

I Strategy™ **P** T O D A Y

An eJournal Sharing Creative and Innovative Ideas in Intellectual Property Strategies and Management related to Global Development and Biotechnology in Agriculture, the Environment and Health

No. 5-2002

1. The Effects of Intellectual Property Rights on Foreign Direct Investment and Imports into Developing Countries in the Post TRIPs Era

2. Technology Transfer for Humanitarian Use: Economic Issues and Market Segmentation Approaches

1. W. Lesser
Cornell University, USA

2. Travis J Lybbert
Cornell University, USA

Published by



Developing the potential of life... for life.™

www.bioDevelopments.org

In collaboration with



Turning stumbling blocks into stepping stones.

www.swift.cornell.edu

Published by: bioDevelopments—International Institute Inc., Ithaca, NY info@bioDevelopments.org
in collaboration with the Strategic World Initiative For Technology Transfer (SWIFTT)
swiftt@cornell.edu

ISSN: 1534-6447

Copyright: © 2002. bioDevelopments—International Institute Inc., Ithaca, NY, USA info@bioDevelopments.org
Sharing of *IP Strategy Today* through the Internet is encouraged. Reproduction for educational or other non-commercial purposes is authorized without prior permission from the copyright holder, provided the source is acknowledged. Reproduction for resale or other commercial purposes is prohibited without the prior written permission from the copyright holder.

Editorial Board: Anatole F. Krattiger, Editor-in-Chief, SWIFTT, Cornell University, Ithaca NY, USA afk3@cornell.edu
Tanit Changthavorn, BIOTEC, Bangkok, Thailand Tanit@biotec.or.th
W. Ronnie Coffman, Cornell University, CALS, Ithaca NY, USA wrc2@cornell.edu
John Dodds, Dodds & Associates, Washington DC, USA j.dodds@doddsassociates.com
William H. Lesser, Cornell University, CALS, Ithaca NY, USA whl1@cornell.edu
Darryl Macer, Eubios Ethics Institute, Tsukuba University, Japan macer@biol.tsukuba.ac.jp
Peter W B Phillips, University of Saskatchewan, Canada phillips@duke.usask.ca

Author's Addresses:

William Lesser Professor Department of Applied Economics & Management Cornell University Ithaca NY 14853, USA whl1@cornell.edu	Travis J Lybbert PhD Candidate Department of Applied Economics & Management Cornell University Ithaca NY 14853, USA tjl22@cornell.edu
---	---

Citation: Lesser, W. 2002. The Effects of Intellectual Property Rights on Foreign Direct Investment and Imports into Developing Countries in the Post TRIPs Era. *IP Strategy Today* No. 5-2002. Pp. 1-16.
Lybbert, TJ. 2002. Technology Transfer for Humanitarian Use: Economic Issues and Market Segmentation Approaches. *IP Strategy Today* No. 5-2002. Pp. 17-25.

Free Publication Orders: For free downloads of this and future volumes of *IP Strategy Today*, please visit:
www.bioDevelopments.org or www.swiftt.Cornell.edu

Free Subscriptions: to *IP Strategy Today*, visit any of the above web site or write to:
IP Strategy Today
bioDevelopments—International Institute Inc.
Cornell Business and Technology Park
PO Box 4235, Ithaca NY 14852, USA.
subscribe@bioDevelopments.org

Submission of Papers: Send an email to the Editor-in-Chief or to (only electronic submissions are accepted):
afk3@cornell.edu

Instruction to Authors: Please visit: www.bioDevelopments.org

Editorial Policy: The purpose of *IP Strategy Today* is to provide a forum to share creative, innovative and pragmatic analysis and ideas in intellectual property strategies and management issues, particularly as they affect the transfer of proprietary technologies to developing countries, developing countries access to proprietary technologies in agriculture, the environment and health, and the international exchange of genetic resources. Emphasis on the implications of biotechnology are specifically encouraged. Papers must have a problem solving orientation and demonstrate originality and innovation in thinking, analysis, methods or application. Issues related to research investments and management, bilateral and multilateral donor policies, extension, teaching, public-private partnerships are equally encouraged, as is interdisciplinary research with a significant IP and international development component. Manuscripts, review articles and working papers that offer a comprehensive and insightful survey of a relevant subject, consistent with the scope of *IP Strategy Today*, are welcome. All articles published, regardless of their nature, will be reviewed anonymously by members of the editorial board.

Concept and Design: Anatole F Krattiger, bioDevelopments LLC (International Consultants), Interlaken, NY.

Funding: We are grateful to the Rockefeller Foundation, to the Department of Plant Breeding and to the International Program of the College of Agriculture and Life Sciences (IP/CALS) at Cornell University for support.

Disclaimer: The views expressed are those of the authors and do not necessarily reflect those of their respective institutions, nor of the publishers, editors and donors of *IP Strategy Today*.

Contents

1. The Effects of Intellectual Property Rights on Foreign Direct Investment and Imports into Developing Countries in the Post-TRIPS Era **1**

William Lesser

	<i>Executive Summary</i>	1
1. Introduction		3
2. Constructing an IPR "Score" for the Post-TRIPS Era		4
2.1 Current IPR Scoring Systems.....		4
2.2 Components of an IPR Score		5
2.3 Constructing an IPR Score.....		8
3. Relationship between Intellectual Property Rights and Foreign Direct Investment and Trade		9
3.1 Literature Review.....		9
3.2 Selection of Variables for Analysis and Data Sources		12
3.3 Results and Discussion		12
4. Conclusions		14
References		14
Appendix: Tables with the Variable Identifications and Sources		15

2. Technology Transfer for Humanitarian Use: Economic Issues and Market Segmentation Approaches **17**

Travis J Lybbert

1. Introduction	17
2. Humanitarian Use Technology Transfer (HUTT)	17
3. HUTT Issues & Complexities	18
4. HUTT Approaches & Criteria	20
5. Conclusions	23
References	24

Technology Transfer for Humanitarian Use: Economic Issues and Market Segmentation Approaches¹³

Travis J Lybbert

PhD Candidate

Department of Applied Economics & Management

Cornell University

Ithaca NY 14843, USA

1. Introduction

Innovation is essential to economic growth. The efficient use of appropriate technology can drive economic development, thereby generating additional resources, ideas, and needs that fuel more innovation and technology creation. Such positive feedback loops generally characterize technological advancement, and these self-reinforcing cycles of innovation have created over time the extreme technological and economic inequalities that persist across the globe (Sachs 2000, UNDP 2001). The world's poor could benefit from access to technology, but incentives to develop and transfer technology are driven by expected profitability (Griliches 1957), which results in 'orphan' technologies and excludes the markets of developing countries (Kremer 2000a, 2000b; Sachs, Kremer and Hamoudi 2002).

Globalization, market integration, and harmonization of standards in recent decades have advanced the vision and virtues of an economically 'level' playing field, but in a world of persistent and severe economic inequality, big and small often compete together, making the notion of a 'level' playing field suspect. These tensions are especially evident in regards to technology, where 'harmonized' intellectual property standards seem to magnify technological disparities. What is to be done? Those loudly crying 'foul' deride the World Trade Organization (WTO)/ Trade-Related Aspects of Intellectual Property Rights (TRIPS) and demand that the harmonization process be reversed. In response, economic liberals relentlessly invoke models of comparative advantage to elucidate the virtues of free trade and harmonized standards. These are not the only options, however, and this paper outlines a more pragmatic approach, one that devises novel contractual strategies for segmenting markets and effectively creates a multi-tiered and fairer playing field.

2. Humanitarian Use Technology Transfer (HUTT)

The transfer of agricultural technology to developing countries is becoming more problematic for several reasons:

¹³ Lybbert, TJ. 2002. Technology Transfer for Humanitarian Use: Economic Issues and Market Segmentation Approaches. *IP Strategy Today* No. 5-2002. Pp. 17-25.

- a. research inputs and outputs are increasingly protected as intellectual property by both the private and public sectors;
- b. the forces of globalization require institutions to consider the global market implications of their technology transfer strategies; and
- c. trade liberalization and increased information flows make it difficult to treat markets independently.

Despite these trends and forces, however, there remains much promise for agricultural technology to improve the lives of the poor in developing countries (Conway 1997, Nuffield Council on Bioethics 1999; The Royal Society et al 2000, Serageldin and Persley 2000, Spillane 2000). But to realize this potential we must develop creative, novel technology transfer mechanisms that reconcile poor farmers' access to new technologies with proprietors' ability to maintain control over their technology and reap a return on their investment in more profitable markets.

Technology suppliers typically rely on contracts (e.g., licenses, material transfer agreements) to regulate the transfer and use of their technology. These suppliers, both private and public, typically segment their recipients into different 'use' categories (e.g., research only, commercial use, etc.). These use categories generally have clear and established definitions that are widely accepted and therefore easily interpreted. Humanitarian Use (HU), a phrase now common in press releases issued by agricultural multinational corporations announcing their intention to share proprietary technology with poor farmers, is presumably meant to ensure that the poor who are unable or unwilling to pay full price for a technology will benefit from it. Yet HU is typically defined very arbitrarily, if at all. Ambiguity about the meaning of HU makes organizations understandably hesitant to pursue HU licensing—even if they otherwise are interested in donating their technology. The successful HU segmentation of international markets is acutely needed, as is clearly illustrated in the pharmaceutical sector by recent demands for access to affordable AIDS drugs by South Africa and Brazil. Access to agricultural technologies generates similarly heated debate.

The most celebrated recent example of an HU clause used to segment access to an agricultural technology involves Golden Rice. Owners of key proprietary components of Golden Rice publicly committed to 'donating' their technology to the poor in August 2000, yet negotiations are ongoing over how exactly to define and operationalize such 'donations'. These negotiations focus on defining the HU market and, ultimately, on the precise wording of the HU clause. Importantly, this HU clause will determine ultimately who qualifies as a beneficiary of royalty-free access to Golden Rice and exactly how they benefit. Other cases in which an HU clause is intended to segment agricultural technology transfer include ring-spot virus resistant papaya transferred from Cornell University to Thailand, as well as several projects brokered by the International Service for the Acquisition of Agri-biotech Applications (ISAAA). The latter include local varieties of potato transferred from Monsanto to Mexico as well as papaya ring-spot virus resistance and delayed ripening papayas to Southeast Asia from Monsanto and Syngenta, respectively. Several similar HU negotiations are ongoing and more are likely in the near future. Finally, Byerlee and Fischer (2001) briefly discuss market segmentation and preferential licensing terms as a potentially promising means of making new agricultural technologies available to developing countries. They present a variety of other examples of different types of Humanitarian Use Technology Transfer.

3. HUTT Issues & Complexities

In negotiating an HU license, the stakes are often high for the technology supplier. It must reap a return on earlier R&D investments and is directly accountable to its shareholders or trustees for its performance. The interests of the technology supplier typically extend beyond short-run returns, however, and often include maintaining control of the technology and managing exposure to liability and public relations risks (Krattiger 2002). Of course, the stakes are also high on the recipients' end, since access

to the technology might mean better food security, better nutrition, and less poverty. Balancing these pressing needs and interests is no easy task, especially given real world complexities.

The intent of an HU license for the transfer of agricultural technologies is generally clear: to provide poor farmers free (or at least subsidized) access to beneficial technologies. Real world complexities, however, can make translating this clear intent into a workable and acceptable HU agreement very challenging. There are several complexities worth noting:

- Many technologies involve multiple stakeholders. Uncertainty about how to define HU and about the implications of various definitions is compounded because many technologies are creative configurations of existing (input) technologies, each with a potentially respective 'owner.' Reaching consensus among multiple stakeholders about how best to define HU can be problematic, especially when the calculation and payment of royalties to input technology suppliers hinges on this definition.
- Perfect HUTT would require information about farmers that is not generally available. For practical purposes, implementing HUTT typically requires the use of imperfect indicators (e.g., land holdings, agricultural earnings) to proxy for the targeted attribute (e.g., 'small-scale subsistence farmers'). The choice among proxies is generally very limited because there is little useful and reliable information about farmers in developing countries. Using an imperfect proxy to discretely impose an HU threshold on a continuum of farmers raises concerns about those who are excluded from the target by a narrow margin, as well as their incentives to deceive their way into the target.
- Leakage of the technology to unintended beneficiaries is possible and even probable. Decades of attempts to transfer food aid to the poor in developing countries painfully illustrate how difficult it is to ensure that the needy, instead of the local elites or the military, actually benefit from the transfer (Srinivasan 1989). Carefully defining the target and establishing a targeting mechanism so as to minimize leakage is essential to successful HUTT.
- Technology is rarely 'scale-neutral' and is often more easily adopted by large-scale farmers. New technologies come with new and unforeseeable risks. A farmer's ability to assume risk therefore largely determines his/her attitude and ability to incorporate new technology. It is thus conceivable that 'small-scale' farmers included in an HU might value the transferred technology less than larger excluded farmers. The benefits associated with accessing the technology may therefore be greater to unintended beneficiaries than to intended ones, introducing the possibility for post-transfer exchanges and strong incentives to deceive, making leakage yet more probable.
- Leakage of HUTT can erode the supplier's return on investment. Anytime a targeting mechanism fails to exclude unintended beneficiaries, the cost of the donation to the supplier can increase dramatically. In terms of lost markets, the cost of such a failure depends on how many farmers included in the target would have purchased the technology from the market had they not been granted preferential access via HUTT. This 'displacement' effect of HUTT, which results from imperfect targeting mechanisms, is a keen concern of suppliers (see Barrett (2002) for a discussion of displacement effects associated with international food aid). In contrast to imperfect food aid transfers, where the burden of displaced international grain trade may be spread among a set of exporters, the burden of displaced technology sales is generally born by the supplier whenever the technology is proprietary. As a key negotiating party in any HUTT negotiation, the technology supplier has considerable say over the HU targeting mechanism and might reasonably opt out of any proposed mechanism that it sees as potentially displacing too much of its prospective market.
- Developing countries are often considered growing markets. Byerlee and Fischer (2001) identify this as a major practical hurdle, stating that many developing countries have a growing potential private market for technologies and to be effective in larger countries, market segmentation must be *within*, as well as across countries—a much more difficult legal and administrative challenge. Furthermore, the technology supplier may plan to develop these growing markets as part of a long-

term market strategy, implying that the supplier expects these currently unprofitable markets to become profitable in the future. Depending on the nature of the supplier's technology and market strategy, HU donations could be more or less generous as a result of this consideration. If the supplier is confident it can create a loyal customer base in the future with a generous donation today, its donation will be less restrictive. If, however, the supplier is concerned about diluting the future profitability of these growing markets, its donation will be more restrictive.

- Displacement effects have dynamic implications. The technology supplier often must approach markets with long term strategies. Displaced sales from HUTT today therefore affect the size and shape of the market in the future, and hence can diminish the supplier's expected long run profitability. Because displacement affects future profits, it also affects the investment incentives that drive future innovation. Domestic suppliers might also see sales displaced by imperfect HU targeting, potentially setting off a series of domestic economy multiplier effects. These domestic economy effects are likely to be important considerations for government officials who often represent poor farmers at the negotiating table. Dynamic implications are therefore of critical importance to all negotiating parties.
- HUTT involves other dynamic considerations. The value of using a particular agricultural technology may increase with the number of users. If such network effects exist, the technology supplier may benefit indirectly from a relatively broad definition of HU, provided this increases its network of users (Takeyama 1994). There are several quasi-network effects in agricultural technologies. For example, biosafety procedures make the regulatory process tedious and time consuming. As the number of farmers using a particular seed ('approved' or not) increases, the regulatory process might be pressured to streamline. The recent case of *Bt* cotton being grown before being officially approved in India is one example of such quasi-network effects. Monsanto, who holds a patent on the technology in many countries, may well feel upset that its technology is used without it capturing a return, but such rapid technology adoption also placed pressure on the approval process in India.

4. HUTT Approaches & Criteria

HU clauses, which will undoubtedly become increasingly important as legal protection and ownership of agricultural technologies expands (Lele, Lesser and Horstkotte-Wesseler 2000), are relatively recent technology transfer tools. The last decade has seen several multinational agricultural companies issue press releases with a commitment to make proprietary technologies available 'royalty-free' for 'small-scale, subsistence' farmers in developing countries. How these commitments will materialize is largely subject to negotiation. The Golden Rice HU license cited earlier currently states that rice farmers earning less than \$10,000 annually from rice cultivation qualify for royalty-free HU. How this figure was generated and its practical utility are unclear. Indeed, it can be argued that the \$10,000 threshold seems to epitomize the ad hoc and arbitrary nature of the present HU negotiations.

This section outlines several alternative definitions of HU, briefly discusses their respective strengths and weaknesses, and comments on other possible HU licensing terms.¹⁴ The criteria adopted to assess the merits of these approaches are:

- feasibility,
- efficiency, and
- optimality.

¹⁴ Byerlee and Fischer (2001) offer a similar, though less extensive, set of possible definitions of HU, which provide a useful complement to the discussion in this section. In their presentation, they discuss these in terms of criteria for segmentation.

As a caveat, this brief discussion is meant only to present possible HUTT approaches and does not constitute a rigorous attempt to develop standards upon which HU negotiations might be based. The latter is the subject of more extensive research currently underway.

The intent of HUTT in agriculture is to provide poor farmers access to beneficial technologies. Generally, poor farmers in this context are defined as 'small-scale' or 'subsistence' farmers, suggesting that the most direct definition of HU should involve farm size and degree of subsistence.

- Maximum Farm Size: Defining HU according to a maximum farm size seems fairly straightforward, even if it requires information on farm size that is often not available or reliable in developing country contexts. Applying a blind farm size metric to rural populations could be hazardous, however, since many who have steady non-agricultural incomes (e.g., local government officials, merchants, etc.) maintain small farming operations on the side.
- Minimum Degree of 'Subsistence': A measure of 'subsistence' is more promising in theory, yet demands more information about farmers. A subsistence HU definition might state that farmers who "sell, exchange, or transfer less than X% of their agricultural production" qualify for HU. The obvious limitation with this approach is that it requires information that is often not reliably available, namely total market transactions and non-market exchanges of agricultural surplus. The possibility of deception is apparent.
- Maximum Income: A somewhat less direct measure of 'subsistence' is farm income, which presumably arises from sales of agricultural surplus. As mentioned, this is presently the approach chosen by the Golden Rice Humanitarian Board. This metric also requires information that is not readily available and that can be 'cooked' if incentives to do so are strong enough. Moreover, farm income is an imperfect proxy for degree of subsistence since farm income may be a small share of total household income.

There are a variety of indirect HUTT approaches that would require less information, making them potentially more feasible to implement and administer. The cost of this feasibility improvement comes in the form of a potential loss of precision and directness.

- Geographic Target: Subsistence farmers frequently eke out a living on marginal lands, which are often geographically concentrated. Thus, in many developing countries, regions within the country are consistently poor relative to the rest of the country. To the extent that 'small-scale' and 'subsistence' farmers are roughly concentrated in a geographical region, the HU target could be defined as all farmers within this region. Such a geographical target has the advantage of being relatively easy to administer and enforce, but it has the disadvantages of leakage to unintended beneficiaries and of excluding unfortunate farmers who are poor but have rich neighbors.
- Country Target: Extending the previous approach, the HU target could also be defined as all farmers within a specified country. This broad definition would likely require an additional restriction on exporting the resulting agricultural produce in the case of seed varieties or re-exporting the technology in the case of input technologies. The possibility of this approach depends on the concentration of poor farmers in a specific country. Countries such as Angola, Bangladesh, Afghanistan, and Somalia might fit this bid. Advantages and disadvantages are as above.
- Existing Program Participation: Many developing countries with relatively strong civil societies have established public extension-like programs to benefit small farmers. The existence of such programs allows for HU to be contingent on participation in a given program. Since these programs usually have already defined who qualifies for participation, this approach is relatively straightforward and may benefit from the local experience and knowledge of the program administrators. Of course,

such a target is only as good as the existing program. Further, many poor farmers in many poor countries simply do not have access to such a program.

A final set of approaches involves 'self-selection' mechanisms. These mechanisms have been discussed at length in the context of food aid transfers (see Barrett 2001 for a review). The idea is simply to devise a targeting mechanism that allows farmers to sort *themselves* according to their own perceived needs. These mechanisms are generally very promising in theory, but their applicability to technology is debatable. Nevertheless, a brief mention of a few 'self-selection' possibilities is warranted.

- Subsistence 'Bundles': While agricultural technologies have historically benefited large-scale farmers, there are crops (e.g., 'orphan crops') and technologies that are useful primarily to 'small-scale, subsistence' farmers. Farmers' technology preferences might be strong enough for them to 'self-select' into the HU target according to their own characteristics and needs if subsistence bundles of technology were freely distributed. This approach is open to leakage, however, and likely applies in only rare cases. Their rarity, in fact, points to a more fundamental, though tangential, problem: the lack of private incentives to develop subsistence technologies (Kremer 2000a, 2000b).
- Introducing Transactions Costs: Distributing technology in a cumbersome and tedious way could ensure that only farmers that truly need the technology participate. Common techniques for introducing transactions costs include requiring the farmer to wait in lines or jump through bureaucratic hoops. Only after proving that she truly values the technology is the farmer offered the technology. But there are obvious troubling aspects to such mechanisms, including wasted time and resources.
- Tiered Pricing: A supplier might establish a tiered pricing schedule that subsidizes small quantities of the technology, but increases the price as additional units of the technology are requested. Similar strategies are used commonly in many other settings. In order to be enforceable, this approach requires tracking repeated purchases by individuals so that total quantity purchased is known.

The above survey of approaches is not meant to be exhaustive. Certainly, other alternatives might emerge from creative discussions between the negotiating parties. Three criteria, however, should consistently determine the merits of any HUTT approach.

First, the approach should be feasible. It should be possible to determine who qualifies for the HU target given existing information of acceptable reliability. The administration of the actual transfer must also be feasible. The feasibility of a HUTT mechanism is also directly related to the enforceability of contractual market segmentation. Such feasibility, of course, matters to both the technology supplier and the party representing poor farmers.

Second, the approach should be assessed according to efficiency. Efficiency encompasses the technology supplier's concerns about including unintended beneficiaries in the target (i.e., leakage that could displace sales). This criterion also includes possible incentive effects, both incentives to deceive as well as incentives for future innovation and technology transfer. Efficiency is most directly a concern of the technology supplier, but because such concerns are likely to be sticking points in the negotiation and because domestic suppliers may also be affected by displacement, efficiency should be a key interest for the HU partner as well.

Third, the approach should be evaluated according to optimality. Optimality requires considering the total benefits to a society. In economics, this 'social welfare' is frequently measured as the sum of producer profits and consumer surplus. In HUTT, optimality should reflect the total social value of the transfer of a given technology according to a specified HU definition and mechanism. A primary concern here is for farmers who genuinely qualify for HU but are excluded in practice because of imperfect HU

definitions or transfer mechanisms. Optimality is difficult to measure in practice, but it is important to consider because it embodies the motivating intent of HUTT.

Table 1 summarizes the approaches mentioned above, each evaluated according to how it performs conceptually according to these three criteria. Performance is measured on a scale from poor (---) to excellent (+++). This table is purely hypothetical but serves to organize the possible advantages and disadvantages of various HUTT approaches.

Throughout this cursory overview of HUTT approaches it has been implied that farmers in the HU target were 'given' the technology 'royalty-free' and that the license required no upfront payment. While statements in press releases often seem consistent with free distribution of the technology, there are other potentially important variants. The technology could be subsidized for those in the HU target (i.e., distributed below-cost). In cases where training is required for the appropriate use of the technology, the terms of the license might stipulate the provision of training. In other cases, the provision of supporting infrastructure might be attractive. The negotiation of an HU license should recognize that while the definition of HU is critically important, there are other also other crucial variables. Creative brainstorming by the negotiating parties would surely reveal additional variables and options.

5. Conclusions

Economists have long considered questions about corporate strategy when facing markets composed of individuals with different preferences or income (Tirole 1988, Malueg and Schwartz 1994). From the perspective of the technology supplier, assuming this supplier is interested in maximizing its return on investment (increasingly a valid assumption for even some public institutes), HUTT is primarily a strategic price discrimination issue. HUTT, in this perspective, is simply a contractual means of segmenting markets and price discriminating. Using contracts to transfer technology for HU is valuable precisely because it offers a mechanism to segment markets that otherwise would be unavailable. When segmentation is not possible the poor are often priced out of the market (Malueg and Schwartz 1994).

Table 1: Approaches to HUTT and Criteria-based Evaluation

			Feasibility		Efficiency		Optimality	
			Information requirement	Administration/enforcement	Leakage and displacement	incentive effects	Unmerited exclusion	Total social value
Indicator-Based	Direct	Max Farm Size	--	-	+	+	+++	?
		Min "Subsistence"	---	--	+	-	++	?
		Max Income	---	--	-	--	++	?
	Indirect	Geographic Target	++	+++	--	++	--	?
		Country Target	+++	++	---	++	--	?
		Program Participation	+++	+++	+	+	-	?
Self-Selection	Subsistence Bundles	+	+++	-	+	++	?	
	Transaction Costs	+++	+++	--	+	++	?	
	Tiered Pricing	+++	+	++	+++	-	?	

HU clauses, as presently written, are often *ad hoc* and arbitrary because the implications of different mechanisms for HUTT are poorly understood. Submitting HUTT to rigorous analysis and developing a more systematic approach to defining HU could help strike the sensitive balance between the suppliers' interests and the recipients' needs. Practical, mutually beneficial mechanisms for HUTT will help ensure that crop varieties currently under development by both private and public sectors genuinely benefit poor farmers in the developing world.

Indeed, a key element of any negotiation is the standard used by the parties to determine what is fair (e.g., market value, salary offered for comparable positions; see Fisher, Ury and Patton 1991). Such a standard is only useful if it is considered by both parties to be somewhat objective. Indeed, the success of a negotiation often hinges on the degree to which the parties agree on the objectivity of a standard. Successfully formulating an approach to HUTT would be a step towards establishing an objective standard for segmenting markets. With such a standard available, technology proprietors would likely be more open to 'donating' their technology to the poor.

If an objective methodology for structuring efficient and workable HUTT can be obtained based on an analysis of the economic implications for both the technology supplier and the recipient, then companies in other sectors (e.g., pharmaceuticals, communications, electronics, etc.) might be interested in transferring technology to developing countries via HU clauses or variants thereof. In short, in a world of persistent economic inequality any technology with a public goods dimension and vested private interests might be distributed more fairly and, from the private proprietor's perspective, more efficiently as a result of a deeper, systematic understanding of HUTT.

References

- Barrett, CB. 2001. Food Security and Food Assistance Programs. *Handbook of Agricultural Economics*. B. Gardner and G. Rausser (eds). Elsevier Science: Amsterdam.
- Barrett, CB. 2002. Food Aid and Commercial International Food Trade. Cornell University Working Paper, Cornell University: Ithaca.
- Byerlee, D and K Fischer. 2001. Accessing Modern Science: Policy and Institutional Options for Agricultural Biotechnology in Developing Countries. *IP Strategy Today* No. 1-2001.
- Conway, G. 1997. The doubly green revolution : food for all in the twenty-first century. Comstock Publishing: Ithaca, NY.
- Fisher, R., W. Ury, and B. Patton. 1991. Getting to yes : negotiating agreement without giving in. Penguin Books: New York, NY.
- Griliches, Z. 1957. Hybrid corn: An exploration in the economics of technological change. *Econometrica* 25:501-522.
- Krattiger, AF. 2002. Public-Private Partnerships for Efficient Proprietary Biotech Management and Transfer, and Increased Private Sector Investments. A Briefings Paper with Six Proposals Commissioned by UNIDO. *IP Strategy Today* No. 4-2002.
- Kremer, M. 2000a. Creating Markets for New Vaccines: Part I, Rationale. Harvard University Working Paper. Harvard University: Boston, MA.
- Kremer, M. 2000b. Creating Markets for New Vaccines: Part II, Design Issues. Harvard University Working Paper. Harvard University: Boston, MA.
- Lele, UJ., W. Lesser, G. Horstkotte-Wesseler. 2000. Intellectual property rights in agriculture : the World Bank's role in assisting borrower and member countries. The World Bank: Washington DC.
- Nuffield Council on Bioethics 1999. Genetically modified crops: the ethical and social issues. Nuffield Foundation: London.
- The Royal Society, US National Academy of Sciences, Brazilian Academy of Sciences, Chinese Academy of Sciences, Indian national Academy of Sciences, Mexican Academy of Sciences, and Third World Academy of Sciences. 2000. Transgenic plants and world agriculture. Royal Society: London. www.royalsoc.ac.uk
- Sachs, J. 2000. A new map of the world. *The Economist* (June 24).
- Sachs, J., M. Kremer and A. Hamoudi. 2002. The Case for a Vaccine Purchase Fund. CID Working Paper, Harvard University: Boston.

- Serageldin, I. and GJ. Persley 2000. *Promethean Science: Agricultural Biotechnology, the Environment, and the Poor*. Consultative Group on International Agricultural Research: Washington DC.
- Spillane, C. 2000. Could agricultural biotechnology contribute to poverty alleviation? *AgBiotechNet* 2:1-39.
- Srinivasan, TN. 1989. Food Aid: A Cause of Development Failure or an Instrument for Success? *World Bank Economic Review* 31:39-65.
- Takeyama, LN. 1994. The Welfare Implications of Unauthorized Reproduction of Intellectual Property in the Presence of Demand Network Externalities. *Journal of Industrial Economics* XLII2:155-166.
- Tirole, J. 1988. *The theory of industrial organization*. MIT Press: Cambridge, Mass.

IP Strategy Today

**An eJournal Sharing Creative and Innovative Ideas
in Intellectual Property Strategies and Management
related to Global Development and Biotechnology in Agriculture, the Environment and Health**

ISSN
1534-6447

Free electronic distribution
US\$ 35 for printed version

www.bioDevelopments.org