether to have a patent law and the form of that law are not separable. The law is but a means to an end. The actual form of the law is all important in achieving the other two identified goals of a law, the stimulation of national invention at the lowest cost and the protection of the interests of its sellers abroad.

The issues typically raised in regard to the form of patent laws, particularly as they apply to developing countries, include the following:

- 1) the duration of protection,
- 2) breadth of protection,

- 3) arbitrariness of assignments for essentially simultaneous discovery,
 - 4) inability of developing country inventors to compete in developed country markets,
 - 5) protection of adaptive inventions - suitability of patent law,
 - 6) complexity of operating a patent office and hence the inevitable dependence on developed countries, and
 - 7) exclusion of selected products from protection, particularly health and agricultural related, for moral and/or equity reasons,
- Each of these will be considered in turn.

Duration of Protection

Patents are typically in effect for 17 to 20 years, this being a largely arbitrary period. Shortening the period would reduce the period of monopoly control, but the practical effect could be minimal. Most patents, if exploited at all, have a commercial life of less than 20 years. In countries with periodic maintenance fees, only a small percentage of patents are maintained for the full duration. For annual plant varieties the commercial life in the US averages seven years and declining, far short of the allowed 18 years. Shortening the protection period for these inventions would do little.

For the longer-duration inventions a briefer period could be counter productive. Patent holders may raise the price as a means of recovering the same profit over a shorter period. This is not possible for all products in all markets, but is conceivable with some pharmaceuticals. With the lack of more precise information, maintaining the current duration seems best advised.

Breadth of Protection

There is a direct, inverse relationship between the breadth of protection and the incentive to invest in inventive activities. At the same time broad protection can be a disincentive for investment by other firms, particularly domestic firms. In Vaitos's words (p.83), "The technological infrastructure that might be created by imitating, absorbing and adapting foreign technology to domestic conditions is restricted." Notably,

restriction is not the same thing as prevention. Patent holders in general will encourage adaptations of their inventions which enlarge or extend the market as these adaptations typically require a license from the original patent holder. But the base issue is clear, the broader the protection the greater the area of technology dominated by a patent.

As a prudent step, it appears desirable to err on the side of too narrow protection. Alternatively, broad measures for compulsory licenses will accomplish the same objective of minimizing the threat of monopoly, although at the cost of some incentive to invent. At the same time, there are overriding practical reasons to standardize the language describing the requirements for a patent. The benefits of standardization underlie the creation of the WIPO Model Law for patents. A conflict then arises, how to benefit from the standardization of language while allowing flexibility in assigning breadth.

The suggested resolution is the use of standard language but reservation of the right of interpretation as a national privilege. This dual approach is especially applicable when regional patent conventions are used. What is recommended is that patents be interpreted in any legal challenge according to national standards, not the interpretation established by the central granting authority. This approach will retain national flexibility within a standardized framework.

Arbitrariness of Assignment

Vaitsos riles at the arbitrariness of granting "... patents to a particular company and to exclude others when independent research often leads to almost simultaneous discoveries by several." (p.88). Within the patent system there is the alternative of the "first to invent system" used in the US. There the legal process of "interference" (35 U.S.C. sec.135) is used to determine who actually made the discovery first, even when the patent had been previously granted to another. This approach has much to recommend it (see Lesser 1987b) but is burdened by an enormously complex system of proof involving voluminous laboratory notes. It does not appear appropriate for developing countries. In place is the prevailing "first to file" system under which the first filer is presumed to be the first inventor, certainly an arbitrary designation. First to file systems create a

winner-take-all race to invent and file.

From an economic perspective, the race to invent first is not necessarily bad. It provides a real incentive to hasten research, thereby speeding the availability of some inventions. At the same time, multiple researchers will likely take somewhat different approaches. In the uncertain world of research and invention, this too enhances the potential of ultimate success. The economic cost is that some of the research will be duplicative and therefore an inefficient use of funds.

It is difficult to determine how the balance comes out between these costs and benefits. Experts suggest that some competition for invention is beneficial for society if not necessarily for individual firms (see eg., Scherer, Chap. 15). From a social perspective then there is no evidence for rejecting the first to file system, arbitrary as it may be.

Inability of Developing Country Inventors to Compete in Developed Countries

This concern runs along the following lines. Technology exports:

<u>patents granted abroad to foreigners</u>
patents granted at home to nationals

from developing countries is limited. This indicates that patent systems in the developing countries "do not stimulate domestic invention in the face of foreign competition" because "most inventions patented in the third world are of an 'adaptive' nature, rather than being highly original and suitable for export." (Evenson, Evenson and Putnam, p. 490).

Two issues are involved when evaluating these statements. First, the criterion should be the degree to which a patent system facilitates any exportation of technology, not only exportation to developed countries. Indeed, to the degree a developing country's inventive activity is adaptive, the market would be other similar (economically and geographically) countries. Yet many of those countries lack patent laws or proscribe the patenting of major areas of technology such as those for agriculture. Thus the measure is a biased one for many developing country inventors are foreclosed from their best

markets. Developing countries in fact discriminate against each other through restrictive intellectual property law.

Second is the matter of the interpretation of the patentability standards. Must an invention be highly original to be patented? Even if the patentability criterion is in accordance with international standards, that does not necessarily imply the interpretation of those standards is similar, as Evenson, Evenson and Putnam suggest (p. 506). By maintaining the flexibility of national interpretation, as suggested above, developing countries can maintain more control over the patent process.

Adaptive Inventions

Continuing in the vein of the above point on adaptive inventions, the recommendation is made that a patent law also allow for so called utility models or petty patents (Evenson, Evenson and Putnam, p. 507). These are variants of patents which provide inferior protection for less original inventions. The weaker protection - weak in terms of both a short duration of around four years and narrow in scope - is appropriate for the limited contribution made to technology. Utility models are well suited to the developing world just because they protect the modest, adaptive research which predominates there. They are also to be favored because under many systems the protection is granted rapidly - in months rather than years -- and at low cost.

The Evenson, Evenson and Putnam argument is a convincing one; the inclusion of utility models is an appropriate one for many developing countries. That said, the form of the law is important to consider.

Quick granting systems are potentially problematic because they function only as registrations. The validity of the grant is not determined unless and until there is a court challenge. Companies could potentially dominate large areas of technology by filing highly questionable applications. Competitors must then go through the delay and expense of a court proceeding to discredit the grants, certainly a chilling prospect. Rather than a pure registration system, it is suggested in the Revised Model Law that utility models be subject to the "novelty" search to substantiate their newness. The

"obviousness" requirement is however discarded meaning a utility model would be granted for a new (not existing) but modest technological advance. There are many parallels with the protection granted through plant variety certificates available in the US through the Plant Variety Protection Act (but less so with other national interpretations of Plant Breeders' Rights which employ an examination procedure).

Complexity of the Patent Process

The operation of a patent office is a complex process requiring trained personnel in a range of technologies. That need led Vaitsos (p. 89) to charge that these offices will forever be dependent on the developed countries. His claims are most applicable to registration systems under which developing countries register patents issued by a developed country, typically the former colonial power. That system has been used by Kenya for some time, to name a single example (Juma and Ojwang, pp. 34-6).

Dependence may be implied by a patent law, but dependence not necessarily on a developed country. Rather a system of regional patent granting conventions is likely to evolve along the lines of the European Patent Office in the north and the African Regional Intellectual Property Organization (ARIPO) in the south. These institutions conserve resources by pooling expertise in one office.

What is not accomplished is the lifting of the burden from a national court system which must rule on matters of infringement and compulsory licenses, if allowed. There is no dependence possible here as the court must be national. Its establishment will be one of the major challenges for a well functioning patent system. And a system which does not function well can be a detriment.

Exclusions of Protection for Classes of Products

Protectable inventions vary substantially across countries, those most commonly excluded being chemicals, medicines, agricultural technologies, and higher living organisms (Evenson, Evenson and Putnam, Table 19.1). Exclusions are synonymous with having no patent protection for those goods, and with similar effect. The product classes typically selected for exclusion are often major ones of public health and agriculture.

As Greif notes (p. 209), these exclusions remove the incentive for both domestic and foreign research in these important technological areas.

Many valid reasons, including moral judgments, exist for excluding some areas from patent protection. What is important is that each country determine for itself the costs and benefits of an exclusion. Under no conditions should an exclusion be accepted from another national law without considering the domestic ramifications. That applies to the WIPO Model Law exclusion of plant and animal varieties (Sec. 112 (3)(iii)) as well as the more extensive list found in the current Indian law.

Conclusions

The actual form of a patent law is critical to its function. The aspects of the law considered here suggest that four are of principal importance:

- 1) the allowance of searched (but not examined) utility models,
- 2) the standardization of patent granting terminology but retention of national autonomy to interpret that terminology,
- 3) the development and maintenance of a technically knowledgeable court to decide patent-related matters, and
- 4) a careful evaluation of any products to be excluded from patent protection.

A satisfactory resolution of these four points will provide relief from most of the concerns expressed about patents in developing countries.

CONCLUDING COMMENTS

A review of the literature suggests that many of the concerns expressed about patents in developing countries are unfounded. There is no evident discrimination against developing countries and monopoly control is not certain, at least under properly designed and enforced laws. What the literature does not resolve -- and likely will never resolve -- is whether patents are indeed socially beneficial.

We do have good evidence that patents encourage investment in inventive activities. Investment response is greatest for the innovation phase, the transformation

of a workable idea into a commercial project. That step is typically best undertaken by a corporation and for that reason corporations hold the greatest number of patents.

Some evidence, both theoretical and empirical, exists that utility models are more appropriate for indigenous inventors in the developing world. Utility models, which offer modest protection for modest inventions, also have the prospect for intra-developing country trade. Provisions for these models should be included in developing country patent law.

What is not well understood is the penalty to developing countries for not having adequate patent protection. The penalty is not a lower level of domestic investment in the working of a patent, that is, local production. Production of patent products in each country for which there is a market is clearly infeasible. Rather the issue is whether the absence of patents hinders access to an invention. My guess is that access will eventually come. But what is the delay and the cost of that delay? Countries must decide for themselves and structure their laws accordingly. Most certainly patents should not be rejected outright or major classes of products (agriculture, pharmaceuticals, etc.) excluded based solely on vague, general expressions of potential problems. As an alternative, non-voluntary license provisions should be structured so that problems can be averted when and if they arise.

That said, there remain countries for which a patent system is not practical. At a minimum a technically competent and independent court system is needed to maintain integrity in the system. At best such a system cannot be generated quickly. It is therefore essential that countries evaluate carefully the costs and benefits, as well as the form of a patent system. If it appears appropriate then plans need to begin soon on establishing the necessary institutional arrangements.

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PATENT PROTECTION IN DEVELOPING COUNTRIES-- AN OVERVIEW

by Joseph Straus*

I. Introduction

1. There are two main reasons why one could assume that there are some common general standards of patent protection in developing countries: on the one hand the joint past efforts of a great number of developing countries for revising the Paris Convention for the Protection of Industrial Property of 1883, and on the other hand the recent move of the United States of America aimed at raising the standards of patent protection in developing countries by shifting the issue of international protection of intellectual property rights from the World Intellectual Property Organization (WIPO) also or even primarily under the umbrella of the General Agreement on Tariffs and Trade (GATT). Nothing, however, would be more erroneous than the idea of developing countries forming a homogeneous unit as regards patent protection. Prior to starting with my brief analysis, however, I would like to trace back the origins of the general position of developing countries and only then touch upon some common or similar characteristics of their respective national legislations.

2. What had started in the early fifties as a predominantly academic debate on prospective economic impacts of the international protection of industrial property on the economies of the then-emerging developing countries (Pretnar, Ladas), had developed in the sixties and the seventies into a major political issue between developing and developed countries. Discussions took place in and resolutions have been adopted even by the General Assembly of the United Nations Organization on this topic. The main work, however, has been performed by the UN-specialized agencies: the United Nations Conference on Trade and

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Development (UNCTAD) and the World Intellectual Property Organization (WIPO). All these efforts eventually resulted in extensive aid programs carried out by WIPO, often jointly financed with United Nations Development Program (UNDP), aimed at instructing, advising and educating the personnel of the industrial property authorities of developing countries on the one hand and in a series of diplomatic conferences for the revision of the Paris Convention on the other.

3. The starting point for the revision conferences on the part of developing countries had been the complaint that the basic principle of the Paris Convention, namely the national treatment, clearly functions only in favor of nationals of developed countries mainly to the economic detriment of developing countries. The basis for this argument being the observation that the high proportion of patents granted by developing countries to nationals of developed countries does reflect the unequal economic and technological strengths of developed and developing countries. Moreover, it has been observed that an overwhelming majority of patents so granted has been used only for securing import monopolies (Vaitsos, UNCTAD, Schwaiger with further references). The central issue of developing countries as regards the envisaged revision of the Paris Convention therefore has been to provide for additional measures in order to enable developing countries to either force patent owners to work their inventions in countries where patents had been granted, or to provide for remedies in form of, e.g., exclusive compulsory licences etc. [Kunz-Hallstein]. In addition, it has been argued along the lines of a basic study of UNCTAD, a lowering of some standards of protection in national laws of developing countries, especially as regards the subject matter eligible for patent protection, the period of protection and the patent working requirements (i.e., problems on compulsory licenses), was economically necessary and appropriate (UNCTAD, Vedaraman, Vaitsos, Schwaiger). Whereas the revision work for the Paris Convention just has come to a standstill in a blind alley, some of the developing countries in fact have introduced a great number of ideas advocated by UNCTAD in their respective national laws.

4. In contrast to developing countries, the developed countries have always been pointing out the important role of patents in context of technology transfer and international trade, as well as for national technological, economic and social developments. Any weakening of patent protection, in their views, would therefore only negatively affect the important international technology transfer and the national industrial development of developing countries, eventually to the detriment of developing as well as of developed countries (Beier).

5. In retrospect and on the basis of the available data one has the impression that many of these past discussions and actions have been based on too many simplifications: When reviewing the presumed effects of patent protection the critics have concentrated on some relatively narrow aspects, viewed them in an isolated way, but then have drawn general conclusions on such a basis. Patents have been attributed an economic role they cannot play themselves alone neither in inciting national technological and economic development nor in encouraging or supporting transfer of technologies between developed and developing world.

6. In this context statistics have played a decisive role: When focussing on the negative ratio between the number of patent applications filed by residents and by nonresidents it has been completely overlooked that this ratio is very similar for developing as well as for developed countries. Although Professor Lesser will deal with this economic issue more in depth, some figures may be offered already here: In 1986 in 52 developing countries, including China, Democratic Republic of Korea and Republic of Korea, VietNam and Yugoslavia, but excluding Argentina, for which no data were available, 31.36% of applications have been filed by residents and 68.69% by nonresidents, or in absolute terms 17,715 to 38,757 applications. In 23 developed countries, excluding F.R. of Germany, Japan and U.S.A., this ratio was 16.91% to 83.09% or 75,581 to 371,333. Even with Germany and

the U.S.A. the ratio still remains 27.76% to 72.24% or in absolute terms 181,942 to 473,512. Only when the extremely specific and atypical Japanese situation is taken into account (290,238 national applications) the overall picture changes considerably to 48.28% to 51.72% (in absolute figures: 472,181 to 505,835) (all according to WIPO statistics for 1986).

7. Being only a lawyer, I can only draw the following conclusions and observations:

--It is plain fact that creative potentials of each single country are obviously inferior to the rest of the world, this being true even for the U.S.A. and Japan. The ratio between domestic and foreign applications, under normal circumstances, therefore, is overwhelmingly negative.

--In extreme cases of developed countries, such as Luxembourg, the portion of foreign applications can be as high as 99.3%.

--The negative ratio alone, however, does not offer any reliable information either on domestic innovative activity or on the functioning of international technology transfer.

--Whereas on average there are no significant differences between the ratio in question in developed and developing countries, the absolute figures for a number of developing countries are eye-catching, no matter how small or how large they are: Ghana, Kenya, Zaire and Zambia may serve as examples: In 1986 no single application by a resident has been filed in Ghana, Kenya, and Zambia and only 5 in Zaire; the respective figures for foreign applicants have been 47, 144, 133 and 81.

8. Overall, the absolute data reveal indeed the indisputable fact that residents of developed countries account worldwide for 472,181 national applications, the respective number for developing countries being around 20,000. Bearing in mind that more than 13,000 of these applications constitute the share of only six developing countries, namely Argentina (no data for 1986 available), Brazil (1.864), China (3.494), India (.999), Mexico (.735), and the Republic of Korea (3.642) the picture for developing countries is even more

unfavorable. It seems to be quite clear that whereas patents in developed countries are widely used as an incentive to invent and to innovate as well as a means of fostering and backing the international flow of goods and technologies, the same is not the case with developing countries. Only a few of them are in the process to follow.

II. Developing Countries and the Membership in the Paris Convention

9. In view of the fact that nearly half of the signatory states of the Paris Convention in 1883 were developing countries, e.g. Brazil, El Salvador, Guatemala and Serbia, and also in view of political developments which have taken place after the Second World War, it does not come as a complete surprise that at present out of the 99 Member States of the Paris Convention, more than sixty, at least according to my incompetent judgment, are developing countries (1989 Industrial Property 6 et seq.). Since the accession of both the Korean Republics in 1980, of the People's Republic of China in 1985 and of Malaysia in January 1989, the only remaining white spots on the Map of the Paris Convention are located in South-East and East Asia with Bangladesh, India, Pakistan, Singapore, Taiwan and Thailand, and in Latin America with Bolivia, Chile, Colombia, Ecuador, Peru and Venezuela. All together these white spots still represent far more than one billion of the earth's population and enormous intellectual research and development capabilities as well as capital resources (McLeland and O'Toole). Notwithstanding the fact that the absence of these countries of the Membership in the Paris Convention can by no means be equated with a total lack of patent protection (in case of India, Sangal is of the opinion that it could accede to the Paris Convention without having introduced a single change into its patent law), at least in the case of the Latin American Non-Members one can assume that even the modest standards of the Paris Convention in the field of patents are not met.

III. Brief Overview of the Existing Patent Laws of Developing Countries

10. Any attempt to offer even a most condensed overview of patent laws of about 70 developing countries would simply constitute a physical impossibility and would hardly appropriately serve the ultimate goal of this workshop. Moreover, it would to some extent duplicate the excellent study of the International Bureau of the World Intellectual Property Organization made for the GATT Negotiating Group on Trade-Related Aspects of Intellectual Property Rights, and issued under the title "Existence, Scope and Form of Internationally Accepted and Applied Standards/Norms for the Protection of Intellectual Property" in September 1988 (Doc. Nv.WO/INF/28). This document is providing a reliable set of information on all questions of interest as regards patent protection in developing countries, regardless of their membership in the Paris Convention. I shall therefore base my comments and observations primarily on this document. Since the WIPO Document, however, does not provide for any background information as to the relationship of the pertinent patent law provisions with past international developments, a few additional remarks are needed here.

11. In spite of their joint efforts as regards the attempt to revise the Paris Convention, at the national level the developing countries did not act or react in the same way: India, for instance, had started already in the early fifties with amendments of the old Patents and Design Act of 1911 by introducing changes relating to compulsory licensing of patents in the field of food or medicine (Vedaraman), but has eventually introduced an entirely new Patents Act only in 1970 in parallel to the International discussions (Vedaraman, Swaminathan, Sangal, McLeland and O'Toole). In this Act further limitations of patent protection have been introduced: As regards the subject matter eligible for patent protection--e.g., new uses of known substances and known processes, products that are mere admixtures, the assemblage of known devices that function in a known way, testing methods used during manufacture, methods of agriculture or horticulture, processes for treatment of

humans, animals or plants to render them free of disease or to increase their economic value, inventions relating to atomic energy, products intended for or capable of use as a food, medicine, or drug, or substances produced by a chemical process. Processes for making foods, drugs and other chemicals remained patentable, however, with the proviso that the term of the patent is reduced to five or seven years respectively (either from sealing or from grant). Moreover, far-reaching restrictions have been placed on patent rights in respect of compulsory licenses: All patents on processes for making food, medicine or drugs, or items produced by chemical processes, are deemed to be endorsed with the words "Licenses of Right" three years from the date of sealing, regardless of the patentees attempts to work the invention (McLeland and O'Toole). In view of the debates previously referred to, it should be noted that in the three years immediately preceding the Act, residents of India filed on average 1,210 applications per year; the applications of nonresidents averaged 4,121 per year. During the first three years after the Act entered into force, patent applications of non-residents were cut down by about 50% to 2,185 (McLeland and O'Toole). Whereas in the year 1984 and 1985 the figures for foreign applications remained substantially unchanged (2291, 2493), the negative trend for national applications has continued (1,003, 982) [all according to WIPO statistics].

12. Changes along the same line as in India, but from the outset directly linked up to international discussions have been introduced by the Decision No. 85 of the Cartagena Agreement of the Andean Pact states in 1974. They have subsequently been transformed into national laws of Colombia, Ecuador and Peru in the years 1977, 1978 and 1979. There has, however, been no such transformation in the laws of Bolivia and Venezuela (Schwaiger). In the context of the Decision No. 85 it should only be mentioned that it contains an explicit provision according to which "the patent does not grant the exclusive right to import the patented product or the product produced by the patented process." (Article 28, para. 2. cf. Schwaiger).

13. Similar though not that far-reaching changes have taken place also in Brazil, already in 1971 (Siemens) and in Mexico in 1976. In Mexico for certain kinds of inventions, even inventor's certificates, similar to those in the Soviet Union, have been introduced (Rangel Medina, Rangel Ortiz, De Villafranca Andrade). Among other countries, Yugoslavia, the first socialist country who after the Second World War had readopted the classical patent system, has changed the patent law and followed the Indian and Mexican examples (Boskovic, Besarovic).

14. Other developing countries, especially former British and French colonies in Africa, as for example, Kenya, Lesotho, Morocco, Tanzania, Tunisia, and others, however, did not substantially or did not at all change their laws. The only remarkable exemption was Algeria, where, however also an entirely new political and economic system has been introduced (Mezghani). Apart from the fact that patent laws of those African countries who register only patents already granted in the United Kingdom, e.g. Kenya, Tanzania (Seyoum, 16 IIC 704 [1985]), or Lesotho (Kumar), seem to present an insuperable obstacle for local inventors and are thus not an operable incentive for indigenous innovative activity, other patent laws also, revised, or not, seemingly can not produce such effects until now. This can be seen from statistics compiled for seven African and Latin American countries for the years 1979 through 1986.

Patent Applications Filed by Residents

	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>
Algeria	5	5	14	7	15	30	19	34
Colombia	45	*	*	*	82	69	72	81
Ecuador	23	*	14	22	24	24	*	27
Ghana	-	-	*	*	-	*	-	-
Kenya	-	-	-	-	-	-	-	-
Zaire	*	3	8	6	6	8	*	5
Zambia	1	*	*	1	1	-	-	-

*No data reported.

Figures based on published WIPO statistics.

15. As regards African developing countries, it should also be noted that in the sixties and seventies they built up two regional patent systems: First, on September 13, 1962, an Accord Relating to the Creation of an African and Malagasy Intellectual Property Organization was signed in Libreville (revised at Bangui in 1977). This Accord has provided for a regional intellectual property office in Yaounde, Cameroon, which serves as the National intellectual property office of the member states in terms of the Paris Convention and grants national patents according unified rules as attached to the Accord in Annex I (Finnis).² Secondly, in April 1976, an Agreement on the Creation of an Industrial Property Organization for English Speaking Africa was concluded in Lusaka. It entered into force in 1977.³ This Agreement too has provided for a new patent granting system with one common granting authority located in Harare, Zimbabwe, and for regional patents having effects of national patents in all designated member states (Seyoum, Mills). Since the adoption of the "Harare Protocol on Patents and Industrial Designs within the Framework of the Industrial Property Organization for English Speaking Africa" (ESARIPO) in 1982, in the member states, which adhered to this Protocol,⁴ patents are issued even on vastly unified legal basis (Ntabgoba). Both African regional patent systems until now, however, did apparently not incent national innovative activities in the member states, at least, as far as these are reflected in patent statistics: for 1984 for ESARIPO countries, e.g., one patent application of residents and five foreign applications were reported; for the Libreville-Accord States (OAPI) the figures for 1986 were 1 and 597 respectively [all according to published WIPO statistics].

² At present the following states are members: Benin, Burkina Faso, Cameroon, Central African Republic, Chad, Congo, Ivory Coast, Gabon, Mali, Mauritania, Niger, Senegal and Togo (1989 Industrial Property 19).

³ In January 1989 the following were the member states: Botswana, Gambia, Ghana, Kenya, Lesotho, Malawi, Sierra Leone, Somalia, Sudan, Swaziland, Uganda, United Republic of Tanzania, Zimbabwe and Zambia (1989 Industrial Property 19).

⁴ All member states of the ESARIPO-Lusaka Agreement except: Sierra Leone, Somalia and United Republic of Tanzania (1989 Industrial Property 19).

16. A completely different way of dealing with industrial property matters has been chosen, however, by the largest developing country of the world, namely the People's Republic of China. After extensive and cautious studies in European, Japanese and the U.S. patent system, China in 1985 promulgated a modern patent law along the lines of those systems. Only as regards subject matter eligible for patent protection some limitations not dissimilar to those previously known to many European patent laws were introduced (Guo). Already in 1986 residents of the People's Republic of China filed 3,494 patent applications.

17. As a result of the aforementioned heterogeneous national developments in developing countries and their very specific (non)reactions to some international initiatives, e.g. that of UNCTAD, patent laws of this group of countries vary so substantially that it appears quite impossible even to mark and identify some common characteristics. These laws cover a whole range of variations: on the bases of the already quoted WIPO Document of September 1988, it can be observed that many national patent laws of developing countries even as regards the subject matter eligible for patent protection and the duration of patent protection as well as in respect of provisions concerning compulsory licenses are similar or even very similar to those of many developed countries. Also in the latter group the differences of patent laws under aspects of interest vary considerably. Only for some groups of developing countries, such as those of Latin America some common shortcomings in patent protection can be identified:

- The Short Duration of Patents: 5 years in Colombia, Ecuador, Peru (with the possibility of a 5-year extension if the patent is adequately worked); 5 or 10 years in Venezuela (depending on the will of the applicant); 5, 10 or 15 years in Argentina (depending on the invention's merits and the wishes of the applicant--the decision is made by the National Directorate of Industrial Property).⁵ In connection with this group also Yugoslavia, with its 7-years protection period (with the possibility of a

⁵ In all cases counted from the date of grant of the patent.

seven-year extension if the patented invention is actively and seriously worked in the country)⁶ and India in respect of the 5 respectively 7 years duration of patents for process inventions for manufacturing food or medicine⁷, should be mentioned.

- Many exclusions from patent protection, especially as regards pharmaceutical⁸ and food⁹ and chemical products¹⁰ but also pharmaceutical and food processes¹¹. As regards other exclusions no substantial difference between developing and developed countries can be observed.
- In most developing countries patent laws provide for non-voluntary licenses for non-working, for interdependence of patents, in the public interest, on grounds such as abuse of monopoly, in the interest of public health, or in cases of inventions relating to food or to medicine and the like. A closer examination of the countries which provide for such non-voluntary licenses does, however, not reveal any special pattern for developing countries. In each group developing as well as developed countries are equally represented.

⁶ Counted from the publication date of the unexamined application.

⁷ Counted from the date of sealing of the patent or from the date on which the complete specification was filled whichever period is shorter. The general duration of a patent in India, however, is 14 years.

⁸ These products are excluded from patent protection in 49 countries, of which, however, only around 30 are developing countries.

⁹ Out of 35 countries excluding these inventions from patent protection, about 20 can be viewed as developing countries.

¹⁰ Here the respective figures are 13 out of 22.

¹¹ In the case of pharmaceutical processes the figure is 8 out of 16; in the case of food processes 6 out of 10.

IV. Recent Developments

18. Some 25 years after the first Report of the Secretary general of the United Nations on "The Role of Patents in the Transfer of Technology to Developing Countries" was published and 15 years after UNCTAD had started to develop new strategies in this field, a new, more realistic and less ideologically influenced attitude towards the role of industrial property rights in international technology transfer as well as in international trade has become the prevailing view in a number of developing countries. This new attitude is mainly the result of two experiences of developing countries: on the one hand, changes which had been introduced along the lines of the former UNCTAD ideas, i.e. a general lowering of the standards of patent protection, did not produce the expected positive economic effects. Neither did indigenous inventive activity increase (often even the opposite was the case), nor did foreign technology owners accept those changes. The latter, more or less, dropped down their patenting activities and became increasingly hesitant in trading -- selling or licensing -- modern technologies to those developing countries. On the other hand, developed countries under the leadership of the United States of America started to develop new strategies aimed at strengthening worldwide protection of intellectual property rights by changing and amending their national legislation relating to international trade as well as by approaching the General Agreement of Tariffs and Trade (GATT) as the forum for providing new instruments in the context of trade related aspects of intellectual property rights (GAO-Report, Stalson, Max-Planck Institute (ed.) "GATT or WIPO"). Though it is difficult to estimate which of the two aspects was more important, it should be quite clear that it was the combination of both which has caused the general change in the attitude.

19. The successful influence of the U.S.A. has been demonstrated by changes which have been introduced in Patent Laws of the Republic of Korea (Gadbaw, in Gadbaw/Richards, 272; Kyum Lee), and Taiwan (Richards, id. 340). Less visible but still influential was the

intervention of the U.S. in Mexico (De Villafranca Andrade). In all these countries, which benefit considerably by the General System of Preferences (GSP) (Gadbaw/Richards, id. Tables 1.4 and 1.5 at 23,24) in their trade with U.S. main changes relate to improvements in patent protection of chemical and especially pharmaceutical products and processes. Other countries, such as India (Swaminathan) and Yugoslavia are in a process of reassessment. In Yugoslavia an improved patent law is in the final stage of promulgation.

V. Developing Countries and Plant Breeders Rights

20. In view of the great importance of plant biotechnology for the agriculture of developing countries, a final remark should be focused on their past attitude toward Plant Breeders' Rights established along the lines of the 1961 International Convention for the Protection of New Varieties of Plants (UPOV-Convention). For a variety of reasons protection offered on the basis of this convention would have appeared to be an interesting protection system also for developing countries: First, it provides for protection also for varieties of "natural origin," i.e. discovered in nature, which could be viewed favorable particularly in those developing countries disposing of rich botanical diversity. Secondly, special protection requirements (homogeneity, stability) are officially examined on the basis of field trials, thus allowing a close watch of the actual value of applications (in agricultural and economic rather than legal terms). Thirdly, UPOV-member countries as yet are obliged to protect only a certain minimum number of taxa (to be included in the list of protected taxa), which presumably served some of the developed countries to use plant breeders' rights also as an instrument of national agricultural policy in the past (Straus, 1989). Fourthly, the limited scope of protection, covering only acts of commercial production and distribution of propagating material as such of the protected variety but not the variety or parts of it as end-products, e.g. leaves, fruits, seeds, etc., in combination with the so-called breeders' exemption (i.e., free utilization of protected varieties for creating as

well as commercializing new ones), should have been quite sympathetic to this group of countries (Straus, 1988).

21. In spite of these seemingly attractive aspects of plant breeders' rights, until now no single developing country joined UPOV. Though Brazil, Colombia, India, Mexico, and Venezuela for some time had been contemplating this kind of plant varieties protection, they all seem to have postponed or even totally suspended all respective legislative plans. This was primarily the result of controversial discussions within the UN-Food and Agriculture Organization (FAO) on the access and exchange of natural resources such as plant germ plasm on the one hand and advanced varieties (cultivars) on the other, between developing and developing countries. This is still an ongoing debate in which, however, not all positive as well as negative aspects of plant breeders' rights for developing countries have been taken into consideration (Straus, 1988). In this context it should be only added that so far only Argentina (in 1971) and Chile (in 1977) introduced in their national laws on seed protection for new varieties of plants. Neither of these two countries, however, became a member of UPOV, nor is at present contemplating its accession.

VI. Conclusions

22. Notwithstanding the hesitant acceptance of patents on the part of economists (Machlup), developed but more and more also developing countries regard patents as potential instruments for inciting indigenous inventive and innovative activity and also for supporting international transfer of technologies. For some time, especially in the sixties, the seventies and the early eighties, the respective role of patents, however, was over - as well as underestimated. Moreover, those estimations were based on much to a narrow and one-dimensional basis--i.e., statistics of patent applications filed by residents and nonresidents in developing countries. Though it should have been clear from the outset, developing countries only slowly have realized that patents are but one of the many elements which determine developments in the area of innovation and technology transfer:

they only can properly function when they can fit in and their use is supported by the general economic and legal system of a given country (they function differently in a market-oriented private economy; in a market-oriented but partly or predominantly state owned economy; or in a centrally planned and state-owned economy). Tax and customs laws, the system of state subsidiaries, the laws on foreign trade and the like are equally influencing the role, patents can play in macro-economic context.

23. No matter how questionable the general value of patent statistics for the measurement of the economic effectiveness of the patent system might be, the absolute figures offered at the beginning of this paper need little comment: quite independent of the patent system applied, i.e., whether offering a high or a low level of protection, residents of only few developing countries indeed make use of it. Moreover, in most developing countries also foreigners only rarely apply for patents. This is even true for developing countries with comparably large markets. The propensity towards patenting of applicants from developed countries is, however, evidently influenced by the quality of the protection offered. The lower the standards, the less applications. Less applications at the same time does not only mean less exclusive rights of foreigners in the territory of a developing country, but, as a rule, also more hesitations as regards technology transfer and international trade in high-tech areas in general. Instead of reliable first class partners, less reliable and more doubtful parties enter the market. Moreover, foreign administrations, dissatisfied with the situation produce pressures and seek retaliatory measures. One can conclude that a solid standard of patent protection in a developing country, especially when accompanied with reasonable supporting legal measures in the field of antitrust, tax and foreign trade law, is a good and working incentive for technology transfer, foreign investments and international trade in general. The plain availability of a solid patent protection is an important psychological aspect of this complex issue. Quite understandably it is not always reflected by patent statistics.

24. As far as the relationship between patent protection and indigenous inventive activity in developing countries is concerned, no convincing solutions have been offered as yet. Neither high nor low standards of protection have so far been able to produce positive results, i.e., offer strong enough incentives to induce national inventive and innovative activity. Whereas patentability requirements corresponding to international standards are needed in order to prevent foreign applications for second or even third class technologies in developing countries, they as a rule, present a prohibitive barrier for residents to enter the field of patents. For the latter lower protection requirements would seem more appropriate. Local industry should be properly stimulated to invest and innovate. Since the principle of national treatment under the Paris Convention does not allow any kind of discrimination of foreign applicants, nationals of the member states, solutions should be sought outside patent protection. Utility models, often called small ("petit") patents, could be viewed as such complementary alternative to the patent system. Due to their lower protection requirements, combined with a narrower scope of protection and a shorter period of duration, utility patents primarily attract residents. Foreign applicants always favor the stronger patent protection. In this respect statistics for developed and developing countries do not reveal any substantial difference. Surprising enough that utility model protection, which can easily be tailored according to specific needs of a country, was as yet introduced only in a few countries of the Third World.

25. "Equitable" patent protection has always been and will remain wishful thinking at all levels: individual, i.e., investors, micro-, i.e. entrepreneurs, as well as macroeconomic, i.e. country level. The only success promising way is a realistic assessment of balancing of interests involved as well as of potentials the patent protection is capable to offer.

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INTELLECTUAL PROPERTY NEEDS OF MULTINATIONALS

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ABSTRACT

Most industrial technology in the world is produced and owned by the private sector, not by governments. It is created at great expense and often with high risk of commercial failure.

To the private sector inventor or entrepreneur, enforceable intellectual property protection is crucial. It is quite literally the sole incentive for risk taking.

Regrettably, however, we continue to witness widespread disrespect for intellectual property rights reflected in runaway piracy and counterfeiting of proprietary goods. This unchecked epidemic has caused staggering monetary losses to property right owners; has created non-tariff barriers to international fair trade; and has deprived certain nations of cutting-edge technology so vitally needed for economic development.

This paper examines the consensus view of private-sector multinationals on intellectual property protection; where those firms believe improvement is required; and how it might be achieved.

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INTELLECTUAL PROPERTY NEEDS OF MULTINATIONALS

INTRODUCTION AND BACKGROUND

"Intellectual property" is the generic phrase used to describe patents, scientific know-how, trade secrets, trademarks, copyrights, semiconductor mask works and industrial designs. In this paper we shall sometimes use the abbreviation "IP".

Most industrial technology and IP rights in the world are produced and owned by the private sector, not by governments. This factor is crucial to keep in mind during this discussion. If IP rights were largely owned by governmental organizations, we could easily reach an entirely different set of conclusions regarding the global handling and respect for IP rights. Private interests in the latter case would be preempted by overriding public interests.

Although this paper examines IP needs of private-sector multinational corporations, there is no intent to exclude the IP needs of private sector firms dealing only in national markets. Indeed, their needs often coincide. And it should be emphasized that the term "multinationals" is by no means confined to American enterprises. Quite the opposite, we have witnessed a dramatic consensus among multinational firms in Japan, America and Europe (including the UK) with respect to the crucial need for improved IP protection throughout the world. After all, these three world powers are major trading partners facing global trade issues of common dimensions.

HOW LARGE IS THE IP RIGHTS ENFORCEMENT PROBLEM?

The problem is enormous! Based upon a recent study in America alone, the U.S. International Trade Commission says U.S. business loses as much as \$61 billion a year in sales and royalties because of international violations of IP

rights. This staggering figure is two-to-three times what was estimated in 1983. Companies in communications-related industries reported some of the heaviest revenue losses.

The Chemical Manufacturers Association, a U.S. trade group, reports that the chemical industry loses between \$3 billion and \$6 billion annually because of international IP infringements. The Pharmaceutical Manufacturers Association, another U.S. trade group, estimates that the U.S. pharmaceutical industry loses \$4 billion a year to IP piracy.

Agrichemical and pharmaceutical multinationals find themselves especially vulnerable to severe losses from IP piracy. Ethical pharmaceutical companies spend an average of \$125 million to develop and launch a new drug because it requires testing over 10,000 compounds to identify that drug coupled with a delay of up to 10 years to obtain required governmental approval. Tragically, however, within a few months of product launch, the identical drug will sometimes already be copied in certain well-known countries which are notorious for their disrespect of IP rights.

Exactly the same trend is well-documented for agricultural multinationals. Only 1 out of 15,000 screened agrichemical candidates will exhibit economic value to agriculture and thereby lead to a single commercial product. Time lapse from laboratory to agrichemical market is 8 to 10 years at costs of \$50-70 million. Global piracy of proprietary agrichemicals is well-documented.

HOW CAN ONE SENSIBLY EXPLAIN THE RUNAWAY IP PIRACY PROBLEM?

As a lawyer, I am often asked by my clients to explain this incredible epidemic of global IP theft. But how can anyone explain rationally and believably to a private sector inventor or entrepreneur the justification for piracy and

theft of privately-owned IP rights? How can one ever justify theft of property by commercial enterprises anywhere in the world? The answer to these questions is surely complex and far-reaching. But that is not the primary concern of this paper. The larger and more immediate question is how can multinationals deal with this widespread problem?

HOW DO MULTINATIONALS REACT TO KNOWN THREATS OF IP PIRACY?

Private sector multinationals owe a well-defined fiduciary duty to their shareholders to act responsibly as custodians for valuable technology owned by the enterprise. This duty is universally taken seriously. Private companies are therefore forced to exercise discipline in dealing with the valuable property rights of the organization. They are permitted no discretion in the matter. Company officers consider unthinkable the notion of carelessly dissipating valuable IP rights.

Thus, it is abundantly clear that major drug and chemical companies which are investing so heavily in cutting-edge technologies, will share their science and the fruits of that science only in those countries which will provide meaningful IP shelters. It would be a breach of the fiduciary obligation to shareholders for any responsible multinational to squander its most valuable scientific know-how and trade secrets by licensing or otherwise transferring those rights into a jurisdiction where their safety cannot be guaranteed. This is not a gesture of arrogance on the part of multinationals. Instead it is a calculated response to reality.

Likewise, why should a multinational allow its product expertise to enter a jurisdiction where the property rights covering that product are not given the degree of exclusivity which they deserve? The enormous front-end R&D

costs for bringing a pharmaceutical or an agrichemical to market would foreclose anything but the most careful disposition of the property rights that go with that product.

It is no coincidence, therefore, that you will find the drug and chemical multinationals operating only in foreign jurisdictions where the IP climate is favorable. This is a long-standing reality. Sadly, certain developing countries which are in the most need of important drug and agrichemical technology, will be deprived thereof because the technology owner cannot risk a legal transfer of that technology into a country without meaningful IP laws. The history book is replete with case histories documenting this very fact.

Continued unbridled disregard for IP rights in certain countries only worsens the chances for an offending country to appear attractive to investment and cooperation from the IP owner.

WHAT CAN BE DONE TO ENHANCE A DEFICIENT IP CLIMATE?

It is without dispute that patents stimulate research and competition and therefore lead to a continual growth in industrial development. If anyone doubts this premise and would like to see valid documentation, I call your attention to the Italian experience on pharmaceutical patents. This has become a classical case history which should convince even the most cynical critic of product patent protection for pharmaceuticals.

For those of you unfamiliar with the Italian experience, full patent protection for pharmaceutical inventions first became available in Italy in 1978 after a long period of controversy. In contrast to the fears expressed by opponents of patents, the domestic Italian pharmaceutical industry has since become stronger in terms of market share and other relevant parameters.

The number of jobs in the pharmaceutical industry, in contrast to Italian industry in general, has increased. Moreover, predictions of an explosive upsurge in pharmaceutical prices have been shown to be groundless. Perhaps most important, the 1978 change to full patent protection has resulted in a greatly increased investment in research and development in Italy. Many confirmed critics of the patent system were thereby silenced.

Japan experienced a similar economic upsurge beginning in 1976 when product patent protection for pharmaceuticals was first introduced. This is likewise well-documented.

Absence of adequate IP protection virtually eliminates the transfer of leading technology from the private enterprises of industrialized countries to the developing areas. Documented studies of the impact of sound patent systems compel the following conclusions:

- (a) Wherever industry has developed, patent systems have emerged and have been adopted. They have played a crucial role in encouraging innovation.
- (b) No alternative system for the encouragement and growth of new industry by private enterprise has been identified or established.
- (c) National patent systems have been of enormous importance in global development of technology with resulting benefit to the expansion of international trade.
- (d) There is no other rational alternative.

In further testimony to the impact of patents on a nation's development, one can turn to the pharmaceutical industry. It has been dramatically shown that it is only in countries with good patent protection that pharmaceutical research has functioned successfully. And it is in those same countries where we have seen the most significant progress in medicine; in the availability of lifesaving drugs; in the quality of medical care; and in the level of public health.

Patents increase the incentive for capital investment in research, development and production. They are the foundation for economic growth and industrialization.

This historical record in the industrialized countries, which began as developing countries, demonstrates that intellectual property protection has been one of the most powerful instruments for economic development, export growth and the diffusion of new technologies, art and culture.

WHAT EXACTLY ARE THE IP NEEDS OF MULTINATIONALS?

We said earlier that multinationals need a conducive local IP environment to attract their valuable products and technology to foreign nations. This means that private sector firms having valuable technology or products available for transfer will expect the licensee or recipient to operate in a nation with IP standards such as those found today in the United Kingdom, the United States, Japan and Western Europe.

When faced with a country that provides inadequate IP protection, multinationals will either take their products and technology elsewhere or simply make available products that contain older technology which they can afford to lose. It is that simple.

There is remarkable unity in viewpoint among private sector counterparts in Japan, Europe, America and the United Kingdom. Private sector companies within these developed nations are adamant in the notion that global respect for IP rights is still deficient in certain regions --- and must be improved in order to eliminate unfair and harmful trade distortions.

These same multinationals unanimously share the conviction that a nation's pathway to economic development resides in creativity and innovation, not in piracy and imitation.

IS ANY PROGRESS BEING MADE?

The good news is that several countries in recent years have made tangible progress toward improving IP hospitality for pharmaceutical and chemical inventions. Here are a few examples:

- In December 1986, Taiwan changed its patent law to provide protection for pharmaceutical and chemical products.
- In November 1987, Canada amended its onerous compulsory licensing provisions applicable to pharmaceutical inventions.
- In January 1987, Mexico enacted a new patent law that acknowledges the right of pharmaceutical and chemical products to enjoy patent protection, although the protection will not become effective until 1997.
- Korea enacted product patent protection for chemicals and pharmaceuticals, effective in July 1987.
- The Indonesian Government recently introduced legislation to establish that country's first patent law, which would provide patent protection for pharmaceuticals and chemicals.

- The Chilean Government currently is considering changes in its patent law to protect pharmaceuticals.

SUBSTANTIAL PROBLEMS STILL REMAIN

Unfortunately there are still some very substantial venues where the abuse of IP rights runs rampant. Much work remains to be done to persuade certain countries to strengthen the protection of IP rights. Negotiations toward this end are prominently taking place in the celebrated GATT negotiations which have been underway for the past 2 years.

Those countries which are so stridently opposing minimum IP standards fostered in the GATT negotiations by Japan, Europe, UK and the United States, are doing so based upon reasons of national interest and policy which apparently transcend internationally-accepted principles of fair trade. Whether or not the GATT negotiators can ultimately produce an IP code which would permit like-minded countries in both the developed and developing worlds to adopt a comprehensive agreement with high levels of protection, remains to be seen.

In the meantime, if ongoing government-to-government negotiations remain unproductive, the following unfortunate conditions are likely to prevail:

- (a) Developing countries so desperately in need of advanced technology will continue to be deprived thereof because private-sector IP owners cannot risk devastating losses in a jurisdiction with deficient IP standards.
- (b) Rampant and widespread piracy of intellectual property will continue unchecked because of lax local enforcement. Massive damage to private-sector enterprises will proliferate worldwide.

CONCLUSIONS

The international trade-distorting problems caused by inadequate and ineffective national protection of intellectual property have become prohibitive and disgraceful. A successful GATT agreement on intellectual property is urgent and critical for the good of all nations --- especially for developing nations.

A GATT agreement must not permit a reduction in IP protection from levels already afforded in major industrialized countries. Otherwise, the entire exercise has been a failure. Furthermore, adequate IP standards alone are not enough. They must be coupled with a code defining dispute settlement and enforcement standards.

A successful GATT agreement can eliminate distortions in the world of trade caused by the lack of respect for intellectual property. At the same time, it will create no barriers to legitimate trade. A successful IP agreement in the GATT negotiations will achieve the following two critical results:

- (a) an effective deterrent to international trade in goods involving infringement of intellectual property rights; and
- (b) the adoption and implementation of adequate and effective rules for the protection of intellectual property.

Quite clearly, of course, a successful GATT negotiation will necessarily require the adherence by all GATT contracting states to the finally-approved code. Countries with currently inadequate levels of IP protection must be induced through incentives to adhere to a GATT agreement.

Thus, a number of important incentives can be included in the GATT agreement on intellectual property (preferential treatment, transition rules and technical assistance), which could, when coupled with incentives outside the GATT framework (consultations, market access and assistance), expedite the process and encourage adherence by all GATT contracting parties.

For all nations of the world who are being drawn together ever closer on a daily basis in this grand scheme of international trade, we are collectively facing a critical moment in time on our consensus toward intellectual property rights. For the good of all mankind and in the spirit of global harmony, let us fervently hope that our respective GATT negotiators can successfully reach some meaningful type of IP agreement in this current round of negotiations. The world will be better for it.

AN OVERVIEW OF CONCERNS REGARDING THE IMPACTS OF
PATENTING LIFE FORMS IN THE THIRD WORLD

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This paper will present a selection of concerns raised by the possibility of extending industrial property rights to life forms in the developing countries. The concerns are presented in a brief series of questions that policy-makers and others involved in the debate over patenting life in the Third World might ask themselves before taking any decision on the matter.

I. WOULD PATENTING LIFE STIMULATE LOCAL INNOVATION?

Patents are often regarded as an incentive to stimulate investment and effort in research and development to provide tools for economic growth (industrially applicable inventions). The developing countries ought to question whether this function of the patent system would successfully apply in their countries if they decided to extended monopoly rights to life forms. If we look at other industrial sectors where patent protection is afforded in the Third World, we have strong reason for concern that patenting life would favour foreign multinational corporations active in those countries at the expense of local innovation and industry.

On the global scale, developing countries are at a disadvantage in the international patent scene. According to Surendra Patel, Senior Advisor to the United Nations University and ex-Director of Technology Transfer at UNCTAD, in the 1970s, of the 200,000 patents granted by developing countries, "an overwhelming majority of these -- as high as 84% -- were owned by foreigners, mainly the transnational corporations of the five major developed market economy countries." Further, Patel notes, "Over 95% of these patents were not used at all in production processes in the developing countries."¹ In other words, less than 5% were "worked" in the framework of national production in the Third World.

Comparable images of this situation can be found at the regional and national levels in the developing world. Using WIPO data, a recent

report issued by the Interamerican Development Bank shows that in the years 1981-1984, over 85% of the patents granted in Latin America were owned by foreigners, not Latin Americans (see annexe 1).² The Bank points out with concern that many of these were never "worked" but used merely to secure, protect or monopolise import flows. Data from individual countries confirm this wholly unbalanced picture. For example, in Peru in the 1960s, of some 5000 patents granted, only 54 were reportedly exploited, i.e. 1.1%.³ More recently, in 1980, it was found that of nearly 23,000 patents registered in Mexico that were supposed to be worked, only 8.6% (1,951) were industrially exploited.⁴

This situation, as a reflection of the profound inequality in North-South relations, could give rise to legitimate doubts as to the benefits of the patent system for nationals in the Third World. In any event it certainly is a very costly system for the developing countries. Costly in the short term, as precious foreign currency must be devoted to imports, with all the potential and often real abuses involved (overcharging, etc.). But perhaps it is even more costly in the long term, as domination of the patent market by foreigners does not provide the incentive for local innovation as normally assumed.

This is particularly clear in the pharmaceutical sector, which is among the most dependent on patents. Pharmaceutical patents registered in the Third World are quite often used to prevent importation of cheaper substances and even wielded against local manufacturing initiatives. For example, in the 1970s the Andean Group (Bolivia, Colombia, Ecuador, Peru and Venezuela) tried to establish local facilities for the production of certain antibiotics. Patents were registered in each of the countries for the antibiotics, but the patentee -- a foreign company -- simply refused to grant a license, thereby protecting its export monopoly and blocking local industry. This resulted in the famous "Decision 85" of the Andean Commission which abolished application of the Paris Convention's provision on import monopolies in the region.⁵

Against this background it would appear erroneous to assume that stronger patent protection, e.g. by extending legislation to life forms, in the developing countries would reverse this situation. It could more likely aggravate it because (1) there appears to be an intrinsic scale bias in the international patenting situation in favour of large, multinational corporations, and (2) Western model law is not adaptable to Third World economic and social conditions in most cases. We will return to this second point later on.

II. WOULD PATENTING LIFE ENHANCE THIRD WORLD ACCESS TO SCIENTIFIC INFORMATION, RESOURCES AND TECHNOLOGY?

Aside from purportedly stimulating local innovation, patents are also generally presented as key mechanisms for Third World access to foreign technologies, including their scientific bases (information and material resources). In the field of life forms, including biotechnological inventions, there is room for doubt here too as to

whether this reputed role of the patent system would indeed prove effective in the developing countries.

In the Northern industrialised countries we have already seen that the question of "appropriation" in the field of life sciences and biotechnology has reduced the information flow in scientific circles. An atmosphere of secrecy linked to the proprietary profit potential of research results has largely infiltrated the public research sector in countries like the United States, where industry grants to universities currently represent about 6% of total university research budgets, amounting some US\$600 million in 1987.⁶ Monsanto alone is investing US\$22 million annually in some 15 contracted biotechnology research programmes with American universities.⁷ According to Martin Kenney, who closely studied the situation in the U.S., "University biology departments have been disrupted as great numbers of biologists have become entrepreneurs or at least deeply involved in commercial affairs."⁸ In many European countries, the absence of grace periods creates additional pressure to withhold important advances in biotechnology.

Aside from scientific communications we have also witnessed increased restrictions in the flow of germplasm, the so-called "raw material" of the biotechnology industries. Property considerations tend to introduce constraints in the handling of genetic resources, as we have already seen in the legal framework of plant breeders' rights. According to a 1988 report issued by the Rural Advancement Fund International, the Irish genebank in Dublin "excludes access to its public material unless the applicant is from a (fellow) UPOV member state."⁹ In fact, such a widespread practice -- legitimised by the UPOV convention which restricts "free exchange" to its 17 member countries only -- was already cause for concern in Australia where proponents of enacting plant varietal legislation in that country came up with an impressive list of cases where Australian breeders were refused access to "patented" foreign varieties because their country did not offer plant breeders' rights at the time.¹⁰ With full-fledged patenting, this situation could be aggravated, as witnessed in the U.S.A.. According to the participants of a recent major workshop devoted to "An Evaluation of the Issues, Challenges, and Opportunities Related to Plant Patenting" (Anaheim, CA, 31 January - 3 February 1989), "Germplasm exchange within the United States has decreased since the PVPA was passed in 1970, as well as since 1985 when utility patents on plant materials were first allowed."¹¹

Thirdly, as seen above already in two instances regarding access to protected technology, patenting by definition confers the negative right to exclude others access to an invention for commercial or experimental purposes. If it is made available, there is a price tag attached through licensing arrangements.

In general, patenting life has seriously contributed to the erosion of the role of public research in technology development. Developing countries might well ask themselves whether they want to continue to try to build up a strong public sector or introduce a mechanism that could distort its social role or even stifle it. The public sector is

generally regarded as an important source of competition in the marketplace, a check against monopoly formation. This function is particularly crucial as regards agriculture and food production for national security.

In this framework, of paramount importance to Third World nations is the position and role of the International Agricultural Research Centres (IARCs) and national agricultural research programmes (NARs). The IARCs always intended to be open providers of germplasm and technology to the developing countries. Yet because of the pervasively private character of the new biotechnologies, the IARCs are under increasing pressure to patent their technology and collaborate with the private sector.¹²

A recent study sponsored by the World Bank in cooperation with ISNAR and the Australian government proposes two types of patenting strategies for the IARCs to seriously consider undertaking: defensive and offensive patenting. Defensive patenting would amount to IARCs taking out monopoly rights over their new crop varieties and other innovations in order to block third parties (presumably private corporations) from doing the same and potentially hindering access to the "improved" germplasm. The Bank paper suggests that such patented inventions could still be made available for free to the NARs. Offensive patenting, as suggested in the Bank paper, would drive the IARCs to actually patent their inventions in order to generate extra income for research purposes through royalty payments.¹³

This type of approach, coupled with international pressure to collaborate more systematically with the private sector in the Northern industrialised countries, represents a visibly dangerous trend to what might be called the "corporatisation" of the IARCs. Critics of the Green Revolution already pointed to biases in "management" or control of the CGIAR (Consultative Group on International Agricultural Research) system. If the IARCs were now to adopt outright patenting strategies, either in isolation or as part of increased collaboration with the private sector, this could introduce fundamental -- and far-reaching, if we consider the needs of small, often marginalised farmers who are the professed targets of IARC technology -- changes in research priorities and conceivably create political conflicts between and among developing countries.

Clearly, patenting concerns could "pervert" the public character and so-called social good or pro-poor mission of the IARCs, thereby undermining the whole 40-year old philosophy behind international agricultural research at the service of Third World development. It will especially aggravate the thorny issues of control over the IARCs and ownership of the germplasm they are holding "on behalf of" the world community.

III. WOULD PATENTING LIFE IMPROVE THE WELFARE OF FARMERS AND CONSUMERS IN THE THIRD WORLD?

Economists agree that patents as exclusive monopoly rights raise the price of patented products, thereby amounting to a forced transfer of income from consumers to producers. In fact at the moment, we are witnessing a rise in royalty charges and substantial hiking of license fees in countries such as the United States, as large companies seek higher revenues.¹⁴ The consumer has to bear the burden of this. But the hidden costs to consumers and society in general are probably far greater.

The developing countries suffer already the consequences of abusive or so-called restrictive practices linked to patents. These practices are well known and relate to price fixing, patent pooling, overcharging or transfer-pricing, tied sales, territorial restrictions and fraudulent patents.¹⁵ Many developing countries have found themselves on the weak end of the bargaining table when it comes to negotiating licenses and few are in a position to get actively engaged in litigation against foreign multinationals.

The high but hidden consumer costs attributable to abuses in the patent system are best illustrated -- or documented -- in the pharmaceutical sector. As laid out in the Paris Convention, pharmaceutical product patents afford the exclusive right to import. Such a largely exercised right has proven so costly to Third World governments that many have refused to inscribe it in national law or have progressively deleted it. In Thailand, for example, cheaper generic alternative drugs are available to the consumer alongside patented brands because the Thai government has excluded the provision for pharmaceutical product patents. According to a study published by the International Organisation of Consumers Unions (IOCU), this allows the Thai citizen to choose between generic cimetidine available for US\$0.34 for one day's therapy or "Tagamet", the inventor's brand marketed at US\$1.68 for one day's therapy.¹⁶ The same IOCU report points out Vaitos' findings in the pharmaceutical sector in Colombia, where prices charged averaged some 155% above world market prices, before providing data on import prices of ampicillin and tetra-cycline in the Philippines in 1975 and 1976, ranging from US\$81 to US\$251 per kg and from US\$19 to US\$130, respectively.¹⁷

But such discriminatory abuses with their consequent social costs are not the fate of developing countries alone. In the famous Roche Products case in the UK, the government ordered the British subsidiary of Hoffman-La Roche to cut the selling price of its tranquilisers Valium and Librium by 60%-75% and refund \$27.5 million incurred through overpricing. The British Monopolies Commission had indeed discovered that Roche was paying the parent company US\$925 per kg for a substance available in Italy (where no product protection was available) for US\$22.5 a kg, and US\$2305 per kg for a substance that could be bought in Italy for US\$50. In total, the Commission calculated overcharging rates of 41 and 46 times the cost of alternative drug supplies.¹⁸

While as early as 1974 the OECD Secretariat laid out a formidable list

of ongoing harmful restrictive practices recorded in the OECD countries, a global evaluation of the abuses of which Third World countries are victims has yet to be produced.¹⁰ Such costs -- which can be veritably "excessive", as shown above -- should be thoroughly evaluated and weighed against potential benefits before strengthening patent laws or introducing monopoly rights on life forms in the developing countries.

As for the impact of life patents on the welfare of Third World farmers, it is evident that patented agricultural technologies (seeds, biocides, etc.) will increase production costs, especially where provisions are laid down for full scope of protection on every generation of biologically reproducible patented seed or livestock. As well, we could witness in the developing countries what has been termed "patent-stacking" as genetic components are individually patented and incorporated into new varieties.²⁰ Increased costs of patented agricultural inventions could feasibly streamline the agricultural production sector in Third World countries, thus contributing to further marginalisation of the already disadvantaged small farmers and aggravating social inequalities.

SOME FUNDAMENTAL PRINCIPLES

Aside from these specific areas of concern as to the implications of patenting in the Third World, some more fundamental principles should be stressed in order to frame ongoing discussions and policy formation. These principles, drawn from over 12 years experience in international debates, both underlie and override ICDA's considerations on the matter.

1. Patents embody a conflict of interests.

It is useful to reconsider the definition of a patent. A patent is basically a contract or compromise between the inventor and society. The inventor, often a private entity, discloses his knowledge to society in exchange for exclusive monopoly rights over it (for a period as long as 20 years in most countries). As the interests of private entities -- individuals or corporations, even universities now too -- and the general public do not necessarily coincide, there is a difficult balance to strike in the patent system. There are many illustrations of this inherent problem with patent law.

For example, throughout history, statutory exclusions have been enacted against patentability in certain economic sectors, especially relating to food and health. Such exclusions are justified by the consideration that the grant of monopoly rights could have adverse effects on availability and/or price of foodstuffs and medicines, not to mention vital agricultural inputs. Through such exclusions, governments may choose to keep the upper hand on private interests, therefore, in the name of national security (especially where compulsory licensing mechanisms are weak).

This is and has been particularly the case in the developing countries, many of which were left with the legal legacies of their former colonisers. While, as Martin Abraham of IOCU points out, "Each revision of the Paris Convention, since its adoption in 1883, has extended the exclusive monopoly powers of patent holders and weakened the bargaining powers of Third World countries,"²¹ the developing countries have, in their own right, been revising their national patent laws to strengthen protection of the public interest. Such changes have applied to:

- ** Non-patentable subject matter: exclusions enacted for drugs, chemical products, and/or foods;
- ** Import monopoly: exclusion of import monopoly from right granted to patentee;
- ** Non-voluntary licenses unrelated to non-working of patents: compulsory licenses apply after a fixed time period of working of patent;
- ** Definition of exploitation or working of the invention: specific definitions included in patent law;
- ** Importation and working of patents: Stipulation that importation does not constitute working of the patent;
- ** Grounds for legal exemption of working of the patent: Recognition of concept of "legitimate reasons" for non-working of patent;
- ** Remedies against non-working of patents: Provisions for compulsory licensing;
- ** Duration of patent protection: Trend to shorten period of patent protection.²²

Such national reforms, as well as proposals made at the intergovernmental level through UNCTAD in particular, have until now aimed to better defend the interests of national economic and social development in the larger sense against excessive monopoly rights granted to private interests. This direction is, of course, currently under attack from bilateral pressure and proposals made through the ongoing Uruguay Round of GATT negotiations (TRIPS).

2. Genetic resources should belong to no one.

Genetic resources have come to be considered the common heritage of mankind, a concept to which 89 countries of the planet so far adhere, through the International Undertaking on Plant Genetic Resources, adopted in the FAO in 1983. These resources are the first link in the food chain and originate for the most part in what is now the Third World, where the greatest share of our crop, fiber, fodder and medicinal plants have been domesticated, diversified, conserved, nurtured and developed for some 12,000 years. Without the genetic diversity found in the developing countries, world agricultural systems could not face up to permanently changing ecosystems, social demands and other stresses on food production.

The source of international conflict over the control of genetic resources and their legal status stems to a great extent from the fact that the South has always "donated" this genetic heritage for free to

Northern scientists and industrialists, while Western law has recently (especially since 1961 when the UPOV Convention was signed) introduced intellectual property rights over finished varieties based on Third World germplasm. Such laws have been progressively strengthened to take the most recent and radical form of full-fledged patents over life forms in general.

The inherent conflict between the recognition of genetic resources as the public good of the world community and the granting of monopoly rights over them in a relatively small number of countries is a profound one. The importance of free access to germplasm is not to be dismissed as a political fantasy but is the key to the entire enterprise of plant and animal breeding itself. For example, in the state of Uttar Pradesh (India) a single sample of *Oryza nivara* was found to carry the only known gene for resistance to grassy stunt virus, a major threat to rice production. That gene has been incorporated into rice sown over 20 million hectares in Asia. The question is simply: should that gene become anyone's private property?

The stakes for humanity are high. And we may feasibly see that if more nations adopt (or adapt) monopoly rights over life forms, the developing countries may close their borders to expatriation of genetic resources, the not-so-raw material of the biotechnology industry. No one could possibly consider this desirable.

3. Western model patent law ignores the informal innovative sector.

The Western régime of intellectual property rights is essentially geared toward the cultural system prevalent in the highly industrialised countries, ignoring the economic and socio-cultural particularities of the developing world. Criteria for patentability are highly demanding, axed in particular on the concept of "absolute world novelty", and the system is dependent on formal education and functioning communications.

In most parts of the Third World, a more informal and communal system of innovation is prevalent, often based in the rural areas. In Kenya, for example, the informal innovative sector is designated by the term "jua kali", which in Kiswahili means "hot sun", reflecting the ambient conditions under which local innovators work.²⁸ Most innovations of the informal sector relate to agriculture, craft and manufacture, and embody as much ingenuity and purposefulness as the Western model invention. However, in terms of reward to creativity and incentive to innovate, the informal sector has been completely left out of the "intellectual property rights" picture.

In the field of plant breeding for example, the Western patent system completely denies the role of Third World farmers in developing valuable genetic diversity, especially in the form of highly selected landraces. Farmers -- especially women -- in the tropics and subtropics have played an enormous role in crop innovations but their intellectual property is negated through the patenting of genetic resources in the North.

In reaction to this biased situation, scientists, NGOs and policy-makers have spearheaded the emergence of an appropriate intellectual property right for informal innovators in the South known as "farmers' rights". The concept was first publicly launched at the FAO in 1987, during the second session of the intergovernmental Commission on Plant Genetic Resources. The rationale behind this new concept holds that Third World farmers should be provided with a legal mechanism of reward for all the work they have put into developing our planet's wealth of genetic diversity. Negotiated on the basis of mutual recognition of the legitimacy of both breeders' rights and farmers' rights, this new legal mechanism will function initially through the International Fund for Plant Genetic Resources which is supporting local conservation and breeding work in the South. A structural financial base for the Fund should logically come from the seed industry that collects royalties on varieties developed with the support of Third World germplasm, in order to give full meaning to farmers' rights. This point is up for negotiation next month at FAO's biennial Conference, where the international community is expected to endorse the concept of farmers' rights (see draft resolution in annexe 2).

In recent initiatives, the discussion on farmers' rights has been broadened to cover the need for an appropriate non-monopolistic reward system for the informal innovative sector at large. The FAO Legal Service is currently preparing a study on the matter.²⁴ African scientists gathered at a meeting on technology licensing convened by ICIPE (International Centre for Insect Physiology and Ecology) and the African Academy of Sciences advanced the call for a non-Western model of inventiveness in the form of informal innovation systems.²⁵ Within the general public as well the discussion has moved forward rapidly, as farmers' rights are the subject of articles in the press, radio programmes, conference agendas, etc.

The point is that when that we look at the current state of negotiations on intellectual property, especially regarding life forms, there is an uncanny flurry of activity going on within major international fora including WIPO, UPOV, GATT, FAO, UNEP, and IUCN. The developing countries have a stake -- and a fair amount of economic clout behind them as the net providers of biological diversity to the world economy -- in all of these discussions and should take advantage of this unique period of opening, before decisions are made, to introduce or advance the concept of informal innovation systems (including farmers' rights) as an appropriate non-monopolistic form of intellectual property for their development needs. The concept is still quite embryonic but merits consideration and support for further development if Third World countries wish to circumvent the negative impacts of Western styled patent laws.

CLOSING REMARKS

This paper has tried to point out some of the areas of concern regarding the Third World's position in the international patent arena, in light of increasing pressure exerted by Northern governments to

strengthen intellectual property rights, particularly on life forms. The grave inequalities between the North and the South -- the North being a net technology exporter and biodiversity user, the South being a net technology importer and biodiversity provider -- must be borne in mind at every stage of the discussion.

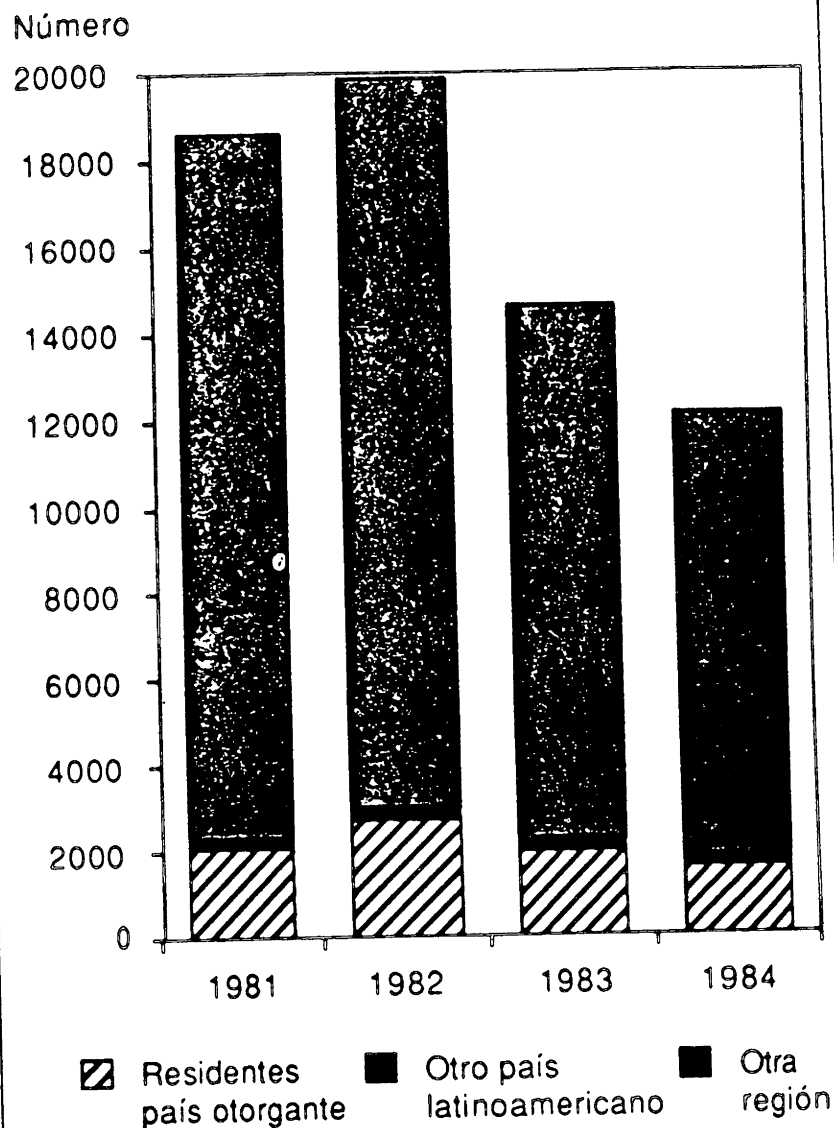
In the current period of legal changes (extending patents to life forms in the North, pressuring the South to do the same) it would seem appropriate for developing nations to seriously consider a positive, creative alternative to Western model law that does service to the informal innovative sector, especially rural communities. If not, we may witness a serious rise of international conflict and retaliatory actions (ranging from taxes on exportation or use of Third World biological material to outright closing of borders) that would be of benefit to no one.

- ¹Patel, S., "Trade-Related Aspects of Intellectual Property Rights in the Uruguay Round of Multilateral Trade Negotiations", Paper prepared for the Commonwealth Secretariat, October 1988, p. 6.
- ²Banco Interamericano de Desarrollo, "Progreso Económico y Social en América Latina: Informe 1988", BID, Washington D.C., 1988, p. 329.
- ³Ibid.
- ⁴Balasubramaniam, K., "Policy Options in Pharmaceutical Patents for Developing Asian Countries", IOCU, 1988, p. 21.
- ⁵Ibid.
- ⁶James, C., "The Role of the Private Sector in Transferring Plant Biotechnology to the Third World", Paper presented to CTA/FAO symposium on "Plant Biotechnologies for Developing Countries", June 1989, p. 6.
- ⁷Ibid.
- ⁸Kenney, M., "Biotechnology: The University-Industrial Complex", Yale University Press, New Haven, 1986, p. 5.
- ⁹RAFI, "A Report on Germplasm Embargoes", RAFI Communique, October 1988, p. 8.
- ¹⁰The Parliament of the Commonwealth of Australia, Senate Standing Committee on National Resources, "Plant Variety Rights", Australian Government Printing Service, Canberra, 1984, pp. 94-97.
- ¹¹"Quandry Over Plant Patenting Brings Diverse Group of Experts Together" in "Diversity", Vol. V, Nos. 2 & 3, 1989, GRCS, Washington D.C., p. 37.
- ¹²ICDA Seeds Campaign, "The IARCs and the Privatisation of Biotechnology", in "Seedling", July 1989, Barcelona, pp. 5-8.
- ¹³Persley, G., (ed.), Biotechnology Study Project Papers, "Agricultural Biotechnology: Opportunities for International Development", (draft), World Bank/ISNAR/AIDAB/ACIAR, May 1989, p. 121.
- ¹⁴Dwyer, P., et al., "The Battle Raging Over 'Intellectual Property'", in "Business Week", 22 May 1989, pp. 80-97.
- ¹⁵OECD, "Competition Policy and Intellectual Property Rights", Paris, 1989.
- ¹⁶Balasubramaniam, K., op. cit., p. 27.
- ¹⁷Ibid., p. 22.
- ¹⁸Ibid.
- ¹⁹Patel, S., op. cit., pp. 7-8.
- ²⁰Fowler, C., et al., "The Laws of Life", Development Dialogue, 1988:1-2, Dag Hammarskjöld Foundation, Uppsala, p. 243.
- ²¹Abraham, M., "Some Consumer and Third World Concerns on the Patenting of Biotechnology Products and Processes", in "Patenting Life Forms in Europe", ICDA Seeds Campaign, Barcelona, March 1989, p. 54.
- ²²See Balasubramaniam, K., op. cit., pp. 28-31.
- ²³Juma, C., Ojwang, J., "Innovation and Sovereignty: The Patent Debate in African Development", ACTS, Nairobi, 1989, p. 2.
- ²⁴Commission on Plant Genetic Resources, Report of the Third Session (Rome, 17-21 April 1989), FAO, Rome, 1989, p. 14.
- ²⁵RAFI, "Farmers' Rights", RAFI Communique, May/June 1989, p. 3.

ANNEXE 1

(Patents granted in Latin America to residents of granting country, to other Latin American countries and to other regions, 1981-1984)

Gráfico IX-6. Patentes otorgadas en la América Latina a residentes del país otorgante, de otros países latinoamericanos y de otras regiones de 1981 a 1984



Fuente: Organización Mundial de la Propiedad Intelectual

In: Banco Interamericano de Desarrollo, "Progreso Económico y Social en América Latina: Informe 1988", p. 331.

Draft resolution on "Farmers' Rights" as adopted by FAO Commission on Plant Genetic Resources, Third Session, April 1989.

Draft resolution on farmers' rights

59. The Commission recognized the need to define the concept of farmers' rights, in order to avoid divergent and erroneous interpretations, and to ensure that this concept benefits society in general. To this end the Commission requested the Director-General to submit, through the Council, to the Conference the following draft resolution:

"The Conference

"Recognizing that:

- "(a) plant genetic resources are a common heritage of mankind to be preserved, and to be freely available for use, for the benefit of present and future generations;
- "(b) full advantage can be derived from plant genetic resources through an effective programme of plant breeding, and that, while most such resources, in the form of wild plants and old landraces, are to be found in developing countries, training and facilities for plant survey and identification, and plant breeding, are insufficient, or even not available in many of those countries;
- "(c) plant genetic resources are indispensable for the genetic improvement of cultivated plants, but have been insufficiently explored, and are in danger of erosion and loss;

"Considering that:

- "(a) in the history of mankind, unnumbered generations of farmers have conserved, improved and made available plant genetic resources;
- "(b) the majority of these plant genetic resources come from developing countries, the contribution of whose farmers has not been sufficiently recognized or rewarded;
- "(c) the farmers, especially those in developing countries, should benefit fully from the improved and increased use of the natural resources they have preserved;
- "(d) there is a need to continue the conservation (in situ and ex situ), development and use of the plant genetic resources in all countries, and to strengthen the capabilities of developing countries in these areas;

"Endorses:

"The concept of farmers' rights ^{1/} in order

- to ensure that the need for conservation is globally recognized and that sufficient funds for these purposes will be available;
- to assist farmers and farming communities, in all regions of the world, but especially in the areas of origin/diversity of plant genetic resources, in the protection and conservation of their plant genetic resources, and of the natural biosphere;
- to allow farmers, their communities, and countries in all regions, to participate fully in the benefits derived, at present and in the future, from the improved use of plant genetic resources, through plant breeding and other scientific methods."

^{1/} "Farmers' rights mean rights arising from the past, present and future contributions of farmers in conserving, improving, and making available plant genetic resources, particularly those in the centres of origin/diversity. These rights are vested in the International Community, as trustee for present and future generations of farmers, for the purpose of ensuring full benefits to farmers, and supporting the continuation of their contributions, as well as the attainment of the overall purposes of the International Undertaking."

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