# Intellectual property rights and globalization: implications for developing countries

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**Abstract:** This paper reviews the implications of the agreement on Trade-Related Intellectual Property Rights (TRIPS) under the World Trade Organization (WTO). It focuses on the national implemention of the TRIPS agreement, technological development, plant variety protection, geopgraphical indications, and biological diversity and the associated indigenous knowledge. The paper argues that efforts to promote compliance with to the TRIPS agreement should be accompanied by measures that address public interest challenges such as health, nutrition and environmental conservation in developing countries. It suggests that addressing these issues will require policy and institutional innovations in the developed and developing countries. While some of the measures can be addressed through multilateral forums, many of them should be addressed through domestic laws and policies designed to foster innnovation and expand international trade.

**Keywords**: intellectual property; international trade; globalization; patents; World Trade Organization; TRIPS; technology transfer; technological innovation; plant breeders' rights; *sui generis* sytems; geographical indications; biological diversity; traditional knowledge.

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## 1 Introduction

The relationship between intellectual property protection and international trade has been one of the most controversial issues in global negotiations in recent years. The debate has largely about the implications of the agreement on the Trade-related Aspects of Intellectual Property Rights (TRIPS) under the World Trade Organization (WTO) for international trade in general, and for developing countries in particular.[1] Most of the views expressed by developing countries on the TRIPS agreement arise from their interest in technological development.

The agreement recognizes the role of technology in social and economic welfare and sets out its objectives in Article 7 as: "The protection and enforcement of intellectual property rights should contribute to the promotion of technological innovation and to the transfer and dissemination of technology, to the mutual advantage of producers and users of technological knowledge and in a manner conducive to social and economic welfare, and to a balance of rights and obligations." Many of the views expressed by developing countries stem from their perception that the TRIPS agreement affects their ability to use technological knowledge to promote public interest goals such as health, nutrition and environmental conservation.

This paper argues that efforts to promote compliance with to the TRIPS agreement should be accompanied by measures that enhance the participation of the developing countries in international trade. These measures include a broadening of the intellectual property regime to cover products and resources that are provided by these countries. It notes the importance of exploring ways by which public interest issues such as health, nutrition and environmental conservation could be addressed through scientific and technological cooperation in accordance with the provisions of the TRIPS agreement.

The paper does not deal with the larger issue of the links between intellectual property, innovation and social welfare.[2] The implicit view in the paper is that intellectual property protection affects the inventive behavior of firms in varied ways depending on factors such as type of industry, corporate affiliations, firm size and intellectual property strategies.[3] Temporal dimensions also play a role. Strong intellectual property protection may be necessary to stimulate research in a particular field but greater social welfare may be gained at a later time through open access to technical knowledge that may be effected by public policy intervention. Impacts on public sector research also need to be considered on a case-by-case basis.[4] Other issues such as competition policy are critical to the TRIPS agreement but are not discussed in this paper.[5]

The paper is divided into three main sections. Section 2 provides an overview of the relationship between development and intellectual property rights. It notes that the debates on TRIPS are part of broader questions regarding the role of technology in development and cannot be treated purely as enforcement issues. The public interest provisions of the TRIPS agreement should guide negotiations and provide opportunities for multilateral as well as bilateral arrangements for technology cooperation. Section 3

deals specifically with the concerns expressed by developing countries. These concerns are related to the implementation of the agreement and the need to provide for flexibility and innovation in property rights systems. The final section examines a number of international policy implications of the concerns expressed by developing countries.

## 2 Technological innovation and intellectual property rights

The TRIPS agreement, which came into effect on 1 January 1995, was one of the main achievements of the Uruguay Round of trade negotiations. The agreement represented an important step in efforts to harmonize intellectual property rules and establishing minimum standards for national laws. Most of the key elements of the intellectual property systems of the United States, Europe and Japan were similar and could be easily harmonized. These are the largest sources of inventions as shown in Table 1. Areas of divergence between these systems include first-to-invent system, scope of patentable subject matter, treatment of plant and animals, geographical indications and the degree to which moral values should influence the granting of intellectual property rights.

**Table 1: Patent applications to the Patent Cooperation Treaty, 1997**

| Region | Country | Number patents filed | Percentage of total |
|---|---|---|---|
| North America | United States | 22,736 | 41.8 |
| | Canada | 1,075 | 2.0 |
| *Total North America* | | *23,811* | *43.75* |
| Western Europe/EU | Germany | 7,436 | 13.7 |
| | United Kingdom | 3,939 | 7.2 |
| | France | 2,496 | 4.6 |
| | Sweden | 2,188 | 4.0 |
| | Netherlands | 1,749 | 3.2 |
| | Switzerland | 1,101 | 2.0 |
| | Finland | 873 | 1.6 |
| | Italy | 797 | 1.5 |
| | Denmark | 642 | 1.2 |
| | Austria | 373 | 0.7 |
| | Norway | 367 | 0.7 |
| *Total Western Europe/EU* | | *22,828* | *41.95* |
| East Asia and China | Japan | 4,845 | 8.9 |
| | South Korea | 304 | 0.6 |
| | China | 157 | 0.3 |
| *Total East Asia and China* | | *5,306* | *9.75* |
| Eastern Europe | Russia | 419 | 0.8 |
| *Total Eastern Europe* | | *732* | *1.35* |
| Australasia | Australia | 881 | 1.6 |
| | New Zealand | 166 | 0.3 |
| *Total Australasia* | | *1,047* | *1.92* |
| *All other regions* | | *698* | *1.28* |
| *Total number of applications* | | *54,422* | *100.0* |

Source: Dutfield, G. Forthcoming. *Intellectual Property Rights, Trade and Biodiversity: The Case of Seeds and Plant Varieties*. IUCN, Gland and Earthscan, London.

Concerns over the impact of intellectual property rights are not limited to developing countries. The Parliamentary Assembly of the Council of Europe, for example, has recommended adoption of guidelines on patents legislation which "should help to develop criteria for granting patents continuously according to technological progress in favour of both the interests of the claiming party, as well as the interests of the public in regard to public order, morality and general aspects of state economy."[6] In addition to reservations about patenting living organisms, the Assembly also extended its concerns to developing country interests by recommending that "the many outstanding questions regarding the patentability and the scope of protection of patents on living organisms in the agrofood sector must be solved swiftly taking into account all interests concerned, not least those of farmers and developing countries."[7, 8]

Differences in disclosure practices between the US, Europe and Japan are also being discussed. Under European and Japanese systems, patent applications are publicly disclosed after 18 months from the filing date irrespective of whether a patent has been granted or not. In contrast, the US system publicly discloses patent information only when a patent is granted. The US Congress has adopted legislation that would bring the US patent system in line with its European and Japanese counterparts. Critics of these changes (who include a group of Nobel laureates) have charged that these changes will work against the interests of individual inventors who play an important role in the economy. But other studies have concluded that "public disclosure leads to fewer patent applications and fewer innovations, but for a given number of innovations, it raises the probability that new technologies will reach the product market and thereby enhances consumers' surplus and possibly total welfare as well."[9]

But for developing countries the concerns go beyond harmonization and are largely about access to technology.[10] Nations that generate technology have always sought to protect it while those that import it have pursued avenues that maximize access to the available technology.[11] Nations seeking to develop technologically have often imitated and learned from those already possing the knowledge. For example, when "the United States was still a relatively young and developing country . . . it refused to respect international intellectual property rights on the grounds that it was freely entitled to foreign works to further its social and economic development."[12] The history of intellectual property protection in pharmaceutical products demonstrates this point. Many of the industrialized countries introduced patent legislation in this field after they had reached a certain level of technological competence and international competitiveness.[13]

More recently, technological learning has provided the policy basis for rapid industrialization among developing countries.[14] These countries have favored policies and laws that promote the local working of patents, parallel imports, compulsory licensing and exclusion from patentability for certain classes of technologies. Much of the debate over the loosening of intellectual property protection in the World Intellectual Property Organization (WIPO) and the United Nations Conference on Trade and Development (UNCTAD) in the 1970s focused on these issues.

For example, the Berne Convention for the Protection of Literary and Artistic Works was substantially revised in 1971 to include an annex on “Special Provisions Regarding Developing Countries”. The annex allows a country to “grant non-exclusive, non-transferable licences to its nationals for the reproduction or translation of foreign-owned copyright works for educational or research purposes.” These revisions were justified on the basis of national public interest. Similar revisions were attempted in other intellectual property regimes but were stalled by the onset of the Uruguay Round of negotiations. It is notable that there have been no major efforts by developing countries to invoke the special provisions of the Berne Convention to grant copyright works to their nationals. This is mainly because of the difficulties associated with the use of compulsory licensing as a development policy instrument (as discussed in section 4 below).

The need to balance between enforcement of intellectual property rights and meeting the technological needs of developing countries became a key theme in the Uruguay Round negotiations. The TRIPS agreement reflects this point. In Article 8 TRIPS states that countries “may, in formulating or amending their laws and regulations, adopt measures necessary to protect public health and nutrition, and to promote the public interest in sectors of vital importance to their socio-economic and technological development, provided that such measures are consistent with the provisions of this Agreement.” The agreement (in Article 8.2) provides countries with freedom to adopt measures that “may be needed to prevent the abuse of intellectual property rights by right holders or the resort to practices which unreasonably restrain trade or adversely affect the international transfer of technology.” This prevention of abuse clause deals primarily with measures that undermine competition.[15]

But the existence of such flexibility suggests that developing countries will need to formulate their interests through national policy and legislation. The successful use of the flexibility granted in the TRIPS agreement will also depend on the relationship between a country and its major trading partners in the industrialized world. This is because most of the inventions that are likely to be affected by national laws belong to rights holders in the industrialized world.

## 3 Emerging development issues

Nearly five years have passed since the TRIPS agreement came into force. Over this period developing countries have had a chance to assess its implications for their development strategies. It should be noted that the last years of the Uruguay Round coincided with the preparations for the United Nations Conference on Environment and Development (UNCED) held in Rio de Janeiro in 1992. As a result, many of constituencies interested in the TRIPS agreement did not adequately follow the process. It was only recently that research on WTO has helped to clarify some of the emerging issues. A number of rulings in the WTO process have also helped to raise awareness on the implications of the agreement for development. The emeging issues include: national implementation of the TRIPS agreement; technological development; plant variety

protection; geographical indications; and biological diversity and and the related traditional knowledge.

*3.1 National implementation of TRIPS*

The TRIPS agreement provides a series of transitional arrangements, timetables and reviews to enable countries to eventually comply fully with its provisions. These include a five-year moratorium (starting 1 January 1995) on the filing of non-compliance complaints against developing countries. In other words, these countries have a grace period of five years over which they are immune from charges of being in violation. Many developing countries have asked for more time to bring their national laws and institutions in line with the agreement. The United States, however, has indicated that it would stick to the original 1 January 2000 deadline.[16]

In addition to an extension of the moratorium, some countries have asked for an extension of the review period based on the fact that the "Council of TRIPs has not yet been able to define either the scope or the modalities for non-violation complaints, as required by Article 64.3. Moreover, the history of the [General Agreement on Tariffs and Trade (GATT)] and the WTO has produced very few precedents relating to proceedings of this type which would enable them to conducted safety in terms of law."[17] At issue here is the limited experience on how violation complaints involving private enterprises and individuals can be dealt with in an inter-governmental framework. These concerns are compounded by the perception that the dispute settlement mechanisms under WTO works against the interest of the developing countries.[18]

The implementation of the TRIPS agreement by developing countries depends in part on the technical and financial assistance available to them. Article 67 of the TRIPS agreement says "developed country Members shall provide, on request and on mutually agreed terms and conditions, technical and financial cooperation in favor of developing and least-developed country Members." Such cooperation shall include assistance in the preparation of laws and regulations to protect and enforce intellectual property rights as well as to prevent their abuse. The cooperation is expected to include support for the establishment or reinforcement of domestic intellectual property offices and includes training of personnel. In this regard, many developing countries have requested greater technical assistance support.[19]

*3.2 Technological development*

Technological development may be one of the most important issues for developing countries. It was because of this concern that many developing countries were originally opposed to a GATT-driven accord on intellectual property rights. Indeed, one of the most important changes in international intellectual property law embodied in the TRIPS agreement is the extension of the scope of protection to all types of technologies. Article 27 on patentable subject matter provides that "patents shall be available and patent rights enjoyable without discrimination as to the place of invention, the field of technology and whether products are imported or locally produced." This provision brought under the

scope of the agreement technological fields, such as pharmaceutical products, that were previous excluded from patentability by many countries. It is therefore no surprise that one of the first disputes to be dealt with by WTO was on pharmaceutical products.

In a dispute involving India and the United States, a panel set up under the Dispute Settlement Body of WTO concluded in its 1997 report that "On the basis of the findings set out above, the Panel concludes that India has not complied with its obligations under . . . the TRIPS Agreement, because it has failed to establish a mechanism that adequately preserves novelty and priority in respect of applications for product patents in respect of pharmaceutical and agricultural chemical inventions during the transitional period to which it is entitled under . . . the Agreement, and to publish and notify adequately information about such a mechanism; and that India has not complied with its obligations [under] the TRIPS Agreement, because it has failed to establish a system for the grant of exclusive marketing rights."[20] India appealed against some aspects of the panel report but the WTO Appellate Body upheld the findings of the panel.[21]

This case is an example of the growing interest in the technological implications of the TRIPS agreement for developing countries. Many of the technology-related concern arise from the public interest provisions of the TRIPS agreement and the perception that these are being eroded. The impact of intellectual property protection on health care in the developing countries has received much attention recently. The issues include the impact of intellectual property rights on access to essential drugs (including parallel imports), drug pricing, promotion of research and development (R&D) on tropical diseases, transparency in drug regulation, and local drug manufacture. [22, 23]

The pharmaceutical industry has, in turn, argued that most of its R&D investment (estimated at US$24 billion for 1999) is made possible because of the existence of an intellectual property protection system. It maintains that drug development period has increased from an average of 8.1 years in the 1960s to 11.6 years in the 1970s to 14.2 years in the 1980s and 14.9 years in the mid-1990s. Nearly 50 per cent of the time is spent in clinical trials. Industry estimates show that only three out of 10 approved drugs recoup average R&D costs and firms are forced to rely on successful drugs to fund new ones. It is estimated that the pre-tax cost of developing one drug first marketed in the early 1990s was US$500 million.[24]

The risks associated with drug development extend to other factors such as product liability and the development of competing or generic drugs. In addition, product development is influenced by the publication of related research results by competing firms or research institutions. Under such circumstances intellectual property protection provides more than just the ability to exclude others from the unlicensed use of inventions; it grants the monopoly control needed to provide a predictable environment for product development. But the public welfare impact of this control is subject of considerable debate.

The patenting of genes associated with certain diseases is an example of an area that requires the policy balance between providing incentives for discovery and ensuring that

the social welfare is maximized.[25] Public sector funding could be used for discovery activities and the results should be available to others on a non-exclusive basis. This argument would hold where political systems favor higher taxes to provide for public investment in activities such as R&D. But where such public investment is declining, it becomes necessary to devise other ways of stimulating R&D. One of these ways is to extend intellectual property protection to activities to discovery.

Developing countries have favored the use of different policy approaches to address public interest goals. These include compulsory licensing, use of generic drugs, parallel imports and support for research on local diseases. Developing countries have the flexibility within the scope of the TRIPS agreement to take such measures.

Since one of the aims of intellectual property protection is to stem unlicensed technology spillovers, it is expected the countries that are most affected will call for alternative mechanisms to address this issue under the TRIPS agreement. India, for example, is calling for the establishment of a Working Group on Technology Transfer under WTO.[26] The call takes into account the implications of other agreements under WTO such the General Agreement on Trade in Services (GATS) and the agreements on Technical Barriers to Trade (TBT) and Sanitary and Phyto-Sanitary (SPS) measures.

India envisages a working group to "foster access to technologies; cooperate in the development of scientific and technical resources including the creation and growth of national innovation systems; grant credits for financing the acquisition of technology; provide assistance and cooperation in the development and administration of laws and regulations likely to facilitate [technology transfer]; strengthen the negotiating capacity for [technology transfer] transactions; and assist in the protection and commercializing local innovations."[27] In addition, the working group would also study the design of incentives that industrialized countries could grant to enterprises and institutions in their own countries to facilitate the transfer of technology to developing countries.

With the growing technological gap between the developed and the developing countries, the developing countries are likely to increasingly call for the creation of mechanisms that promote technology transfer and dissemination. It is doubtful, though, these calls will amount to very much. Another way to address some of these concerns could be to formulate long-term science and technology strategies for developing drugs and products of relevance to the tropics.

*3.3 Plant variety protection*

The debate on plant variety protection relates to Article 27.3(b) which exempts from patentability "plants and animals other than micro-organisms, and essentially biological processes for the production of plants or animals other than non-biological and microbiological processes."[28] This exemption is conditional on the existence of a system for the "protection of plant varieties either by patents or by an effective *sui generis* system or by any combination thereof." The agreement provides that Article

27.3(b) “shall be reviewed four years after the date of entry into force of the WTO Agreement.”

Developing countries have expressed concern over the lack of clarity on the criteria or rationale used to determine the exclusions in Article 27.3(b). The first issue is the distinction between plants and animals (which may be excluded) and micro-organisms (which may not be excluded). The second is the distinction between “essentially biological” processes for making plants and animals (which may be excluded) and microbiological processes.

This exemption was derived from the Strasbourg Convention on European Patents. Under the concept of “essentially biological” processes, classical plant breeding methods would be excluded from patentability but genetic engineering methods would be patentable. The difference lies in the degree of technical intervention. The debate over this issue partly relates to the moral objection raised by many countries about the patenting of living organisms or other naturally-occurring material.[29] The African Group has stated that the “the provisions of Article 27.3 contravene the basic tenets on which patent laws are based: that substances and processes that exist in nature are a discovery and not an invention and thus not patentable.”[30]

The general orientation of TRIPS is to extend patentability to plants and other living organisms. But developing countries have argued for *sui generis* systems of protecting plants that build on some of the principles outlined in the Convention on Biological Diversity (CBD). Compliance with TRIPS, however, would require that the developing countries demonstrate that the *sui generis* system is effective as an intellectual property protection instrument.[31] What is generally implied as a *sui generis* system under Article 27.3 is the adoption of the provisions of the Union for the Protection of New Varieties of Plants (UPOV).

Developing countries have been opposed to this approach because they consider it to be a transitional phase towards patent protection for plants and the erosion of their ability to formulate *sui generis* systems that represent local needs and protect genetic resources and the rights of local and indigenous communities. Furthermore, the 1978 UPOV convention provided farmers’ privileges and breeders’ exemptions, both of which were made more restrictive in the 1991 revision. The use of research and farmers exemptions in many developing countries is a critical aspect of national food security systems and the functioning on international agricultural research institutes and should be provided.

Countries that have adopted or proposed *sui generis* systems include Nicaragua, Costa Rica, Zambia, Zimbabwe, India, Thailand, Bangladesh, Pakistan and members of the Southern African Development Cooperation (SADC). Many others such as Brazil and Argentina have adopted laws that use the TRIPS exemption and therefore create the space needed to consider the relevance of *sui generis* systems.[32]

This debate has been fueled by recent effort to develop germination control or the so-called “terminator” technologies. The technologies employ germination control as an

intellectual property protection tool requiring farmers to buy new seed every season. Developing country farmers who want to continue keeping seed would naturally be opposed to the use of such technologies. On the other hand, private firms wanting to recoup their investment in R&D would be interested in using them. This issue could be resolved through the selective application of the techniques. In addition, social and economic factors will play a greater role in shaping the adoption of these technologies. So far, research efforts are shifting towards controlling the expression of specific traits instead of suppressing the entire germination process.[33]

There is no common position on the issue of plant patentiability among developing countries because of the wide technological gaps between them. Those countries that are relatively advanced and have developed capacity in biotechnology may find it necessary to adopt patent laws for plants. Others, however, would favor the flexibility that is provided in the 1978 UPOV convention. But the existence of different intellectual property standards may pose challenges for international trade, especially in new biotechnology products. A way forward could be to extend the review period to allow developing countries adequate time to consider the options available to them in light of their level of technological development and position in international trade related to biotechnology.[34]

*3.4 Geographical indications*

Geographical indications are analogous to trademark except that geographical indications identify territories instead of companies of brands. Article 22 of the TRIPS agreement provides for the protection of geographical indications which “identify a good as originating in the territory of a Member, or a region or locality in that territory, where a given quality, reputation or other characteristic of the good is essentially attributable to its geographical origin.”[35] The provision prohibits the use of misleading information as to the geographical origin of a particular product.

These original TRIPS provisions set the stage for subsequent trade negotiations aimed at protecting specific geographical indications. This process has resulted in at least two issues of relevance to developing countries. The first relates to the consequences of non-compliance by developing countries whose use of geographical indications did not fall within the exceptions provided in Article 24.[36] The second relates to the level of protection given to goods covered by the rules governing geographical indications. Currently, higher protection is reserved for wines to spirits.

Developing countries have requested that the scope of protection for geographical indications be expanded to cover other goods in addition to wine and spirits. This position was first put forward by India in 1996. The African Group, for example, has argued that “the negotiations envisaged under Article 23.4 should be extended to other categories, and requests, in this regard, that the scope of the system of notification and registration be expanded to other products recognizable by their geographical origins (handicrafts, agro-food products).”[37]

It has been noted that restricting higher protection of geographical indications to wines and spirits would "not constitute a fair and equitable treatment of the rights and the interests" of WTO members.[38] Those supporting the extension believe that this would promote the development of local products and would be consistent with the overall goals of the agreement. In the absence of such an extension, the TRIPS agreement would favor a limited number of products developed in certain regions of the world and its role in stimulating innovation worldwide would remain open to challenge.

In addition to the scope of protection, negotiations have also taken place have been scheduled as a part of the built-in agenda on the multilateral system of notification and registration of geographical indications of wines based on proposals by the European Union on the one hand, and the United States and Japan on the other.[39] The two proposals call for a system of registration that would require notification to the WTO secretariat on what geographical indications have been registered domestically. Both proposals call for a voluntary system of notification. Unlike the US and Japan, the EU proposes that the products accepted for registration at the national level be protected in all WTO member countries despite differences in registration methods and criteria. This approach would add new regulatory burdens on member states but would offer protection rather than simply provide a global database.

Future work on geographical indications will entail harmonization of practices. Some countries have specific laws on geographical indications while others rely on trademark, consumer protection, marketing and common laws, or a combination thereof. Some countries maintain formal lists while other rely on case histories. While some recognize place names, others accept names that are simply associated with a place. Both are acceptable under TRIPS.

One of the objections to extending protection is the open-ended nature of the products that could be covered by geographical indications. Since international trade is considered to be a stimulant of growth and innovation, such an expansion of scope would be consistent with expectation of the agreement. What is needed, however, is an active system for harmonizing and clarifying the technical aspects of the products.

*3.5 Biological diversity and indigenous knowledge*

The role of indigenous knowledge is debated in a wide range of international forums including WTO, WIPO, the CBD, and the Food and Agriculture Organization (FAO) and the International Labour Organisation (ILO).[40] Probably the most critical areas of conflict arise from developing country interests in implementing their obligations under WTO and the relevant provisions of the CBD. The main issue addressed by developing countries is that the traditional knowledge held by local and indigenous communities now forms part of the product development process of the industrialized countries.

Developing countries are seeking to remedy this problem by implementing the relevant provisions of the CBD, especially those dealing with traditional knowledge and overall access to genetic resources.[41] Developing countries are seeking intellectual property

registration systems that would identify and document the sources of genetic material and indigenous knowledge used in product development. Such a system would allow for the sharing of benefits arising from the use of such genetic material and knowledge in accordance with the CBD.[42]

But in cases where domestic law prohibits certain categories of patents on living organisms, the system could also be used to invalidate patents. The TRIPS agreement allows this provided these organisms are also prohibited from commercial exploitation. It is in this respect that ways need to be found to reduce possibilities for conflict between the two regimes. Indeed, discussions under the CBD are already addressing issues related to intellectual property protection. In turn, WIPO is also examining intellectual property issues related to traditional knowledge and biotechnology in light of the CBD provisions.

The concerns of the developing countries have recently been aggravated by reports of inventions in industrialized countries derived from products and knowledge that have been in use in the developing countries for centuries. For example, the patenting of traditional Indian herbal remedies derived from the use of turmeric or a patent related to the “ayahuasca” plant used for centuries by the indigenous people of the Amazon have given rise to considerable controversy. Both patents have subsequently been revoked by the US Patent and Trademarks Office. The patenting of basmati rice, long used in Pakistan and India, has added to the controversy. The situation is compounded by the use of broad patents to protect plant varieties, some of which form the staple diets in these countries.

India and many other developing countries have argued that the absence of requirements in patent documents (in Article 29 of the TRIPS agreement) to name the countries or origin of genetic material and traditional knowledge creates a conflict between WTO and CBD. The inclusion of such information would make it possible for the developing countries to meet their obligations under the CBD. A proposal to give this effect in Europe was rejected in 1998 by the European Commission following its endorsement by the European Parliament. The CBD requires that genetic resources and traditional knowledge be used following the granting of prior informed consent (PIC) by the holders of such material and knowledge.[43]

The TRIPS agreement, however, does not require PIC and it is therefore deemed to contradict the CBD. It is generally understood that the PIC requirement would be embodied in some form of agreement for the transfer of biological material or traditional knowledge.[44]

Such agreements would be made between foreign firms and the governments of the developing countries. But this point tends to conceal the fact that there are areas of conflict between indigenous communities and national governments in regard to sovereignty claims in many countries. There is a wide range of institutions that guarantee the rights of private individuals in regard to inventions but such rights are still nascent when it comes to the claims of indigenous communities over genetic resources. This is a particularly sensitive issue because of the efforts of various indigenous groups around the

world to seek greater autonomy. Rights to land (and the related resources such as genetic material) are part of the national discourse.[45]

An additional dimension to this debate is the claim that indigenous knowledge and the associated genetic material should be considered to be in the public domain and be excluded from patentability. This approach would exclude herbal remedies, cuisines and many other traditional applications from being patented and would reduce some of the international conflicts arising from recent patenting acts. But this would not solve the larger issue of how to stimulate further innovation among local and indigenous communities.

Industrialized countries have favored a system that involves voluntary agreements rather than strict national laws.[46] Indeed, many countries are pursuing this approach. However, nearly 40 countries have either adopted or are actively pursuing the adoption of laws that would regulate access to genetic resources and the associated knowledge. The emergence of these laws and the growing interest in facilitating the implementation of the TRIPS provisions will increase tension between countries on this subject.

Resolving these issues may require an exploration of the extent to which existing intellectual regimes can protect certain aspects of indigenous knowledge.[47] When such possibilities are exhausted, a case should be made for considering this issue in the context of the *sui generis* systems derived from a flexible interpretation of Article 27.3(b) of TRIPS as well as the extension of higher levels of protection for geographical indications to products other than wine and spirits.

## 4 International development policy considerations

Section 3 has provided an overview of some of the key issues that developing countries have raised in the implementation of the TRIPS agreement. The question remains to what extent issues are likely to be addressed. The issues that are being considered have different institutional implications that need to be taken into account. Some of the issues such as geographical indications are part of on-going negotiations in WTO.

The assessment points to the call for special and differential treatment of the developing countries on a case-by-case basis. This principle is already incorporated into the functioning of WTO and is expressed in many of its clauses. This is partly a result of the negotiations that took place under other agreements that provided special treatment to developing countries on public interest issues such as education.[48]

There are other issues, however, whose discussion require re-opening the TRIPS agreement for revisions. It is unlikely, and possibly undesirable, to re-open an agreement in the early stages of its implementation. Re-opening a part of the agreement means that the entire document is subject to revision unless clear procedures and terms of reference are set out. But the extension of the grace period under which non-compliance complaints cannot be brought against developing countries would be a legitimate demand.

Another area of interest is the establishment of new working groups under WTO to address some of the concerns of the developing countries. One of these is the proposal on a working group on technology transfer. But many of the technology transfer issues are unlikely to be resolved under multilateral arrangements. This, however, does not preclude the promotion of incentive mechanisms for technology transfer and cooperation in specific areas of mutual advantage. This could be in areas of national interest such as health, nutrition and environmental management. But such bilateral arrangements will only address the interests of the more advanced developing countries, leaving the rest to promote their interests through the multilateral system.

Compulsory licensing (provided for in Article 31 of the TRIPS agreement) has often been promoted as a policy tool to address public interest concerns but it is not widely used. This is mainly because access to patents or copyright is part of the process of product development and marketing. The ability to make effective use of patented technologies is largely dependent on existing technological capacity in a country. The more advanced a country is the more likely it can benefit from compulsory licensing.

However, such countries are also more integrated into the global economic and there more vulnerable to isolation by technology exporters. The poorer countries may not have the requisite competence to use patented technologies. Granting copyright to nationals is not sufficient unless it is complemented by other requirements such as printing that may rely on imported inputs. Although compulsory licensing appears to be a viable public policy instrument to deal with public interest issues, its use is complicated by many other factors.

Developed countries have a wide range of policy instruments and incentive schemes that can be used to address some of the issues raised by the developing countries. For example, many of the developing countries do not have the requisite technological capacity to use state-of-the-art technologies. But they could benefit from using inventions that are already in the public domain. To do this may require additional institutional arrangements that promote the transfer of such technologies to the developing countries.

For example, there may be a role for a new generation of charitable organizations that focus on promoting the use of public domain technologies to solve tropical problems in fields such as health, agriculture, environment and energy. One option that could be considered is the creation of charitable institutions that hold intellectual assets that could include patents of relevance to the developing countries.

Other approaches include the creation of incentives to promote and mobilize scientific knowledge in the industrialized countries to address specific challenges such as the development of vaccines for tropical diseases. Such initiatives would require new forms of R&D and commercial partnerships. Much of this will need to be discussed in the context of specific programs such as research on tropical diseases, foreign direct investment linked to technology transfer in fields such as communications, collaborative research using genetic resources in the developing countries and others.

One way to add value to genetic resources is to invest in their identification and monitoring. So far, little attention has been paid to this task as illustrated by the low level of support for taxonomic work. Current estimates show that only about 1.7 million species have been documented out of an estimate of 40-50 million. In order to play a key role in a strategic research program involving modern biotechnology, developing countries will need to invest more in the identification and monitoring of biological diversity (covering genes, species and ecosystems). Undertaking this task would be in line with the provisions of Article 7 of the Convention on identification and monitoring of biological diversity. This work will be in keeping with the requirements of Article 7 of the CBD which calls upon governments to identify and monitor "Species and communities which are: threatened; wild relatives of domesticated or cultivated species; of medicinal, agricultural or other economic value; or social, scientific or cultural importance; or importance for research into the conservation and sustainable use of biological diversity, such as indicator species." This work should also include the identification and documentation of innovations by local and indigenous communities.[49]

This approach could result in a series of collaborative research arrangements that offer mutual advantage to the developed and developing countries. Many of the practical details related to access to technology, capacity-building, benefit-sharing and intellectual property protection can be addressed through such collaborative partnership. The lessons learnt from the process could help to inform further negotiations under WTO, CBD and other agreements.

## 5 Conlusion

This paper has reviewed the implications of the TRIPS agreement for developing countries. An overview of the relationship between development and intellectual property rights shows that the debates on TRIPS are part of the broader issues of the role of technology in development and cannot not be addressed in narrow terms pertaining to enforcement. The public interest provisions of the TRIPS agreement should provide guidelines for further negotiations and offer opportunities for multilateral as well as bilateral arrangements for technology cooperation.

Probably the most important issue for developing countries is to seek an extension of the grace period for the implementation of TRIPS. This period would allow for a better understanding of the implications of TRIPS for development and would make it easier for the industrialized countries to consider how to promote technology cooperation. Many of the issues raised by developing countries are already part of the in-built agenda of WTO.[50] Others such as the need to balance between invention and discovery will require careful consideration at the national level. The general principle of broadening the scope of property rights to include other systems should be accommodated.

Probably the most challenging issue that underlies much of the discussion is how to mobilize the world's stock of knowledge to address developing country problems, especially those of the tropics. This will require approaches that go beyond the scope of intellectual property protection and require new forms of partnerships. What the debate over the TRIPS agreement shows is that prospects now exist for new partnerships in this area but implementing viable programs will require a careful review of the relationship between technological innovation and global capital flows. This link is important because investment capital is one of the most important mediums for international technology transfer.

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## Refrences and Notes

1 The TRIPS agreement covers: copyright and related rights (including the rights of performers, producers of sound recordings and broadcasting organizations); trademarks including service marks; geographical indications including appellations of origin; industrial designs; patents including the protection of new varieties of plants; the layout-designs of integrated circuits; and undisclosed information including trade secrets and test data.

2 Recent studies have shown that high levels of investment in R&D are not matched by similar growth levels. See, for example, Jones, C.I. 1995. "R&D-Based Models of Economic Growth." *Journal of Political Economy*, Vol. 103, pp. 759-784. It has been suggest that this productivity paradox may be explained by the observation that "R&D efforts are more and more attributed to product differentiation, thus enlarging consumers' welfare while simultaneously exhibiting only limited effects on economic growth," Loo, I.D. and Soete, L. 1999. *The Impact of Technology on Economic Growth: Some New Ideas and Empirical Conservations*. Maastricht Economic Research Institute on Innovation and Technology, Maastricht, The Netherlands. This view has far-reaching implications for technological development and the public interest provisions of the TRIPS agreement.

3 Davis, L. 1999. *Impact of the Patent System on the Innovating Firm's Use of Knowledge*. Paper Presented at CISTEMA Conference on Mobilizing Knowledge in Technology Management, Copenhagen, October 24-27.

4 National Academy of Sciences 1997. *Intellectual Property Rights and Plant Biotechnology*. National Academy of Press, Washington, DC.

5 Maskus, K. 1999. *Competition Policy and Intellectual Property Rights in Developing Countries*. Paper Presented at the WTO/World Bank Conference on Developing Countries in a Millenium Round, September 20-21, Geneva.

6 Council of Europe 1999. *Biotechnology and Intellectual Property*. Recommendation 1425, Parliamentary Assembly, Council of Europe, Strasbourg, Luxemburg.

7 Council of Europe 1999. *Biotechnology and Intellectual Property*. Recommendation 1425, Parliamentary Assembly, Council of Europe, Strasbourg, Luxemburg.

8 For an examination of the moral aspects of intellectual property protection, see Drahos, P. 1999. "Biotechnology Patents, Markets and Morality." *European Intellectual Property Review*, Vol . 21, No. 9, pp. 441-449.

9 Aoki, R. and Spiegel, Y. 1999. *Public Disclosure of Patent Applications, R&D, and Welfare*. Working Paper No. 30-99. The Foerder Institute for Economic Research, Tel-Aviv University, Israel.

10 These issues are part of a larger developing country multilateral trade agenda. For a review of the issues, see The South Centre 1998. *The WTO Multilateral Trade Agenda*. The South Centre, Geneva; The South Centre 1999. *Issues Regarding the Review of the WTO Dispute Settlement Mechanism*. The South Centre, Geneva.

11 For a review of the negotiating history, see Yusuf, A.A. 1998. "TRIPs: Background, Principles and General Provisions," in Correa, C.M. and Yusuf, A.A., *Intellectual Property and International Trade: The TRIPs Agreement*. Kluwer Law International, London.

12 Office of Technology Assessment 1986. *Intellectual Property Rights in an Age of Electronics Information*. US Government Printing Office, Washington, DC, p. 228.

13 France and Germany introduced pharmaceutical patent laws in 1960 and 1968 respectively while Japan and Switzerland acted in 1976 and 1977 respectively with Italy and Sweden joining them in 1978.

14 Kim, L. 1997. *Imitation to Innovation: The Dynamics of Korea's Technological Learning*. Harvard Business School Press, Cambridge, USA.

15 It has been argued that this provision needs to be developed into a separate agreement to protect the interests of the developing countries. This issue arises from Article 40 of the TRIPS agreement which deals with "licensing practices or conditions that may in particular cases constitute an abuse of intellectual property rights having an adverse effect on competition in the relevant market." It has been proposed that this could be remedied by the adoption of a Trade-Related Anti-trust Measures Agreement (TRAMS) which "would focus on basic principles, cooperation in procedures, and disciplines against clearly anticompetitive measures such as tolerance of export cartels and domestic exclusionary agreements and the protectionist use of anti-dumping rules. . .[but] such an agreement would be difficult but certain tradeoffs may be envisioned that could enhance its likelihood and effectiveness," Maskus, K. 1999. *Competition Policy and Intellectual Property Rights in Developing Countries*. Paper Presented at the WTO/World Bank Conference on Developing Countries in a Millenium Round, September 20-21, Geneva.

16 A number of developing countries have already been placed on the priority watchlist of the Special 301 provisions of the United States Trade Act for denying effective intellectual property protection or market access to United States firms. These include Argentina, Dominican Republic, Egypt, Guatemala, India, Indonesia, Kuwait, and Peru. Others on a general watchlist include Brazil, Chile, Colombia, Costa Rica, Equador, Jamaica, Jordan, Lebanon, Mexico, Oman, Pakistan, The Philippines, Qatar, Saudi Arabia, Singapore, South Africa, Taiwan, Thailand, United Arab Emirates, Uruguay, Venezuela and Vietnam.

17 WTO 1999. *Proposals Regarding the TRIPS Agreement (Paragraph 9(a)(ii) of the Geneva Ministerial Declaration.* Communication from Venezuela, World Trade Organization, Geneva.

18 "Political and economic power are the key factors in the implementation process and in forcing compliance on a reluctant party. Developing countries, as weaker partners, are at a double disadvantage. If a developing country balks at a panel or Appellate Body ruling in favour of a developed country complainant, it has to face sanctions and pressures by a more powerful country from the North. If, on the other hand, the latter balks at a judgement in favour of a developing country complainant, a developing country is hardly in a position to

mobilize and exert the necessary pressure to force compliance or to retaliate," The South Centre 1999. *Issues Regarding the Review of the WTO Dispute Settlement Mechanism*. The South Centre, Geneva.

19 WTO 1999. *Proposals on IPR Issues*. Communication from India. World Trade Organization, Geneva. "International institutions such as the World Bank may play an important role in enhancing the capacity of developing countries to take advantage of innovative activity in the industrialized countries, as well in promoting local innovation. These institutions may play the role of honest broker among countries and groups with different technology-related interests, they may create training programs for technical administrative personnel and judges, they may facilitate improvements in educational institutions that encourage innovative activity, and they may also take a lead role in advanced research on the role of IPRs in international economic development," Braga, C.A.P. and Fink, C. 1997. "Reforming Intellectual Property Rights Regines: Challenges for Developing Countries." *Journal of International Economic Law*, Vol. 1, No. 4, pp. 537-554.

20 WTO 1997. *India: Patent Protection for Pharmaceutical and Agricultural Products*. Report of the Panel. World Trade Organization, Geneva.

21 WTO 1997. *India: Patent Protection for Pharmaceutical and Agricultural Products*. Report of the Appellate Body. World Trade Organization, Geneva.

22 For a review of the impact of intellectual property protection on drug pricing, see Subramanian, A. 1995. "Putting Some Numbers on the TRIPs Pharmaceutical Debate." *International Journal of Technology Management*, Vol. 10, No. 1/3, pp. 151-168.

23 Over the 1975-97 period over 1,223 new chemical entities were marketed of which 379 were considered therapeutical products. Only 12 of these (1%) were specifically for tropical diseases, according to Troulle, P. *et al.* 1997. *Analysis of Drug Development Patterns of Six Tropical Diseases Between 1975 and 1998*. Paper Presented at the 8th International Congress on Infectious Diseases, May 15-18, Boston, USA.

24 PhRMA 1999. *Pharmaceutical Industry Profile, 1999*. Pharceutical Research and Manufacturing of America, Washington, DC; Office of Technology Assessment 1993. *Pharmaceutical R&D: Costs, Risks, and Rewards*. US Government Printing Office, Washington, DC. In the meantime, the modernization of the US Food and Drug Administration has helped to reduce approval times for new drugs.

25 It has also been argued that intellectual property protection is some areas may inhibit research. "Disease gene tests, however, are being monopolized by a small number of providers. Monopolization of medical testing services: (a) threatens to restrict research activities; (b) creates unacceptable conflicts of interest; (c) may reduce patient access to testing; (d) may lead to inequitable extensions of patent terms on tests and related discoveries; and (e) grants to patent holders the ability to dictate the standard of care for testing, and to otherwise interfere with the practice of medicine. Because of the risks raised by monopolization, amendment of the patent law to require compulsory licensing of physicians providing medical services is recommended," Merz, J. 1999. "Disease Gene Patents: Overcoming Unethical Constraints on Clinical Laboratory Medicine." *Clinical Chemistry*, Vol. 45, pp. 324-330.

26 WTO 1999. *Transfer of Technology*. Communication from India. World Trade Organization, Geneva.

27 WTO 1999. *Transfer of Technology*. Communication from India. World Trade Organization, Geneva.

28 This exception is derived from the European patent system and preferred by many developing countries.

29 For a broader review of the ethical aspects of transgenic crops, see Robinson, J. 1999. "Ethics and Transgenic Crops." *Electronic Journal of Biotechnology*, Vol. 2, No. 2.

30 WTO 1999. *The TRIPS Agreement.* Communication from Kenya on Behalf of the African Group. World Trade Organization, Geneva.

31 For a review of options for such a system, see Leskien, D. and Flitner, M. 1997. *Intellectual Property Rights and Plant Genetic Resources: Options for a* Sui Generis *System*. International Plant Genetic Resources Institute, Rome.

32 UNEP 1999. *Consequences of the Use the New Technology for the Control of Plant Gene Expression*. Subsidiary Body on Scientific, Technical and Technological Advice, Convention on Biological Diversity, Fourth Meeting, 21-25 June, Montreal, Canada.

33 This is compounded by the on-going debate over trade in genetically-modified (GM) crops following the decision of the European Union to impose a de facto moratorium on their commercialization in its market area. This is the subject of separate discussions under WTO and under the Convention on Biological Diversity. The latter is currently hosting negotiations to adopt a protocol on transboundary movement of living modified organisms. For details on the negotiations, see Gupta, A. 1999. *Framing "Biosafety" in an International Context*. Discussion Paper, Belfer Center for Science and International Affairs, Kennedy School of Government, Harvard University, Cambridge, USA.

34 Brazil's Law No. 9.279 of May 1996 excludes from patentability "all or part of natural living beings and biological materials found in nature or isolated therefrom, including the genome or the germ plasm of any natural living being, and any natural biological processes." Similarly, Argentina's Law No. 24.481 excludes from patentability "all biological and genetic material existing in nature or its replica, in the biological processes implicit in animal, plant and human reproduction, including the genetic processes relating material capable of conducting its own duplication under normal and free conditions, such as they occur in nature."

35 This article incorporated into the TRIPS agreement principles derived from the 1958 Lisbon Agreement for the Protection of Appellations of Origin and Their International Registration as revised in Stockholm in 1967.

36 Article 24 of the TRIPS agreement makes a number of exceptions from protection which include: (a) those who have already used geographical indications of wines and spirits for at least 10 years; (b) acquired rights on trademarks already "applied for or registered in good faith" or to marks "acquired through use in good faith"; and (c) geographical indications that have become generic or customary terms in member countries.

37 WTO 1999. *The TRIPS Agreement.* Communication from Kenya on Behalf of the African Group. World Trade Organization, Geneva; WTO 1999. *Agreement on TRIPS: Propsal Regarding Extension of Protection of Geographical Indications Under Paragraph 9(a)(i) of the Geneva Ministerial Declaration.* Communication from Cuba, Dominican Republic, Egypt, Honduras, India, Indonesia, Nicaragua and Pakistan. World Trade Organization, Geneva. Some developed countries have also expressed interest in extending the scope of protection to cover other products. Iceland, for example, would like geographical indications for its fish.

38 WTO 1999. *The Agreement on TRIPS: Extension of the Additional Protection for Geographical Indications to Other Products.* Communication from Turkey, General Council, World Trade Organization, Geneva.

39 The notification system could draw from the experiences of existing databases on geographical indications. For example, the International Vine and Wine Organization maintains a database of over 1,760 geographical indications which are often composed of one or more names, amounting to over 4,000 entries.

40 Posey, D. 1996. *Beyond Intellectual Property Rights: Towards Traditional Resource Rights for Indigenous Peoples and Local Communities*. International Development Research Centre, Ottawa; Pistorius, R. and van Wijk, J. 1999. *The Exploitation of Plant Genetic Information: Political Strategies in Crop Development*. PhD Thesis, University of Amsterdam.

41 WTO 1999. *Proposal on Protection of the Intellectual Property Rights Relating to the Traditional Knowledge of Local and Indigenous Communities.* Communication from Bolivia, Colombia, Ecuador, Nicaragua and Peru. World Trade Organization, Geneva. Article 8(j) of the CBD calls for national legislation that would "respect, preserve and maintain knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity and promote their wider application with the approval and involvement of the holders of such knowledge, innovations and practices and encourage the equitable sharing of the benefits arising from the utilization of such knowledge, innovations and practices."

42 Glowka, L. 1998. *A Guide to Designing Legal Frameworks to Determine Access to Genetic Resources*. World Conservation Union, Gland, Switzerland. Similar debates have been going under the auspices of the FAO Commission on Plant Genetic Resources for Food and Agriculture. The work of the commission focuses on revising the International Undertaking on Plant Genetic Resources to bring it in line with the Convention on Biological Diversity.

43 Article 15(5) of the Convention on Biological Diversity provides that: "Access to genetic resources shall be subject to prior informed consent of the Contracting Party providing such resources, unless otherwise determined by that Party."

44 For a detailed review of this subject, see Ten Kate, K. and Laird, S. 1999. *The Commercial Use of Biodiversity: Access to Genetic Resources and Beneft-Sharing*. Earthscan Publishers, London.

45 See Juma, C. and Ojwang, J. eds. 1996. *In Land We Trust: Enviornment, Private Property and Constitutional Change*. Initiatives Publishers, Nairobi and Zed Books, London; Ladidoth, R. 1997. *Autonomy: Flexible Solutions to Ethnic Conflicts*. United States Institute of Peace Press, Washington, DC.

46 OECD 1996. *Intellectual Property, Technology Transfer and Genetic Resources: An OECD Survey of Current Practices and Policies*. Organization for Economic Co-operation and Development, Paris, p. 56.

47 The World Intellectual Property Organization (WIPO) is examining these options but supporters of sui generis systems as well as some indigenous groups are opposed to this process and argue that it is will undermine their efforts to secure unique rights at the national and international level.

48 "Article 9.1 of the TRIPs Agreement requires Members to comply with the Appendix of the Berne Convention (1971) which contains special provisions for developing countries. These provisions provide developing countries, inter alia, with some flexibility in the area of compulsory licenses for translations and reproductions subject to a number of notification

procedures. They are not used extensively. They have been invoked under the TRIPs Agreement by one WTO Member. They are currently used by five countries under the Berne Convention, of which four are WTO Members but still benefiting from the transitional period. However, these provisions may have made the use of translations and reproductions in developing countries more affordable in the area of education. The possibility of using them may encourage publishers to make licensing for translation and reproduction available in developing countries on reasonable conditions," Youssef, H. 1999. *Special and Differentiated Treatment for Developing Countries in the WTO*. The South Centre, Geneva.

49 Gupta, A. 1999. *Personal Communication*. Indian Insitute of Management, Ahmedabad, India.

50 Watal, J. 1999. *Future Issues on IPRs in the WTO*. Paper Presented at a Seminar on Future Issues on IPRs in the WTO, Indian Council for Research on International Economic Relations, New Delhi, 14 October.