

## **INTELLECTUAL PROPERTY PROTECTION, BIOTECHNOLOGY AND DEVELOPING COUNTRIES: WILL THE TRIPS BE EFFECTIVE?**

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The international protection of intellectual property has been a contentious issue between developed and developing countries. Protection of intellectual property rights in agricultural biotechnology is the latest manifestation of the dispute with both developed and developing countries accusing each other of bio-piracy. The Agreement on Trade Related Aspects of Intellectual Property (TRIPs) was only grudgingly agreed to by developing countries at the Uruguay Round of WTO negotiations. The WTO allows trade retaliation to be used for violations of TRIPs commitments. The paper investigates the likely efficacy of trade measures in encouraging countries to live up to their TRIPs commitments. The results suggest that developed countries will not receive the protection they desire and, hence, there may be a mutual interest in re-opening negotiations related to patenting genetic material.

*Key words:* bio-piracy; biotechnology; intellectual property; trade measures; TRIPs; WTO

### **Introduction**

The debates over protection of intellectual property rights are largely polarized between developed countries, which produce most of the world's intellectual property and are advocates of strong international protection, and developing countries which perceive that the payment of monopoly rents for the use of intellectual property is detrimental to their development process (Mansfield, 1993; Taylor, 1993; Gaisford & Richardson, 1996; Government of India, 1989). The payment of monopoly rents has been particularly contentious for agricultural inputs such as seed as well as pharmaceuticals -- the former, because of its effect on poor farmers, and the latter, because of the effect on the poor's ability to afford health care.

Within this context, intellectual property piracy has often been perceived as a one way street: intellectual property is developed in technologically advanced countries and, once released, it is copied and used in developing countries without compensation. This perception was the main reason developed countries insisted that the Agreement on Trade Related Aspects of Intellectual Property (TRIPs) be included in the new World Trade Organization (WTO) negotiated at the Uruguay Round. The structure of the TRIPs also reflects this "piracy in developing countries" perception.

In the period since the TRIPs was negotiated, however, some developing countries have begun to

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suggest that their intellectual property is at risk from the activities of firms based in developed countries. At the center of this “new” perception is biotechnology (Khamphiraphap, 1998). According to Panutampon and Lianchamroon (1998):

Biopiracy, or the stealing of genetic material and knowledge from communities in the gene-rich developing countries, is an exploding issue in Asia. Industrialized countries want exploitation and ownership rights over the biodiversity of the South (p. 51).

To illustrate the complexity which surrounds intellectual property in agricultural products, consider the following scenario. Over a long period of time farmers in a developing country breed a crop variety which is adapted to local climatic conditions and which has characteristics that appeal to local consumer tastes. Over the last few decades, local plant breeders improve on the varieties through selective breeding and release strains using a name which has widespread local acceptance. These local varieties also appeal to niche market consumers in other countries and a considerable export trade develops. Intellectual property protection in the home country, however, is poor and, in any case, the government is opposed to the granting of monopoly rights in agricultural crops.

Seeing the international market potential of the local crop variety, an agricultural biotechnology company in a developed country acquires samples of the crop. As these varieties are not produced using biotechnology, the firm convinces its government to make use of the exemption for plants and animals allowed in the TRIPs by claiming these are natural varieties where no inventor can be identified. This is strictly correct because the developing country did not provide intellectual property protection for the varieties. The use of the exemption voids any rights on the part of the developing country to the natural varieties. The agricultural biotechnology company then genetically engineers a close substitute for the “natural variety” which maintains its desirable consumer characteristics. This genetically modified variety can be patented and its name copyrighted, which makes it eligible for intellectual property protection under the TRIPs. This means that the biotechnology firm can license the production of the crop in any climatically friendly country, export the product in competition with the natural varieties and prevent the natural varieties from being sold in importers’ markets using their traditional names. In the extreme, the biotechnology firm could ask for protection of its intellectual property in the original developing country to prevent both seeds and the outputs of the natural varieties from being sold under the traditional name. The claim for protection would be backed by the TRIPs. Far fetched?

A close variant of this scenario is being played out for Jasmine rice from Thailand and Basmati rice from India. In both cases, variants of the two rice varieties have been patented and copyrighted by United States (U.S.) firms. There has been an adverse reaction to this perceived “biopiracy” in both India and Thailand. For example, in an open letter to the U.S. Ambassador to Thailand dated July 22, 1998, Thai Farmers (1998) called on the U.S. government to:

revoke the patent on basmati rice and to reject any IPR application from Rice Tec Inc. and other companies in the US related to jasmine rice... Thai farmers and Indian farmers have developed rice varieties over thousands of years. Jasmine and basmati are two such rices widely known and appreciated across the planet today.

... rewarding minor genetic modifications of these materials through patent and other monopoly rights in the United States is nothing less than stealing the natural resources for the sole and totally illegitimate benefit of the rich in industrialized countries.

We call on the US government to cancel and prohibit the use of any form of the name Jasmine on any rice grown in the United State. The trademark "Jasmati" is a blatant defamation of both jasmine and basmati and gives deliberately false information to consumers. People are being led to believe they are buying a product related to Thai jasmine rice (back cover).

Thailand's Deputy Agriculture minister Newin Chidchop announced his government's resolve to fight "U.S. effort to imitate or undermine" jasmine rice by lodging a formal protest at the World Trade Organization (WTO) (Hongthong, 1998).

The complexity of the issues relating to the international protection of agricultural biotechnology suggests that a wide range of potential areas of dispute exist, and that it may not only be developed countries which will seek resolution of disputes at the WTO. As a result, the likely efficacy of the TRIPs/WTO enforcement mechanisms is of interest. This paper analyzes whether the enforcement mechanisms in the TRIPs/WTO can provide sufficient inducement for countries to live up to their TRIPs commitments to effectively enforce intellectual property rights in agricultural biotechnology. If they cannot then both developed and developing countries may have an incentive to see the TRIPs opened up for further negotiation, or to look for alternative frameworks that reward investments in intellectual property.

### **Evolving International Protection For Intellectual Property**

In recent years, the value of intellectual property in various consumer goods has increased considerably. Accordingly, intellectual property piracy has become of increasing concern to firms in developed countries and, as a result, the protection of intellectual property was a major topic of negotiation at the Uruguay Round of the General Agreement on Tariffs and Trade (GATT).

The outcome of the negotiations was a radically altered institutional structure for the conduct of international commercial relationships. The new World Trade Organization was instituted to administer three agreements, the GATT, the TRIPs and the General Agreement on Trade in Services (GATS). A major reason for tying the three agreements together in the WTO was to allow retaliation across agreements. In short, the WTO structure allows retaliation against the import of goods through the GATT for violations of intellectual property rights protection in the TRIPs. The absence of an effective enforcement mechanism was the root of developed countries' frustration with the existing World Intellectual Property Organization (WIPO) (Gutterman, 1993).

The new TRIPs/WTO mechanisms will not be tested until the twenty-first century because a period of grace was provided to allow countries to put legal, regulatory, and enforcement regimes in place to comply with their TRIPs' commitments. As yet, no agreement has been reached on the penalties which can be imposed on the party judged to be in violation of its TRIPs' commitments. In the absence of either a formal WTO agreement regarding the penalties which can be imposed, or precedents from dispute panels, the question arises as to what might be the retaliatory principle applied. If no agreement can be reached on compensation, the common practice when a country ignores the trade rules established by the GATT is for the injured country to be allowed to retaliate against the offending country up to the value of the trade foregone. This retaliation takes the form of a tariff or other border measures (Kerr & Perdakis, 1995). The products to which retaliatory tariffs apply are selected by the injured party. Allowing retaliation of this form for TRIPs violations would be consistent with GATT precedents and, for the moment, we will assume this is the retaliation rule agreed at the WTO.

Biotechnology has added a new dimension to the debate because there is perception among some in developing countries that the granting of monopoly rights to genetic material is biopiracy being practiced against developing countries.

Monopoly returns to intellectual property that is traded internationally are appropriated in three ways: (1) directly through the prices of exports; (2) fees for use; and (3) profits of subsidiaries (Maskus, 1990). If failure to enforce intellectual property rights is instrumental in preventing the establishment of a foreign subsidiary, the use of WTO-sanctioned cross retaliation via trade measures would not be possible. As no trade in goods has taken place, retaliation based on the value of lost trade has no effect. No loss of goods exports can be claimed by the country owning the intellectual property, even though there is a loss from the failure to protect intellectual property.

### **Modeling Retaliation**

The case where the monopoly rights to the intellectual property of a foreign owner are enforced in the importing country can be illustrated in figure 1. This is the “worst case” for those in developing countries who object to intellectual property protection for foreign owners. For simplicity, we assume that this is the small country case where imports of the product will be supplied at a constant price whether at the monopoly price or at a price that reflects costs -- the competitive export supply curve is perfectly elastic due to constant marginal cost.

Assume that a market situation exists where the home country faces no threat of cross-retaliation as a result of non-enforcement. This is where it has exercised an unchallenged exemption, or would have been the situation prior to the TRIPs. A pirate industry exists in the home country and has supply curve  $SP_1$ .

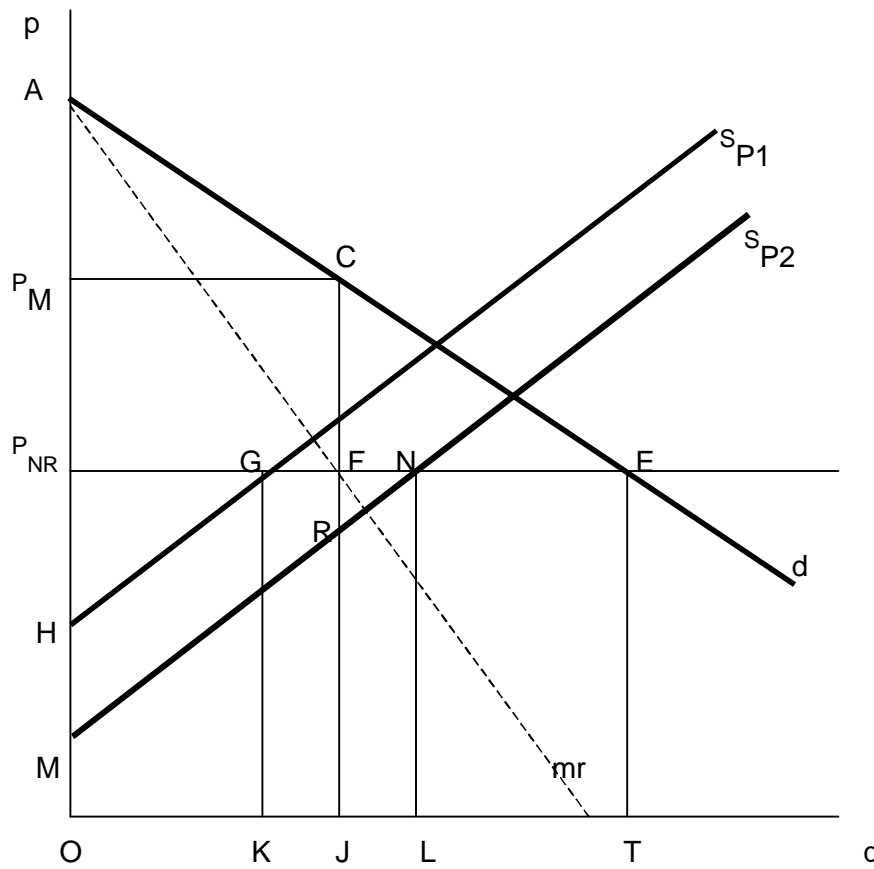
When faced with non-enforcement of its intellectual property rights and competition from pirate firms, the firm which produces the agricultural biotechnology will attempt to compete with pirate firms and supply exports at a price that reflects a normal rate of return on the investment in creating intellectual property,  $P_{NR}$ . Domestic pirate firms will supply  $OK$  and imports will equal  $KT$ .

Now assume that the country is a member of the WTO and either lives up to its TRIPs commitment, or suffers the imposition of trade sanctions. The importing country now has a choice. It can live up to its TRIPs commitments and enforce intellectual property rights by shutting down the pirate industry, or it can ignore its TRIPs commitments and suffer the cost imposed by cross-retaliation.

### The Non-Enforcement Outcome

If the importing country chooses not to enforce, then it can expect its exports of other products to be subject to trade measures imposed by the government of the firm which holds the intellectual property rights and exports the agricultural biotechnology.

**Figure 1. Foreign Monopolization Of The Industry If Intellectual Property Rights Are Enforced.**



Assume the lost value of exports is used to establish the size of the penalty. In figure 1, the value of the trade loss is  $P_M CJO$ .

It should be made explicitly clear that the export loss is not  $P_{NR}GKO$ , the value of the pirates' production, but rather the value of exports once a monopoly position in the market has been obtained. Of course, the value of the trade loss will be applied strategically against export products of the offending country where the damage done to firms in the offending country is expected to have the best effect in terms of encouraging the government to enforce intellectual property rights. Alternatively, the restrictions on imports might be used to satisfy influential domestic vested interests seeking protection.

### The Enforcement Outcome

If the importing country chooses to enforce, the exporter of agricultural biotechnology will be able to set its exports so as to monopolize the market, at  $P_M$ . Quantity  $OJ$  will be imported. As price increases from  $P_{NR}$  to  $P_M$ , there will be a loss in consumers' surplus equal to  $P_M C E P_{NR}$ . There will also be a loss in producers' surplus equal to  $P_{NR}GH$  from shutting down the domestic pirate industry. To this must be added the cost of enforcement. The total cost to the importing country equals  $P_M C E P_{NR} + P_{NR}GH +$  the cost of enforcement.

Little is known about the costs of intellectual property rights enforcement. There are two aspects to enforcement costs. First, there are costs associated with identifying pirate firms and monitoring. Clearly, these costs will vary from product to product and will depend on the degree to which the capital equipment required for pirate production is fixed or mobile, the absolute size of the premises required for production, the degree of concentration in the pirate industry, and so on. Secondly, there are factors that affect the efficacy of the enforcement effort. These include the effectiveness of the legal system in obtaining convictions, the degree of corruption in the police service and justice system, and the ability of the pirate industry to influence the political will to actively pursue enforcement. Given these costs are not transparent, however, they will be ignored in this analysis. Hence, it is assumed that fully effective enforcement can be costlessly obtained. Our analysis represents the “best case” for enforcement from the perspective of the firm who owns the rights to intellectual property.

### Incentives to Enforce

To see if the importing country will have the incentive to enforce intellectual property rights in agricultural biotechnology in the absence of enforcement costs, one must compare the loss associated with enforcement,  $P_M CEP_{NR} + P_{NR} GH$  with the loss associated with non-enforcement,  $P_M CJO$ . As areas  $P_M CFP_{NR}$  and  $P_{NR} GH$  are common, i.e., they arise whether or not enforcement takes place, the net loss from enforcement is CEF while the net loss from non-enforcement is HGFJO. As shown in figure 1, HGFJO is greater than CEF and the importing country will have an incentive to enforce intellectual property rights in agricultural biotechnology, as long as the cost of enforcement is less than HGFJO minus CEF.

Compare this result with that where the pirate industry is larger -- pirate supply curve  $SP_2$ , as depicted in figure 1. In the absence of enforcement, imports will be LT. If the importing country chooses to enforce intellectual property rights, the loss in consumer surplus remains the same as in the previous case,  $P_M CEP_{NR}$  but the loss in producer surplus increases to  $P_{NR} NM$ . The retaliatory trade loss remains unchanged at  $PMCJO$ . The net loss from enforcement increases to CENR (from CEF) while the net loss from non-enforcement declines to MRJO (from HGFJO). Hence, the likelihood that the importing country will have an incentive to enforce intellectual property rights in agricultural biotechnology will decline as the size of the pirate industry increases. The likelihood that enforcement will take place is further reduced because one would expect the cost of enforcement to rise as the size of the pirate industry increases.

This result is not the one desired by the owners of intellectual property in agricultural biotechnology. Presumably, they would wish for stronger incentives to enforce intellectual property rights as the size of the pirate industry increases. Similar results are obtained under industry structures beyond the simple monopoly case presented here (Yampoin & Kerr, 1996).

### **Discussion**

It would appear that if the members of the WTO decide to follow the customary GATT practice of allowing penalties equal to the value of lost trade when they establish the cross-retaliatory penalties for TRIPs violations, then the penalties which can be imposed will not provide sufficient incentives for countries to fulfill their TRIPs commitments in all situations when violations of intellectual property rights occur. If the monopoly rents are large, the size of the potential trade penalty will not be sufficient to justify enforcing intellectual property rights. Of course, the transfer of monopoly rents to foreigners is the basis for the objections to the enforcement of intellectual property rights by developing countries.

Further, our analysis puts forward the “best case” for enforcement because the costs of enforcement are assumed to be zero. As the size of the pirate industry increases, the likelihood that the importing country will enforce intellectual property rights to agricultural biotechnology declines. Thus, when large pirate industries exist, and firms that own intellectual property rights to agricultural biotechnology are suffering large losses, the probability of enforcement is smallest.

It might be possible for the owners of intellectual property in agricultural biotechnology to convince their governments to threaten retaliation when the pirate industry in a foreign country is small. This is when the threat of trade sanctions is likely to be most effective, and could deter the successful establishment of a pirate industry. Finding sufficient political support, however, for mounting a costly WTO challenge when only a small pirate industry exists may be very difficult given that WTO challenges tend to sour international relations on a number of fronts.

The use of a retaliation rule based on the value of exports lost might also have considerable practical difficulties associated with its implementation. This is because the trade loss is a counterfactual value, in other words, it is not observable when a country fails to enforce intellectual property rights. Quantity OJ in figure 1 cannot be determined until pirate firms are removed from the market. While it would be possible to estimate point C in figure 1, it depends crucially on the slope of the demand curve. Disputes over the size of the threatened penalty would likely become endemic at the WTO.

The threatened country will also have difficulty assessing the actual harm it will suffer when the equivalent value is translated into trade restrictions on its exports. Such a lack of transparency may well reduce the effectiveness of the threat, therefore reducing the incentive to enforce intellectual property rights to agricultural biotechnology.

### Alternative Penalty Structures

If penalties based on the value of lost exports will not consistently lead to compliance with TRIPs commitments, what should members of the WTO consider as an alternative? The use of the value of the trade foregone to establish penalties is only a crude proxy for the loss suffered by the owners of intellectual property in agricultural biotechnology when their rights are not enforced in the importing country. The true loss is the monopoly profits foregone.

Would using the direct measure of the loss suffered by the owners of intellectual property provide the appropriate incentives for consistent enforcement of TRIPs commitments? In figure 1, the monopoly rents lost when enforcement does not take place equal  $P_M CFP_{NR}$ . As this value is less than the value of trade foregone,  $P_M CJO$ , it will provide even less incentive for importing countries to enforce intellectual property rights. In any case, the loss of monopoly rents will always be less than the loss of consumers' surplus associated with enforcement,  $P_M CEP_{NR}$ . This suggests that an importing country would never have an incentive to enforce intellectual property rights in agricultural biotechnology.

It should be clear that to induce consistent compliance with TRIPs commitments, the members of the WTO would have to agree to penalties which are greater than either the actual losses suffered by agricultural biotechnology companies, or the (larger) value of the trade loss arising from the failure to enforce intellectual property rights. Setting aside the practical difficulties of establishing the actual size of the penalty required to induce a country to enforce intellectual property rights, that is, having to estimate consumer and producer surplus plus enforcement costs, it seems unlikely that countries would agree to trade penalties in excess of the loss suffered by the exporting country, however defined. That is not a precedent that WTO members would desire for other aspects of trade disputes.

Thus, it seems that the TRIPs and WTO cannot be relied upon to provide the level of protection desired by the owners of agricultural biotechnology.

These results suggest that the entire idea of using cross retaliation in the WTO to induce enforcement of intellectual property rights needs to be re-examined. Cluttering trade agreements with non-trade issues is a poor precedent in any case. The problem of protection of intellectual property needs to be tackled directly through multinational negotiations. In the past, the problem was that developing countries had little to gain from protecting intellectual property. Now there are signs that they may see some benefit to owning property rights in the genetics of their natural flora, fauna, and traditional crop varieties. Hence, with both parties having something to win from international protection of intellectual property rights, there may be the basis for an agreement.

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