

The Right To Save Seed

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ABSTRACT

This study aims at providing insight on seed acquisition mechanisms of farmers in the state of Jharkhand, India. By first establishing this mechanism, insight is provided on how India's obligations within the Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS), particularly Article 27.3 (b), will affect this acquisition. India's *sui generis* option, the Protection of Plant Varieties and Farmers' Rights Act (2001) (PPVFR) is considered, as is the other relevant option, UPOV. Other international agreements are considered in light of their relevance within the *sui generis* context. The main conclusions are that India's current *sui generis* option, the PPVFR, while successful and unique internationally in protecting the rights of farmers, is difficult to enforce in an international context as well as domestically. Further, the paper argues that the PPVFR will prove unsuccessful in limiting instances of "biopiracy", or the commercialization of plant genetic resources with no benefit sharing to, or recognition of, farmers. It also concludes that suggestions of the rates of farmers saving local varieties of seed have been greatly exaggerated in the extant literature, and that a coordinated effort at all three levels of the Indian governmental system - central, state, and village level, is undertaken to ensure that the goals of the India's *sui generis* option are achieved.

1. AN INTRODUCTION

The attitudes surrounding the ownership of genetic resources have seen a sea change over the last ten years. Whereas previously, these resources were seen by many as being part of the common heritage that is owned and used by all of humanity, recent advances in technology and the corresponding changes and developments within the policy frameworks that surround its management have resulted in a noticeable change. The primary catalyst for these changes has been economic; the incentives that exist for the assertion of private ownership over these resources are enormous. The pharmaceutical industry is often cited as a classic example of why these resources are so valuable. For example, medicinal knowledge held by indigenous peoples has the potential to be of enormous value to both society and commercial parties if the relevant elements of the resource can be isolated, successfully pass clinical trials, be subjected to private ownership via a formal intellectual property right, and commercialized by the new owner. However, examples of such ownership and the relevant incentive structure are not limited to pharmaceuticals, or indeed to any one industry.

With advances in genetic engineering and policy frameworks, the research, development, and acquisition of plant genetic resources (PGR) have been the focus of many firms in the agriculture sector, especially within the seed sector. Given the wide range of agro-climatic conditions that exist among the world's farming communities, firms who develop new varieties of seed are often looking for ways to introduce a product that is both ideally suited to the region to which it is being marketed and capable of producing higher yields. This is true in classical breeding techniques, where two or more parental varieties are crossed to create a progeny that exploits the desired traits of the parent, but it is also true in techniques that incorporate genetic engineering, as the DNA of older varieties may exhibit beneficial

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traits that could be introduced via genetic engineering within a new variety. Clearly, in both cases, the obvious place to look for these parental varieties would be the source of origin of the crop itself. The holders of these resources more often than not have been and are indigenous communities who have practiced their form of agriculture for hundreds of years, often not moving from the geographic areas from where their forefathers lived.

While concepts of private ownership over PGR may have taken root in global policy circles and, perhaps, within farming communities in countries that practice industrial, input intensive forms of agriculture, the same cannot necessarily be said about farmers in countries where farming practice is not for industrial purposes, but mainly for personal consumption. Indeed, in this context, “older” concepts of ownership are still prevalent, and PGR are often still considered to be owned by all, or at the very least, to communities or groups of people rather than single individuals or firms. However, given the changes in both mindsets and policy environments, there exists the potential for conflict between those who currently hold these resources and those who desire them for the commercial benefits they can potentially offer. If not outright conflict, then perhaps the relationship can be better expressed as a fundamental asymmetry that requires intervention, by state or non-state actors, to ensure that these resources are managed in a way that is mutually beneficial to both parties.

The catalyst for this study lies within two concerns. First, there has been and currently is a significant increase in the number of intellectual property rights granted on PGR used by farmers for hundred of years¹. This change in ownership has the distinct potential to affect the ability of farmers to access this PGR within the context of food security due to the exclusionary nature of intellectual property rights. Moreover, as per the experiences of farmers interviewed for this study, the prices of seed acquired from the private sector have been rising over the past five years, often by as much as 300%. While this rise cannot directly be attributed to the assertion of IPRs, its exclusionary nature confers monopoly rights over seeds, and awards the holder the possibility of pursuing monopoly pricing strategies. These prices are generally higher than those available in competitive markets. Second, private ownership of PGR affects pricing at the market level, and ultimately, in terms of the cost of inputs required by farmers to successfully pursue their livelihoods. Yet to what extent? Is there cause for alarm? Certainly, these issues have received much attention as of late, both within the context of multilateral trade negotiations (i.e. the WTO) but also at the domestic level, both at the state and civil society levels. However, in much of these debates, the actual effects of legislation aimed at protecting the interests of industry, end users (i.e. farmers) or some combination of the two, are not discussed within the context of the direct effects of the legislation on farmers themselves.

This study, then, is rooted in precisely what intervention on the part of the state is required, what it currently is, and what it could potentially be, and how state intervention will have an effect on farmers. The context of this work is, in terms of geography and communities, among farmers in the newly formed state of Jharkhand. In terms of the emerging policy that surrounds the ownership and movement of PGR, the context is the World Trade Organization (WTO), specifically the Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS). There are others, both at the levels of multilateral obligations as well as individual countries trying to meet these obligations, but the WTO is commonly recognized as the most relevant in terms of influence and action, both at a global and, due to the commitments that member states have made at WTO ministerial conferences, the national level. Thus, this study will look at nascent Indian policy, which has for the most part developed due to the obligations that the WTO minimum standards prescribe.

The objectives of this paper are threefold. **First**, to determine the way that farmers actually acquire the seed that they sow. Before any analysis can be lent to the implications of policy frameworks, an understanding must be acquired of what relevance the private ownership of

¹ There are many examples of this; in the Indian context, consider Neem and Basmati. More recently, consider wheat.

PGR may have to farmers by ascertaining how farmers acquire seed. **Second**, once the ground realities faced by farmers are understood, the study will consider the implications policy mechanisms such as TRIPS and India's own domestic legislation will have on the movement of seed, using the observations of current practice as a normative framework. **Third**, the conclusions that arise out of the observations and analysis can be used towards the ongoing process of developing policy around the issues considered here.

This study aims to provide pragmatic analysis for those interested in the implications of multilateral trade agreements and policy instruments on small scale farmers in India and, by extension, other agrarian economies with similar environments. The primary data and observations gathered here were undertaken by the author during a twenty-three week visit to India. A short film and photography exhibition accompany this study². This paper begins with an overview of farmers' experiences, followed by an explanation of the precise mechanisms by which farmers avail of seed; public, private, via saving, and farmer interaction. The paper then outlines the contours of relevant policy instruments at both an international and domestic level, and utilizes the information on farmers and their seed acquisition mechanisms to evaluate the policy. The paper concludes with recommendations to suggest a way forward.

2. SCOPE OF STUDY

Geographically, the area chosen to conduct this study has been the newly formed state of Jharkhand, erstwhile Bihar. Of the total population of 26.91 million, almost 80% of the inhabitants live in rural areas; of the total labour force, nearly half are engaged in agricultural activities. Nearly 30% of the population are tribal, or *Adivasi*; indeed, this significant minority was the catalyst for the formation of Jharkhand as an independent state in November 2000.

FIGURE 1: THE STATE OF JHARKHAND



The study was conducted in five districts; Ranchi, Palamau, Latehar (Daltonganj), Hazaribagh, and Giridih. One exception to this is the city of Hajipur, located about fifteen kilometres north of Patna, the capital of the state of Bihar. Hajipur is a major centre of seed for Bihar, as well as the surrounding states of West Bengal, Uttar Pradesh, and, of course, Jharkhand. Three hundred farmers were interviewed, either on a one on one basis or in groups of five to twenty farmers³. These three hundred farmers were spread over sixteen

² Interested readers are encouraged to visit <http://photos.yahoo.com/article273b> for a virtual version of the photographic exhibition. At the time of this writing, the film was still being edited for final dissemination; interested readers may contact the author directly to receive a link to the film, which will ultimately be available on the IDRC website.

³ In terms of gender, explicit attempts were made to solicit responses from men and women equally. However, it must be stated that responses from women required additional effort on the part of the author, as opposed to

villages. Aside from farmers, ten scientists at the state agricultural colleges, ten state and private sector plant breeders, and members of ten civil society organizations were also interviewed. Finally, the comments of various individuals from both intergovernmental (i.e. FAO, WFP) and governmental organizations (i.e. ICAR) elicited at various conferences were also taken into consideration.

Jharkhand was chosen as a geographic focus for a number of reasons. **First**, the rationale for this newly formed state was to give more autonomy to the *Adivasi* population; there are, correspondingly, a significant proportion of *Adivasi* communities in Jharkhand, and the type of agriculture practiced within these communities is relatively more rooted in traditional practice (i.e. saving seed, using little to no commercial factor inputs). With regards to the practice of saving and selecting seed, these communities are particularly well suited for consideration, as these practices are still very much alive. **Second**, the author had been fortunate enough to work with an organization, Gene Campaign, which has extensive applied experience working in Jharkhand; making contacts both at the village level as well as at the state level was simplified, as were logistical details such as travel and translation. **Third**, Jharkhand is continually a drought prone state. Local varieties grown here have often been adopted by formal breeders seeking to develop new varieties that utilize the drought tolerant characteristics of these local varieties, and so transfer of these resources from farmers to institutions are common. This has relevance with respect to access issues and ownership of these resources, which is a focus of this study. **Finally**, there is a dearth of literature that applies to Jharkhand, both due to its relatively recent formation, as well as the remote conditions that many of its inhabitants live in.

With this in mind, it should be pointed out that the observations stated here apply to Jharkhand, and certainly not to India as a whole. India hosts an incredibly diverse mix of agro climactic conditions, cultures, and landscapes; to extend these observations to the rest of the country would be inaccurate. However, there are certain aspects of the observations that could successfully be extended to other areas of India due to similar geography and ethnic composition (i.e. Chhattisgarh, parts of Madhya Pradesh, the Purulia district of West Bengal).

TABLE 1: MAJOR CROPS GROWN IN JHARKHAND

Cabbage	Cauliflower	Tomato	Aubergine	Spinach
Coriander	Beans	Cucumber	Chili	Mustard
Radish	Potato	Peas	Bitter Gourd	Rice
Finger Millets	Ginger	Chickpea		

While wheat and maize are grown in the areas surveyed, it is minimal as water is scarce (often forty or more feet below the ground), and much of the land is hilly, making water even harder to acquire. If they are grown, it is only in the *Rabi* (winter) as opposed to the *Kharif* (monsoon) season, when paddy is grown. Given the low availability of water in Jharkhand and the dependence on rainwater for irrigation, maize and wheat are not grown to the extent of rice. Thus, when seed is referred to here, reference is implied to either paddy or vegetable seed, and if it diverges from these two crops it is mentioned explicitly.

Before considering how farmers acquire seed, an explanation of the characteristics of farming practice and land usage will prove useful. **First**, consideration will be given to, broadly speaking, societal dynamics. This refers to the implications that religion, castes, and gender have on seed movement. **Second**, consideration is given to the precise ways that farmers acquire seed; either from the private sector, public sector, from other farmers, or by saving.

responses from men, which came relatively easily. Women often felt less willing to participate in discussions, particularly when in the company of men. To accommodate this, women were often interviewed separately and with the assistance of a female as opposed to male translator. By this way, equal representation of both men and women was achieved. Thus, when "farmers" are referred to as a broad group, the reader can assume equal representation in terms of the analysis presented here, unless explicit mention is given to one gender or the other.

The section closes with three case studies to provide pragmatic insight on what the experiences of three farmers interviewed are and have been.

2.1 SOCIETAL DYNAMICS

India has a wide variety of faiths, class distinctions, and gender roles. All these factors require consideration when looking at seed movement, as they all play specific, non-trivial roles in the acquisition of seed. They are often interlinked with each other; one factor may have direct implications on the other.

2.1.1 Religion

Of the seven major religions practised in India, Hinduism is by far the most prevalent (81%), with Islam following (12%). In Jharkhand, the numbers conform closely to these proportions, with the addition of approximately 30% of the total population being *Adivasi*, or tribal. Many of the *Adivasi* people interviewed for this study have converted to Christianity; those who have not are in the minority. The role of religion is important to consider as it has direct implications on the usage of resources. This is particularly true when considering Hindu and Muslim farmers; however, it would be misleading to consider what distinguishes *Adivasi* farmers from others within the context of religion, as it more a factor of class.

Depending on the village and the topography, certain resources are often found more in one part of the village than the other. In one village considered here, the majority of the wells were located in the predominantly Muslim part of the village. While the wells were drawn by all, Hindus would often not use the water out of a bucket drawn by a Muslim. Similarly, a Hindu will typically not enter the home of a Muslim, and vice versa. That said, in the villages surveyed for this study there did not appear to be explicit conflict between Hindus and Muslims. There were no obvious communal tensions, and when asked about how they view each other, most respondents stated “as equal”, or “as brothers”. Yet, in light of how faith relates to the usage of resources as outlined above, the attitudes encountered by the author could lead one to conclude differently. There appears to be a growing sense of division based on religion in many (but certainly not all) of the communities surveyed for this study. In particular, members of the RSS have encouraged younger men to reconsider whether or not Muslims belong in their communities (for example, due to their consumption of beef), and have sponsored schools for Hindu (and only Hindu) children at local temples⁴. This is a relatively new phenomenon in the areas visited according to those interviewed; the RSS and the Hindu right has not been a significant factor previously in these areas. These recent developments were viewed with either concern or outright disgust by those interviewed, both Hindu and Muslim. Time will tell whether or not these sentiments will fade or become more prevalent.

Generally speaking, when interviews were held in a group, both Hindus and Muslims were represented equally. It is the author’s opinion that to provide any real analysis or consideration of these issues would require far more time in the villages surveyed. The observations here, while truthful, are not sufficient to accurately address the complex relationships between Hindus and Muslims.

⁴ Briefly, the Rashtriya Swayamsevak Sangh (RSS, or National Volunteers Society) was founded in 1925; while its origins are steeped in India’s then pre-independence desire for autonomy from British colonial rule and a sovereign identity via an identification and regeneration of Hinduism, its recent agenda has become more focused towards, arguably, the creation and sustenance of a Hindu state. This redirection of goals and means to achieve these goals has seen the generation of activities, often violent, focused towards the non-Hindu - primarily Muslim - sections of society. However, the recent face of the RSS represents, in the opinion of many, not the interests of Hindus at large but rather those of upper caste Hindus, primarily Brahmins. Refer to <http://www.sacw.net/DC/CommunalismCollection/ArticlesArchive/anganaNov2003.html> for further information on the RSS and their inroads into schools in India.

2.1.2 Class

Within most villages, Hindus, Muslims and *Adivasis* live side by side. Yet beyond this distinction, one must also consider class, or more specifically, caste. While caste distinctions may be relatively less of a distinguishing factor in urban India, it is still very prevalent in rural India. Indeed, it may be one of the first questions asked among newcomers to most villages by people, particularly by older people. Caste has distinct implications with regards to the size and ownership of landholdings in particular, which directly corresponds to the wealth of the farmer and their ability to acquire different types of seed, factor inputs, credit, and financial loans.

Typically, large landholdings and higher caste go hand in hand, as do smaller plots and lower castes. Similarly, private moneylenders are typically higher caste, while those who avail their services are often lower caste. Land reforms have certainly lessened the influence of large landowners; still, it is a major factor in terms of the dynamics that exist between farmers. Such caste distinctions subordinate the bargaining power of lower castes due to the implicit inequalities that exist due to the delineations they present. However, this is a very dense and complicated dynamic, one that would require far more time and observation than was spent to date for this study. Thus, it is only pointed out here as a factor to illustrate the dynamics that exist among those who hold resources (i.e. land or money for lending purposes) and those who wish to avail them.

2.1.3 Gender

Gender is impossible to ignore when considering seed movement in India, as it is women who typically save and select seed. Religion and class play a significant role in determining what gender roles are. For instance, *Adivasi* women are far more vocal and are more apt to share the type of work undertaken by *Adivasi* men when compared to their Muslim or Hindu counterparts. That said, in the two latter households, women do share the workload, but the tasks done by men and women are more clearly delineated.

TABLE 2: GENDER ROLES

Gender	Roles
Women	Storing and selecting seed (mainly done by women, but not exclusively), household chores, sowing seed, transplanting seedlings to be planted for harvest, weeding, animal care, carrying and processing cow dung
Men	Purchasing all factor inputs (i.e. seed, pesticides, fertilizer), ploughing (almost exclusively done by men), waged work outside the village (between February and June; brick kilns, construction, ricksha driver), carrying crops from the field to storage, carrying grain to the mill

These observations apply to Hindus and Muslims equally, yet there are always exceptions to these roles. These distinctions apply more accurately to Hindu and Muslim communities as opposed to *Adivasi* communities, where these lines are harder to draw. For instance, unlike their Muslim or Hindu counterparts, *Adivasi* women do take part in waged labour from time to time, and will on occasion (if required) go to the market to purchase factor inputs.

Equal representation of both women and men was the ideal for the data gathered here, but in practice was more difficult to acquire. *Adivasi* women excepted, it is often difficult to speak to women outside of the company of men, which is necessary as the replies from women in the company of men are subject to scepticism; women will often not give answers that truly reflect their circumstances in the presence of men. However, within the company of women only, Hindu and Muslim women are far more vocal. On one of the field visits, a female interpreter as opposed to a male interpreter accompanied the author; this allowed significant insights on caste and religion that were not made clear during previous interactions.

2.2 Seed Dynamics

Farmers acquire paddy seed from a variety of sources; from the **private sector**, the **public sector**, from **civil society organizations**, via **exchange** with other farmers, and from **saving** their own seed. Yet at the same time, to delineate it as such is somewhat misleading, as very few farmers acquire seed from only one of these sources. Most farmers (with the exception of some *Adivasi* farmers) acquire seed from a number of places. There are a number of factors which influence where seed is acquire from; proximity to the market, income, availability of seed (both new and older varieties) within the community, and the efficacy of the state agricultural extension system. The relevance of these factors will become clearer after consideration is lent to the characteristics of the four sources mentioned here.

Before discussing seed acquisition in detail, an identification of the types of seeds is required, as not all seed can be saved⁵.

TABLE 3: THREE TYPES OF SEED AVAILABLE TO FARMERS

Type of Seed	Characteristics
Hybrid	Cannot be saved; progeny requires constant mating of two parental varieties. Typically provides the highest yields.
High Yielding Variety (HYV) /Composite Variety	Can be saved, but productivity diminishes over time. Typically saved and replanted for three years. Typically provides medium to high yields.
Local/Indigenous Variety	Can be saved indefinitely, typically of lower yield.

Major changes have occurred with respect to seed acquisition within the last five to ten years. Many of the farmers interviewed had only recently given up growing local varieties of rice and vegetables; in some cases, as recently as two years. The major rationale given by farmers for ceasing to grow these varieties was based on their lacking performance compared to newer varieties. That is, the yields of hybrids/HYVs as opposed to local varieties are typically (but not always) greater. While local varieties are capable of producing yields on par with those of HYVs, in the absence of irrigation (as is the case in most areas that source water for irrigation from the rain) it is rarely the case.

In order to be considered a HYV by the Indian government, the seed must produce at least 20% more yield⁶. This roughly corresponds with the experiences that farmers had stated; HYV paddy costs between INR 10-14/kg and hybrid varieties cost between INR 100-130/kg. Their yields are between 1,500-1,800 kg/acre and 2,200-2,400 kg/acre respectively, while local varieties average around 800-1000 kg/acre. Note the disproportionate relationship between cost and yield for hybrid varieties as opposed to HYVs; while hybrids cost almost ten times as much, they only yield about twice as much. Many farmers cited this as the reason for not adopting hybrid varieties. However, hybrids are also more efficient; less seed yields more paddy.

At this point, a crucial distinction requires attention; when referring to the practice of farmers saving seed, explicit mention is required of precisely **which kind of seed farmers are saving**. Much of the extant literature discusses seed saving without explicit mention of the types of seed being saved. Farmers only can save two kinds of seed; composite/HYVs or local varieties. The former are purchased regularly, anywhere from every two to three years, while the latter can be saved indefinitely. Given the fact that Composite/HYV varieties are initially purchased at the outset, it would be incorrect to state that those farmers who save such seed do not buy seed. Rather, those farmers who save seed may be saving one of these two types

⁵ Note that when describing the magnitude of yields, generalizations are avoided by qualifying the level with the word "typically", as all seed is subject to a wide variety of both biotic and abiotic stresses which result in some level of variation in the context of yield.

⁶ While most of the farmers interviewed stated HYV yield figures that did correspond to this 20% increase, not all did.

of seed, and if they are saving the former, they still purchase them on a regular basis. Broadly speaking then, those who save seed do not necessarily depend solely on local varieties for their seed requirement; these farmers do engage in the market for their seed requirements on a regular basis, as their use of Composite/HYVs indicates. Indeed, the majority of those farmers interviewed for this study purchase Composite/HYVs, and while these are indeed saved, they are not saved indefinitely as they must be purchased through the market initially.

2.2.1 *The Private Sector*

In stating the private sector, reference is implied to those parties outside of the public sector that offer varieties of seed on the market. Typically, the medium by which private sector seed is made available is via stalls in villages and urban centres that sell not only seed, but also fertilizers, pesticides, and other such factor inputs. These stalls generally do not have a formal relationship with the firms who sell the seed (i.e. as an “authorized” retailer), but rather are entrepreneurs who purchase the seed either directly from the suppliers, wholesalers or farmers themselves for resale. Those who purchase from wholesalers and suppliers directly are typically larger in terms of volume and the turnover they manage, smaller sellers often purchase the seed from the larger sellers and resell the seed in smaller quantities. This caters to a significant portion of the market, as many potential buyers often do not want or cannot afford to buy large packets of seed. Also, these smaller sellers also sell local varieties of seed, either from their own farms or from other farmers with whom they have cultivated relationships with, by kin or by other means. Generally, these resellers add on 20% of their cost to their price (i.e. if it costs a small reseller INR 100 for the seed, he will charge INR 120 and keep INR 20).

In terms of pricing, similar mark-up practice occurs within the larger seed sellers as well; often, “branded” seed is merely seed that is purchased at a fixed rate on an annual basis from farmers with whom firms have had long term relations, and is then repackaged under their brand name. There is, however, no mention or recognition of this on the package of the seeds themselves. Profit margins in these cases are far higher than in the case of the smaller resellers; branded seed acquired at wholesale rates for this study indicated a discrepancy between cost and retail of approximately 400%; that is, while the retail price may have been INR 120, these seeds at cost were closer to INR 30⁷.

Given that smaller sellers are not licensed suppliers of the non branded varieties they sell, there exists very little in the way of support to farmers in terms of literature or instruction. In many cases, instructions for the precise application and maintenance of seed were simply not available, either on the package itself, via literature, or from the seller directly. Farmers often turned to other farmers for instruction on how to grow new varieties, made educated guesses based on their past experiences with other varieties of the crop, or in limited instances, received assistance from government extension workers or civil society groups. While a “guesstimate” does not necessarily imply failure of the crop, it could certainly be argued that with the proper training, the performance of these seeds could be improved upon. This is assuming that the seed itself is not spurious. If the seed itself is spurious, farmers often have little recourse; typically, farmers do not ask for receipts when purchasing seed as to do so would incur additional costs due to sales tax. As a result, there exists no record of the sale, and any attempt at taking some sort of legal recourse is rendered futile. This is further exacerbated by the fact that typically, packaged seed is sold with the guarantee (printed on the package itself) that the seed is guaranteed only to germinate. Beyond that, there is very little assurance given to farmers for the performance of the seed.

This guarantee is a requirement for all “registered” varieties. However, registration within this context is distinct from any registration within the context of IPRs. Registration of seed

⁷ This conclusion assumes the wholesale rate as a proxy for cost and does not consider the additional costs incurred in providing seed, as they were not available. Thus, it is not to say that profit margins approach 400%, but that the magnitude of the profit margin is certainly higher than that of smaller resellers.

results in a “Truthful Label” that can be found on the back of the package of all registered seed. This registration is given by the State Department of Agriculture; but all the registration implies is that the seed was germinated at State labs and determined to be of passable quality. The label states a minimum level of germination, physical, and genetic purity, when it was packaged, and a disclaimer indicating that the guarantee only applies if one stores the seeds as indicated⁸. Beyond this, there are no forms of IPR protection available to the seller of the seed. Apart from the brand name of the seed (which is protected and cannot be reproduced), one could conceivably open a branded package, repackage it under a different name, and sell it with no legal concerns of infringement on any “registration”⁹. Since the genetic blueprint of the seed is not recorded for the majority of these varieties, formal ownership does not exist.

In terms of contracts or agreements between farmers and seed suppliers (as is often the case in industrialized farming), this study found none in Jharkhand. Thus, farmers are currently not subject to any penalty for saving seed that was originally purchased from the private sector. Farmers are free to save seed where possible, and do. With regards to non-hybrid vegetable varieties, seed can be saved anywhere from one to five years; high yielding or composite paddy varieties can be saved for three. Yet ultimately, save for those farmers who only grow local varieties, seed has to be purchased somewhere along the line, and if it is not from the private sector, then it would be from the public sector.

2.2.2 The Public Sector

During the Green Revolution of the early 1970s, India adopted a program with consultation from the Consultative Group on International Agricultural Research (CGIAR) to develop high yielding varieties (HYVs) of crops, primarily wheat, rice and maize. These HYVs are predominantly of paddy, often IR-36 and IR-64¹⁰. With regards to public and private sector breeding, the different classes of seed that exist in Indian commercial seed production require some explanation.

TABLE 4: CLASSES OF SEED AS DETERMINED BY PUBLIC SECTOR BREEDERS

Class Of Seed	Characteristics
Breeder Seed	This is the original seed produced by the breeder, either an institution (i.e. an agricultural college) or an individual. These seeds must be genetically pure.
Foundation Seed	Using Breeder Seed, Foundation seed is then multiplied on government farms, experiment stations, and agricultural universities. Foundation seed has strict controls for genetic purity.
Certified Seed	Using either Breeder or Foundation Seed, Certified Seed is then collected and sold commercially.

Source: Singh (1993)

Raw genetic material in the form of local varieties grown by farmers is acquired by public sector breeders via exchange. That is, breeders, for instance those at Birsa Agricultural College in Ranchi, the capital of Jharkhand, developed drought tolerant varieties of finger millets by exchanging varieties they had developed with those grown by local farmers for centuries. These local varieties were then used to develop improved varieties of finger millet, which are then made available to farmers on the market or via block development officers¹¹. Farmers are willing to exchange their varieties for new ones as they acquire improved

⁸ Ironically, the storage instructions indicate that seed should be stored at 18 degrees Celsius, and if seeds are not stored in this way the germination information is rendered invalid. Such temperatures rarely occur during an Indian summer, and, depending where in India one is, it is unlikely to occur regularly in the winter either.

⁹ This conjecture is strengthened by similar conclusions from private sector firms interviewed here, as well as officials within the State Department of Agriculture in Bihar and Jharkhand.

¹⁰ The International Rice Research Institute (IRRI) in the Philippines developed these varieties of rice. IRRI is one of the sixteen agriculture, forestry and fishery research centers that are part of the CGIAR system. The two varieties mentioned here are not only used in India however, but in many countries.

¹¹ The role of the Block Development Officer, or BDO, is to ensure that the development plans as directed by the state are implemented at the village level.

varieties at no cost during the initial exchange; the exchange is done on a one to one ratio¹². Breeders visit farms, select the most promising varieties from standing crops, and acquire them via exchange for new varieties. This raw genetic material is then analysed to determine its characteristics by the breeder, and once the characteristics have been formalized, is referred to as nucleus seed. As far as the breeders interviewed here are concerned, once this identification occurs, ownership is transferred from farmer to breeder; if not technically via some formal IPR, than at least in informal practice and recognition. Nucleus seed is then directly used as a parent in creating an improved variety, is mutated via gamma rays or other methods to encourage specific traits, or is purified via further cross breeding. After this nucleus seed is improved upon by one or some combination of these three methods, the seed then is considered to be Breeder seed. Nucleus and Breeder seed can change hands from institution to institution, and if this occurs it is priced at a fixed rate as determined by the government on an annual basis.

Once the Breeder seed has been successfully propagated, it is referred to as Foundation Seed. This is then handed to the Department of Agriculture at State levels, Agricultural Universities, or private sector seed firms for further propagation. Once Breeder seed is successfully propagated at these levels, it is considered Certified seed. This is then distributed to the National Seed Corporation as mandated by the Seed Act, and is provided to private sector seed firms, block development officers, or civil society groups for final dissemination to farmers. While breeders at the agricultural universities surveyed for this study explained that the block development officer was to offer this seed to farmers at a subsidized rate (or free of cost in the case of the varieties of finger millets developed by Birsa), the farmers interviewed here never received these seeds at the subsidized rates indicated by those breeders interviewed. More than likely, corruption at the block level restricts farmers from receiving these seeds at any subsidized rates, with block officers collecting fees for their own benefit. Indeed, farmers complained about the lack of subsidies and had diminished faith in the sincerity and effectiveness in the government due to this.

2.2.3 *Farmer to Farmer Exchange, Lending, and Sale*

Farmers exchange seed within their own villages, but also outside of their villages as well. While the former is facilitated via personal relationships that may predate the age at which farmers began to practice their trade, relationships outside the village are either cultivated via similar patterns as those within the village, but more often by marriage. Women almost always marry outside the village; connections are forged between families in this way, and if the family of the bride in one village has seed that is of interest to the family of the groom in another, exchange may occur. Again, it appears as though for the most part, these exchanges are on a one to one ratio, often regardless of the quality of seed¹³. A bride from one village will also bring with her a quantity of rice to present to her new family; typically, these varieties are chosen on the basis of high quality, and can be composite, hybrid, or local. The amount varies depending on what the family of the bride can afford, and can be anywhere from one to thirty kilograms.

Farmers also sell seed to each other, although less often it seems than purchasing directly from the market. Typically, the prices of the seed are on par with the market. Wealthier farmers who have the capacity to do will often make the trip to larger seed markets in urban

¹² There is no formal material transfer agreement between the two parties, namely breeders and farmers. While the question of formal ownership has never really been given any practical application among these varieties to date, emerging IPR frameworks may change this. Indeed, at this point, even the certified seeds developed by these public institutions are not protected by any kind of formal IPR, and they are not individually catalogued by their DNA as it is an expensive and time consuming process to do so.

¹³ The fact that exchange occurs on a one to one ratio surprised the author; a rational agent (in terms of classical economic behaviour) would presumably price the seed according to the implicit value it offers in terms of yield and other characteristics. However, as with many other aspects of seed movement, classical notions of economic rationality do not apply. Farmers often are motivated to offer seed on a one to one ratio purely due to the fact that it would help another farmer out. While it may be naïve to simply attribute this behaviour to benevolence alone, it cannot be ignored as a factor, perhaps the main factor.

centres to buy the latest varieties, and will sometimes disseminate these seeds to other farmers, by selling or lending. Farmers may lend or sell seed to each other, but not necessarily with interest or for profit¹⁴. Rates of interest vary from between 5-10% per month, or not at all depending on the agreement between lender and borrower. Often farmers will simply help each other out, and will not ask for any interest, or will request repayment in kind.

2.2.4 Saving Seed

As mentioned earlier, all seed with the exception of hybrid varieties can be saved, though generally with diminishing returns over time; HYVs of paddy are generally only saved for three years, and some wealthier farmers do not save HYVs at all due to their limited capacity to perform over time. Thus, when considering saving seed, a distinction must be made between newer varieties (i.e. composite/HYVs) and older varieties (i.e. indigenous varieties that have been saved, sown, harvested and used again for years).

One aspect of seed saving that applies to both newer and older varieties is the storing and selection of seed. Generally speaking, paddy seed is kept in either steel drums, or the more traditional bin used primarily by *Adivasi* peoples constructed of paddy or bamboo stalk. These containers are typically kept inside the homes of farmers, and are rarely held by more than one family. Each family tends to store their own seed, and there are minimal community storage facilities available. Paddy seed stored in this way can be kept for three years. Vegetable seed is not stored with paddy seed, but in plastic bags or other similar containers. As opposed to both HYV and local paddy seed which is saved relatively often, vegetable seed is often purchased on a regular basis, and are often hybrid varieties. Hybrid varieties of vegetables are not saved; however, local varieties of vegetables, if grown, are saved. Either private entrepreneurs or the government have, in certain areas, established storage facilities; they are not used by farmers only to save seed, but also to save produce¹⁵. Often the produce, for instance, potatoes, are used both for consumption as well as for seed.

With respect to traditional varieties, saving seed appears to occur as a function of two factors; one being the size of the landholding, and the other being income. Interestingly, those who do save indigenous varieties lie at opposite ends of both these spectra. Those saving seed either do so out of necessity (i.e. not paying for seed is preferred due to minimal financial resources), or out of some sense of “luxury” (i.e. wealthier landowners who have thirty acres of land or more at their disposal can afford to sacrifice some land which could grow HYVs to those local varieties that yield less). In addition, while those who grow them out of necessity do so because their choices are limited, the latter group of farmers grow them purely because they want to. This delineation raises the question; if a wealthy farmer can afford to buy high yielding varieties of seed on a regular basis, why would he or she choose to grow local varieties that typically yield less? There are a number of factors.

BOX 1: REASONS GIVEN BY FARMERS FOR GROWING AND SAVING LOCAL VARIETIES

- Free of cost; no need to buy seed on a regular basis;
- Better taste; vegetables and rice are considered tastier and more fragrant;
- Pride and ownership; the seed has a long history within communities;
- The straw is preferred by farm animals, as opposed to hybrid/HYV straw;
- Additional inputs such as pesticides and fertilizers are not absolutely necessary;
- Traditional aromatic varieties of rice command higher prices at the market.

¹⁴ Usury is not allowed in Islam; thus Muslim farmers will not lend for money. This is not to say they do not lend; if they do they will either ask for the full amount to be paid back by a specified time, or will take payment in labour during harvest.

¹⁵ Government facilities are significantly less costly; it costs INR 11 for a lifetime membership at one facility used by one farmer, while a comparable facility operated by a private party costs much more. This facility costs INR 142 (CAD 4.70) for a four month period, and provides enough space for 100 kg of produce. Farmers using the latter stated that it is cheaper to save potatoes and either replant them or consume them than it is to purchase seed.

Beyond the fact that saving local varieties can be done at no cost to the farmer, indigenous varieties of seeds have existed since, in some cases, time immemorial. Many of the farmers interviewed for this study have had family living in the same village for upwards of four hundred years. They themselves are no longer exactly certain where the seed originally came from, but they do know that the seed belongs to their community, and that sense of ownership is a major contributing factor to their growing these varieties. There are more pragmatic reasons as well; often farmers feel that local varieties taste better, and that the animals (i.e. cattle, goats) reared by farmers prefer the chaff that results from harvest as fodder, as opposed to that which results from newer varieties.

2.3 THREE CASE STUDIES

In order to better characterize the observations, we present the following three case studies. These are based on three actual sets of interviews, and have been selected to represent three strata of farmers; marginal (less than 5 acres, usually on the lower end of the spectrum), medium (between 5 and 20 acres) and large (20 acres or more)¹⁶. These should be considered with the following state wide statistics in mind; 46% of all farmers own less than two hectares, 21% own between two to five, and 32% own more than five.

CASE 1: A SMALL LANDHOLDER

Nandalal Ekka owns three acres. He lives in Meeru village, about 15 km from Hazaribagh; about 7000 people live in his village. He grew only local varieties of paddy until about ten years ago; since then, he has stopped growing these varieties. Mr. Ekka could not support himself or his family growing local varieties alone, and would have to take up seasonal labour in lean times. Since adopting newer varieties of seed, he now claims to have more food for his family, and does not have to work outside the village. He now has a small tailor shop in his village to supplement the income he makes from selling vegetables; he consumes all the rice he harvests. For the most part, he mainly grows rice, but to a very limited extent he grows maize and wheat as well. For vegetables, he grows potatoes, cauliflower, tomatoes, spinach and coriander. He saves some of the vegetable seed for himself, but he does not sell these varieties as he feels there is not sufficient demand on the market. According to him, "they taste better, but they don't look as good as the hybrid varieties, so I don't sell them. No one will buy them." But he himself prefers his own varieties of vegetables as opposed to the hybrid varieties; "they are free, they taste better, and they are mine".

Mr. Ekka does not buy hybrid varieties of rice, as he feels that they are more susceptible to pests; also, given that hybrids cost about ten times as much as HYVs he feels he cannot afford them. He pays between INR 14-15/kg of HYV paddy seed, which is on par with what others pay for similar varieties. However, he also avails of paddy seed from the Central Rainfed Upland Rice Research Station, a state managed research institution; paddy seed here costs about INR 11/kg. He saves his HYV varieties for three years, after which he buys new seed.

He gets his information about how to grow these varieties from shopkeepers, scientists at the research station and from the Holy Cross, a Christian organization in the area. The Holy Cross gives information to farmers about how to use these new varieties, and he is happy with this. He knows the state is supposed to do this, but he is not satisfied with their efforts. He feels as though the state has abandoned him. In his village, only about 2% of all the inhabitants rent their land, the rest all own their land, as he does. About half the people in Meeru have one acre or less; a quarter have between one and five, about 10% have between five and ten, and a small remainder have more than ten. It is this latter group of larger landowners who still continue to grow older varieties.

Scientists from the research station have come in the past when he used to grow old varieties of rice and offered IR-36 on exchange for his varieties; he thinks this is fine as he gets new seed this way. He has never really questioned why the government wanted his seed. If he was certain that they were using his varieties to develop new ones, he would feel as though he should have gotten some kind of recognition for it. But he is not too bothered about it.

CASE 2: A MEDIUM LANDHOLDER

Aziz Rehman and his son live in Putrunji village, in Latehar district. His family has been living in Putrunji for over three hundred years. He does not know exactly where the local varieties he grows originated from, but, as he does and will do with his own son, he knows that seed is passed

¹⁶ In the interests of anonymity, the names of those farmers illustrated in these three studies have been changed.

on from generation to generation. He has twelve acres between himself and his son. Of this land, eleven acres are solely for paddy; the rest are for potatoes, pulses, peas, cauliflower, cabbage, eggplant, okra, and tomatoes. He sometimes grows wheat and maize, but given the poor monsoons and his dependence on the rain for irrigation, he has not lately. He grows three local varieties of rice, and about five HYVs; he adopted these HYVs in 1978. Given that Mr. Rehman has the connections and the resources, he arranges for seed to be acquired in Ranchi, which is quite far from Putrungi; about a seven hour drive on poorly maintained roads. These roads are also often subject to lootings by the Maoist Communist Centre (MCC); the MCC is a common threat to most people living in Latehar and Palamau districts. The police have a minimal presence there (compounded by their own sense of being threatened by the MCC), so for the most part there is no law enforcement. He rarely ever makes the drive himself anymore, but rather buys the newest varieties from a middleman who brings them from Ranchi. This middleman charges an extra INR 40 per 100 kg of seed, or an extra INR 56 on the total 140 kg he has purchased last year.

Mr. Rehman feels that he does not have to rely on the government for seed; in his opinion, only small farmers and *Adivasis* need to do so. He does avail of other government services however; he uses a government seed storage facility. This facility costs INR 11 for a lifetime membership. He and others use this to save their seed, particularly maize, wheat, pulses, and paddy. However, other people in Meeru do not seem to know about this facility (as per the author's investigations). Apart from that, the government comes once a year to his block and set up a training camp on how to use new varieties; he finds this helpful. There is a Christian mission as well in Mahuadanr, the nearest town; he uses this as well. The government has not come to him seeking older varieties; if they did however, he would ask for payment as he is not interested in exchange. When asked why he thought the government would want his seed, his assumption was that it would be redistribution rather than any kind of breeding effort.

Mr. Rehman also acts as a sort of seed supplier himself; since he makes an effort to get the best seed, he offers his seed to other farmers as well. But he generally does not sell this seed; he does loan it (not for interest as he is Muslim) and expects payment either in kind (i.e. labour) or cash. He hires labour to work his farm during the pre-monsoon planting season; for every 1.5 acres, he hires forty to fifty people at a rate of INR 50 a day. These people work one day on, one day off. If any of these people have any outstanding debts, then this is cleared first in lieu of payment.

Unlike many of the other farmers interviewed, Mr. Rehman has achieved results from local varieties of paddy that are almost on par with HYVs. Specifically, planting 200 kg of local varieties yielded 5500 kg of paddy, while planting 140 kg of HYVs yielded 5000 kg. The yield ratios are 1:28 and 1:36 respectively; granted, HYVs do yield more, but also require pesticides and fertilizers, additional factor costs that are not applicable in growing local varieties. He only uses cow dung for fertilizer for his local varieties, and has minimal pest problems with these varieties, unlike his HYVs which require regular applications of pesticides. However, local varieties require more land. Of the 10,500 kg of rice he has harvested last season, he kept 6000 kg, and sold 4500 kg. Of the 6000 kg he kept, he has put aside 200 kg for saving; it should be noted that he only saves local varieties, as he would rather buy fresh new varieties every season than save HYV seed that has diminished in productivity.

Mr. Rehman has decided to grow both local and new varieties for a number of reasons. As the figures show, he does not find that the differences in yield are that significant. But, ultimately, he still prefers to grow more new varieties than older ones. He stated three reasons; first, people prefer the aesthetics of new varieties. Visually, they are more uniform in terms of the physical characteristics of each kernel and longer in length. Second, new varieties are more land efficient; one can get more yield per acre as opposed to older varieties. Third, in light of the first reason, newer varieties command higher prices on the market; he sells aromatic HYVs for INR 16/kg as opposed to INR 9/kg for local varieties. That said however, he will continue to grow old varieties, as he has the capacity to do so, and, according to him, because they belong to him and they just taste better.

CASE 3: A LARGE LANDHOLDER

Faiz Hussein owns over thirty acres in Astha village, located in Giridih district. His brother is the *mukhia*, or village head. He is in the minority in Astha in terms of his landholding; only 10% have over ten acres. One quarter own less than one acre; about 30% have between one to five and five to ten acres each; the remaining 5% are landless. As with most farmers interviewed, he focuses his efforts on paddy cultivation, though he does grow some maize and wheat. In terms of vegetables and other crops, he grows cucumbers, eggplant, cauliflower, cabbage, mustard and some pulses. Astha is located in a quite hilly area; thus, the two local rice varieties he grows are suited for this; he grows one lowland variety as it requires more water, and one midland as it requires less.

Mr. Hussein buys new varieties of seed from the market every three years. If not from the market, then he gets new varieties from the Block Development Officer, or BDO. The BDO offers seed every

June, though often he finds that the seed is made available too late. The seed is allegedly priced competitively; it is subsidized by the state, but in reality he finds that they are more expensive than what he could (and does) pay at the market. Unlike other farmers, he uses fertilizers and pesticides on both local and newer varieties.

This farmers' relationship with the government is quite healthy; perhaps this is due to his brothers' (and by relation, his) higher standing in the community. As a result, he knows the BDO and has a cordial relationship with him; the office is seven km away, closer than in most other villages surveyed. The BDO holds a *Jan Sevak*, or people's meeting, twenty evenings a month during the monsoon season to provide instruction to farmers on how to grow new varieties. However, the attendance to these facilities is small. He argued this was because the government is trying to impose farming practice rather than workings with what farmers are currently doing.

There are similar results with the governments' money lending initiatives. The State Bank of India (SBI) established a *Kissan*, or Farmers', Credit Card system. To be eligible for this service, a farmer has to show he or she has collateral in the case of default. According to Mr. Hussein however, the process is very long and drawn out, so only 5% of the farmers in Astha use it. More popular are the services of private moneylenders, as the loans can be secured immediately. Technically, private money lending is illegal. Private moneylenders are popular regardless of the fact that they charge 12.5% per month, as opposed to the SBI initiative which charges 12.5% a year. Generally, these private moneylenders are higher caste; this implies a direct class relationship between higher castes lending money and lower castes borrowing money. Caste also is a factor in the cooperative society that exists in Astha; the co-op exists to lend money, seed and other inputs at 12.5% a year. However, most of the resources of the co-op have been exploited and hoarded by the richer, higher caste farmers. As a result, the system is barely functioning. The government initially provided the funds for the co-op, with the management to be undertaken equally by members of the co-op. This, however, has not been the case. While Mr. Hussein himself is well off, he is frustrated with the state of things in Astha. But he feels that while the government is partly to blame due to its lacking interest and knowledge of the realities faced by farmers, farmers are equally to blame. Class distinctions, conflict, and in his words, "laziness" are as much to blame as anything else.

3. PROTECTION MECHANISMS

The implications of protection mechanisms as embodied via Intellectual Property Rights, or IPRs, on farmers are relevant for a variety of reasons. **First**, plant varieties used by farmers over significant amounts of time hold tremendous potential to formal plant breeders. Farmers have selected varieties best suited to their agro climactic conditions. This raw genetic material can be, and is, used for formal breeding exercises as parental varieties in creating new, "improved" varieties that exhibit certain desired traits; for instance, drought and salinity tolerance. However, the acquisition of this material is often achieved with little or no approval, or consent, of those farmers who have held them for generations. If farmers' varieties are used as raw material in creating new varieties, and these varieties are then awarded formal protection via a plant breeders' right or a patent and are marketed, the exclusionary nature of the protection assures significant financial benefits for the party that commercialized the improved variety. However, farmers, at least in the Indian context, rarely receive any benefits accrued from this commercialization. There has been a shift in global mindsets addressing this sharing of benefits, mostly notably via the Convention on Biological Diversity¹⁷.

Second, the assertion of IPRs, and, as a corollary, monopoly rights, have distinct pressures on pricing. Farmers interviewed for this study have already seen a 300% rise in the price of private sector seed within the past five years. Based on the evidence of a wide variety of consumer products subject to monopoly pricing (i.e. software, pharmaceuticals) these varieties of seed may prove unaffordable to farmers unless they are guaranteed to perform as they are described, which, in light of recent experience (i.e. Bt Cotton) may not be the case¹⁸.

¹⁷ Refer to section A.2.

¹⁸ Briefly, the BT Cotton crop in India has been the subject of much debate regarding its alleged success among farmers in southern regions of India. While the national government has officially stated it has been a success, some state level officials (i.e. the Minister of Agriculture in Andhra Pradesh) have stated it was far from a success. Moreover there exist similar discrepancies among farmers; while some have stated positive experiences, others have stated quite the opposite. The most common complaint among the latter group is that while the seeds were offered

Third, the assertion of an IPR on a variety currently in use by farmers may exclude them (at least in a legal framework if not in terms of immediate practicality) from reusing this seed due to the private, exclusionary ownership that an IPR confers on a resource. This is particularly relevant in light of recent international experiences (i.e. Percy Schmeiser and Monsanto)¹⁹.

Recent advances in biotechnology have broadened the definition of what exactly is an “invention” worthy of being protected by an IPR. Historically, patents and other forms of IPR have not been applied to biological resources. Yet with the tremendous progress seen in fields such as biotechnology and more recently, nanotechnology, patents have been applied for in order to assert ownership of resources at the genetic, and now atomic, level. This has raised a wealth of concerns within a variety of spheres; political, ethical, scientific, and philosophical. However, patents are not the only form of IPR that exists.

TABLE 5: FORMAL IPR MECHANISMS

IPR Mechanism	Application
Copyrights	Protects the way an artist or other party expresses an idea; i.e. songs, software code, plays, sculptures. Typically, copyrights are recognized by many countries, so applying in many countries is unnecessary.
Trademarks	Identifies a product via a symbol; links a good with a visual icon so as to not confuse or mislead consumers about who has provided the good. Not enforceable across borders; must be reasserted in different countries.
Patents	Protects ideas and inventions via exclusion; the owner of a patent is legally recognized as the only party allowed to produce the good. Like trademarks, patents must be reasserted across borders (though this is changing due to TRIPS and WIPO).
Trade Secrets	Protects a process not generally known by the public. For instance, recipes, contact lists, and techniques can all be protected via a trade secret.

Different forms of IPR are used in different circumstances; typically, parties have used these four depending on their circumstances and needs. However, in light of the changing landscape of what precisely embodies an “invention”, other forms of IPR have also been considered.

TABLE 6: OTHER IPR MECHANISMS

IPR Mechanism	Application
Plant Breeders’ Right	PBRs are similar to patents in terms of their ability to exclude. However the criteria to award a PBR are slightly different; varieties must be novel, uniform, distinctive and stable.
Geographic Indication	This is used on goods that have a specific geographical origin and possess qualities or a reputation that are due to that place of origin; i.e. <u>Champagne from the Champagne region in France</u> .
Community Property Rights	CPRs are a relatively new concept; it is rooted in the protection of the Traditional Knowledge of indigenous peoples. However, due to its recent emergence, there is still much work to be done on its implementation and enforceability in an international context.

Clearly, there are a number of options for parties to pursue depending on their needs and requirements. In the present context, patents and PBRs are the most relevant given their potential, and, in some cases, explicit application within India’s nascent regulatory framework.

on the basis of three results (i.e. higher yields, pest resistance, and a guarantee from the state for performance), the seeds have not performed as promised, and the state has provided nothing in the way of compensation.

¹⁹ See Note 29. Granted, varieties of rice such as IR-36 and IR-64 may not become hindered in terms of the ability to be saved, given that one of the government’s objectives in providing this seed was to ensure that farmers can save the seed for a certain amount of time. The concern, however, lies in the rapid displacement of older varieties (such as those developed by IRRI) for newer ones that were not developed by state (or international) bodies. These varieties have not necessarily been developed with the interests of saving seed in mind, and if one looks to the current practice of seed contracts excluding saving practice in other countries, it cannot be ignored as a distinct possibility in India.

3.1 PATENTS

If resources are to be appropriated from communities for potential commercial purposes, there is a strong likelihood based on past experiences that the isolated chemical compound that comprises the base of the commercial embodiment of the resource may become a privately owned resource via some IPR mechanism, potentially a patent. The basis of a patent being granted is based on the resource being **useful, novel and non-obvious**. Usefulness implies having industrial application, novelty implies not previously existing in the public domain, and the non-obvious criterion implies that the idea must be “not obvious to a person skilled in the technology and more inventive than mere discovery of what already exists in nature (such as a gene with no known function)” (Posey and Dutfield 1996: 77). Non-obviousness is also often referred to as the “inventive step”.

The first criterion of being useful is an obvious incentive for a firm to pursue a patent, and it is generally clear that if a compound has been isolated for commercial purposes, then it must be useful in this sense. However, the second and third criteria are contentious in light of the number of patents recently awarded to resources that have been used by communities for many years. The criterion of novelty, as that of usefulness, seems intuitive. Yet, the term novelty in the context of patents does not imply what one would generally assume in everyday knowledge. To receive and assert a patent, one has to prove that the resource is novel, and precisely how to do so varies among jurisdictions. The basic premise that exists among all jurisdictions however is that the only factor that can really challenge novelty is **prior art**. Prior art relates to the dissemination of knowledge on the usage of the resource. More specifically, prior art exists to alert those potentially seeking to invoke a patent on a resource of knowledge of the resource previously existing in the public domain. The question however, is what really constitutes prior art.

Given the wide range of interpretations of what prior art really means among those developed countries that file the vast majority of patents worldwide (i.e. the US, EU and Japan), what is required for developing countries wishing to challenge a patent is an indication of how resources within their own communities can be shown to constitute the prior art. Much attention as of late has been devoted to prior art databases. The purpose of these databases is to provide evidence of prior art by providing a record of the fact that these resources have indeed been within the public domain. Yet, given the explicit definitions provided by the EU, US and Japan, it is debatable as to whether these types of databases can really constitute the prior art in those jurisdictions²⁰. Moreover, it is not clear as to whether or not a prior art database will truly serve the best interests of those holding the resources, as such a database may act as a “shopping list” of sorts to those looking to commercialize these resources, thereby placing additional stresses on the resources.

Various jurisdictions consider the form of acceptable prior art in different ways, though generally what is required is a written record. However, this is not to say that merely stating that a given resource is capable of facilitating a specific outcome and recording it in written form is sufficient to establish prior art. Any novelty-defeating prior art has to be described in such a manner as to guide someone “skilled in the art” (i.e. someone capable of understanding the technical specifications of the patent) to create and utilize the resource. This can be construed as meaning that the description of the resource must be technical in nature; this indicates that merely stating that the given resources exists, has been used for a specified amount of time by certain individuals, and has particular properties described in a

²⁰ The US considers sources of prior art to be “written texts, databases, published herbarium specimen (in the case of plant patents) or other sources, or when it is provided by the applicant as part of his disclosure obligation” (CIEL 1999). On the other hand, Japan recognizes prior art if found “through public telecommunication lines in Japan or elsewhere”, which could conceivably include texts found on the Internet (Ruiz 2002). The EU lies somewhere in between, specifying acceptable prior art along similar lines as the US, but also inclusive of “non-patent literature” (EPO 2002).

qualitative sense will more than likely be insufficient to constitute the prior art²¹. While novelty in patents thus hinges on establishing the prior art, novelty within the context of a Plant Breeders' Right carries a slightly different meaning.

3.2 UPOV AND PLANT BREEDERS' RIGHTS

The International Union for the Protection of New Varieties of Plants (UPOV based on the French translation) is unique; it is the only intergovernmental organization that is devoted to the protection of new varieties of plants developed by formal plant breeders. Since 1961, it offered recognition to the rights of formal plant breeders by a formal intellectual property right, namely a **Plant Breeders' Right (PBR)**. PBRs were introduced as an alternative to patents due to concerns that patents, or more specifically the "inventive step", could not be applied to plant varieties. The argument was that new varieties of plants are generally "improvements" rather than inventions, and that conferring patents on plant varieties would dilute the meaning of an "invention" in the legal context (Cullet 2003: 1).

BOX 2: What Is A Plant Breeders' Right?

A Plant Breeders Right (PBR) is a form of Intellectual Property Right for parties developing new plant varieties. PBR differ from patents with respect to the criteria that determines whether or not protection can be conferred on the variety. The criteria for allowing a patent on an invention is that the invention must be useful, novel and non-obvious. With a PBR, the criteria are that the variety be **distinct, uniform, stable** and **novel**. To be distinct implies that the variety should be easily distinguishable from other varieties; uniformity implies that the variety will reproduce in a similar manner. Similarly, stability implies that the variety will not change over generations²². Novelty however, has a somewhat different interpretation than it has with reference to patents.

In the case of PBRs, novelty is conferred more along the lines of market concerns rather than existing knowledge. That is, while novelty in the patent context hinges on whether or not the invention already exists and has been documented, or the prior art, within PBRs "the variety shall be deemed to be new if, at the date of filing of the application for a breeder's right, propagating or harvested material of the variety has not been sold or otherwise disposed of to others, by or with the consent of the breeder, for purposes of exploitation of the variety" (UPOV 1991). Here, the concern is not that the variety previously existed, but rather that it was not previously available on the market. The novelty criterion provides a sound indication of this distinction, as it presumes at the outset that seeds are a marketable commodity, as opposed to an input that is not owned by private parties, but by communities.

Many developing countries, including India, have based their plant variety protection (PVP) legislation on a UPOV framework. UPOV currently exists in two forms, a 1978 version and a 1991 version. As of April 1988, the 1978 convention can no longer be acceded to; that is, technically, only UPOV 1991 can be adopted or joined by interested parties. The major difference between UPOV 1978 and 1991 within the context of our discussion relates to "plant-back rights", or the ability of farmers to retain and exchange seed. The 1991 version treats breeders' and farmers' exemptions differently. With regards to breeders, the 1978 formulation allows breeders free access to varieties as an initial source of variation; the 1991 version follows along similar lines, with the caveat that essentially derived varieties, or EDVs, cannot be used as source material without the permission of the owner if they are protected²³.

²¹ The particular format of the database and the syntax of how resources are described in the database is thus of extreme importance. Indeed, if databases are not developed in such a way as to enable someone skilled in the art to fully comprehend the characteristics of the resource, thus establishing the resource as being in the public domain and constituting the prior art, then documenting the resource may actually have the potential to further jeopardize the resource in question. If a resource is entered in a database in terms that describe what it can be used for in non-technical terms (i.e. medicinal uses or agricultural application) and the database is publicly available, it could potentially be used by those seeking commercial uses of PGR as a "wish list" of sorts.

²² For a more detailed description of how precisely these criteria are defined, interested readers can refer to Articles 6 through 9 of the UPOV 1991 convention, which can be found at <http://www.upov.int/en/publications/conventions/1991/content.htm>.

²³ Most genetically modified varieties are based on material found in extant varieties, and are thus considered EDVs; for instance, Bt Cotton is a variety of cotton identical to its parent except for the inclusion of a bacterial gene from *Bacillus Thuringiensis* (Bt). Bt is a bacterium that affects the caterpillars of some moths and butterflies that

As for farmers, the 1978 formulation allowed farmers to save and replant a portion of seed protected by a PBR (i.e. plant-back rights, or to a limited extent farmers' rights), or to exchange limited amounts seed with other farmers. In the 1991 version, this exemption is removed and is left to the discretion of member states as an option, and this only applies to seed on the farmers' own plot; that is, the exchange of protected varieties is not allowed.

PBRs are valuable, as some form of protection is certainly useful for plant breeders, be they public, private, or farmers. While patents on PGR may be inappropriate for developing countries (both for moral and ethical reasons, but also for logistical reasons; substantial costs are incurred in applying and processing a patent application), PBRs can be used to protect the interests of farmers by offering an internationally recognized form of formal IPR on farmers' varieties. The concern however is whether or not UPOV should be adopted by developing countries as the appropriate model, or whether a more concerted effort is needed to not simply adopt UPOV, but to develop options that more accurately reflect the requirements of individual countries where seed is saved and exchanged on a regular basis.

3.2 FARMERS' RIGHTS

Farmers' Rights can be defined as the entitlement of farmers to save, use, sow, resow, exchange, share or sell farm produce including seed. This has direct implications on the farmers considered here. Local varieties of seed in the villages surveyed for this study are saved on a regular basis, as are HYV/Composite varieties. Currently in India, there are no restrictions on the ability of farmers to do so. As discussed in section two, seed is saved, exchanged, and sold freely. However, this is not the case in many countries that practice more input intensive forms of agriculture; in Canada for instance, most large-scale farmers sign contracts with private seed firms indicating that they will not reuse their seed. There are farmers in India (such as Mr. Rehman from Case Study 2) who purchase seed on a regular basis, but this is by their own choice and is not the norm; there is no legal obligation to regularly purchase seed. Moreover, the farmer considered here had the resources to buy seed on a regular basis. This is not the case in general in India. Most farmers are more like Mr. Ekka (from Case Study 1) who have small plots of land, do not have much in the way of additional resources, and depend on the fact that they can still either save seed annually (i.e. local varieties) or every three years (i.e. composite varieties). Indeed, interviews with senior plant breeders in some of the agricultural colleges surveyed for this study indicated that one of the main objectives of the Indian government in introducing composite varieties of paddy such as IR-36 and IR-64 during the Green Revolution was to allow farmers to save seed. This was done in order to minimize the costs incurred by farmers and to help ensure their food security.

This freedom could potentially be curtailed, depending on what type of regulatory framework is in place in countries like India, where a significant number of farmers save both local varieties and composite/HYV seed. The implications of regulation may not have immediate effects on seed movement, but if the experiences of other countries can be used as proxy, it certainly will in the future. Many countries that now practice more industrial forms of agriculture saw a distinct rise in the number of private sector seed firms over the last century, and gradually adopted IPR frameworks that accommodate the requirements of, among other parties, the seed industry. Over time, farmers have adjusted to these norms, willingly or not. Thus, it is imperative now to consider the form of regulation in countries like India that will be adopted, in order to ensure that the welfare of farmers is not worsened. The Farmers' Right embodies precisely this. It attempts to address the fundamental differences that exists between different countries in terms of the requirements and needs of farmers, and seeks to bridge this gap by providing a framework that is better suited to agrarian economies. Any legislation that includes a section on Farmers' Rights will, by

traditionally attack the bolls of cotton plants. The Bt gene is spliced into the DNA of Bt Cotton, and EDV of cotton, thereby protecting the cotton plant from relevant moths, butterflies and worms.

construction, allow farmers the flexibility to save seed, subject to certain limitations. If the welfare and livelihood of farmers who depend on saved seed are considered worthy of protection, Farmers' Rights are a necessary condition in any policy environment relating to plant variety protection.

4. LEGISLATION

There are two strata of regulatory frameworks that exist with respect to providing protection on plant varieties; the international level and the domestic level. In order to address this, two things are required; an overview of the international agreements that relate to farmers' rights, plant breeders' rights, and patents, and an overview of similar legislation at the national level. The latter stems from the former; India's obligations within the multilateral framework (i.e. the WTO) require this national legislation to exist and be compliant with certain minimum standards. In this section, these two strata of regulatory frameworks will be considered.

While the WTO may have been the primary catalyst for the changes in policy relating to IPR, it cannot be considered in isolation. The implementation of WTO minimum standards incorporates perspectives gained not only from ministerial meetings, but also from the other fora that member states are party to. There are four fora that are most relevant to this discussion; the WTO, the CBD, the FAO, and WIPO.

TABLE 6: INTERNATIONAL LEGISLATION ON PGR

Forum	Agreement	Characteristics
World Trade Organization (WTO)	Agreement on Trade Related Aspects Of Intellectual Property Rights (TRIPS)	The objective is a "level playing field" for trade liberalization. Flexibility on plant variety protection provided via Article 27.3(b). "Legally" binding via the WTO dispute settlement mechanism.
United Nations Environmental Program (UNEP)	Convention on Biological Diversity (CBD)	Objectives are the conservation, sustainable use, and equitable sharing of biodiversity. Article 15 on benefit sharing resulted in Bonn Guidelines. CBD is legally binding; Bonn Guidelines are voluntary.
Food and Agriculture Organization (FAO)	International Treaty of Plant Genetic Resources for Food and Agriculture (IT/Seed Treaty)	Provides access to 64 crops via a multilateral system, but not for commercial reasons. Encourages adoption of Farmers' Rights; ultimately the adoption of farmers' rights is up to individual countries. Not legally binding.
World Intellectual Property Organization (WIPO)	Intergovernmental Committee on Intellectual Property and Genetic Resources, Traditional Knowledge and Folklore (IGC); Substantial Patent Law Treaty (SPLT)	The IGC attempts to establish Prior Art via the creation of TK databases; their objectives mirror that of the CBD. However, the SPLT potentially could subvert these efforts due to the broad rules for patenting it presents, the fundamental asymmetries it has with the Bonn Guidelines, and the potential it has to render the flexibility provided by TRIPS inconsequential.

These four agreements have common ground with regards to the protection of plant varieties via patents or other mechanisms. However, due to commitments that member states have made in each, and the often divergent objectives of these four agreements, there is currently much uncertainty regarding how to successfully implement them. Moreover, the objectives of some have the potential to negate the objectives of others. Member states are currently working on resolving these differences; it is crucial to consider them here as the consequences of these debates have direct implication on the affordability of, access to, and ownership of seeds used by farmers. This applies not only to local varieties, but also to all varieties of seed.

Often, WTO member states have obligations (though not always legally binding) to each of these fora, particularly the first three. These interlinkages are, on the one hand, useful and

required, as the management of PGR should not be discussed within a forum primarily geared for trade alone, namely the WTO; on the other hand, the interlinkages have created a wealth of uncertainties about the compatibility of these four fora in terms of their goals, objectives, and ultimately their implementation. For the sake of brevity and to accommodate those who are already familiar with these instruments, further details on the four international fora considered in this study are provided as an appendix. However, due to its direct relevance to the issues at hand, a description of India's *sui generis* option, The Protection of Plant Varieties and Farmers' Rights Act is provided directly.

4.1 THE PROTECTION OF PLANT VARIETIES AND FARMERS' RIGHTS ACT

The Protection of Plant Varieties and Farmers' Rights Act (PPVFR) relates both to the protection of farmers' varieties of seed via the *sui generis* option outlined in TRIPS, but also to the other fora discussed here, such as the Bonn Guidelines and the Seed Treaty. The first efforts at drafting the current PPVFR began almost ten years ago; in August 2001, the current form of the act was passed by the Indian government (Seshia 2002: 2). Before the late part of the 1980s, trade policies in India were not favourable to foreign investment; however, trade reforms in the early 1990s opened up markets in India in a manner unprecedented by previous administrations. Previous to this new economic environment, most plant breeding was undertaken by the public sector. Incentives for the private sector to provide seed to farmers were not particularly substantial, as the public sector had been filling that role during the Green Revolution (Dhar 2002: 40). There was not a prevailing need at that time to establish rules for the private sale of seed.

After the changes in policy, it became easier for both domestic and foreign private firms to invest in seed production, as well as for non-domestic seed firms to enter India or enter into partnerships with Indian firms. The introduction of TRIPS in 1995 certainly acted as a catalyst for further development of policy around PGR, though it was not the sole catalyst. The emergence of TRIPS, however, did consolidate the need for India to develop a mechanism to protect plant varieties, as outlined in Article 27.3(b). The objective of the PPVFR as stated in its preamble is to establish "an effective system for the protection of plant varieties, the rights of farmers and plant breeders, [and] to encourage the development of new varieties of plants." Dhar (2002: 41) has outlined three factors as being the main catalysts for the PPVFR.

BOX 3: WHAT IS THE RATIONALE FOR THE PPVFR?

- The protection of Farmers' Rights in respect of their contribution made at any time in conserving, improving, and making available plant genetic resources for the development of new plant varieties
- The protection of Plant Breeders' Rights to stimulate investment for research and development, both in the public and private sector, for the development of new plant varieties, and;
- Giving effect to Article 27.3 (b) of the Agreement on TRIPS relating to protection of plant varieties.

Note the balance between Farmers' Rights and Breeders' Rights; the PPVFR makes an attempt at striking a balance, thus satisfying both the concerns of farmers' regarding their ability to save, acquire, and sell seed, but also the concerns of breeders who desire adequate protection for their research and resultant technologies. The Indian legislation models itself after UPOV with regards to the four criteria that determine a PBR, but diverges from UPOV in two main ways; first, their treatment of what types of seed can be given PBR, and second, the inclusion of Farmers' Rights to balance those rights held by breeders.

Article 14 of the PPVFR identifies three classes of seed that can be protected: new varieties, extant/farmers' varieties, and EDVs. New varieties are self explanatory; this class includes seeds that have been developed and satisfy the four criteria that a PBR implies. An extant

variety is essentially one that is currently in the public domain, or where there is common knowledge regarding this seed. This includes farmers' or local varieties. The PPVFR makes a departure from UPOV in including extant varieties; nowhere in UPOV are extant varieties even mentioned. Lastly, EDVs, as defined by UPOV, are "predominantly derived from the initial variety, or from a variety that is itself predominantly derived from the initial variety, while retaining the expression of the essential characteristics that result from the genotype or combination of genotypes of the initial variety"²⁴. Most genetically modified varieties are based on material found in extant varieties, and are thus considered EDVs. The inclusion of extant varieties in the PPVFR distinguishes it from merely being a UPOV variant; it is a distinct departure from that framework.

Under the PPVFR, farmers' varieties of seeds are offered protection under a PBR; moreover, protection on an EDV can only be granted if explicit permission is granted by the farmers who hold the original genetic material that the EDV is sourced from. The question is how precisely farmers' varieties are to be catalogued and thus conferred a PBR, though Sahai states that "any one is entitled to register a community's claim [on a seed] and have it duly recorded at a notified centre" (Sahai 2002: 3). The Act states that a National Register of Plant Varieties "shall be kept at the head office of the Registry, wherein shall be entered the names of all the registered plant varieties with the names and addresses of their respective breeders, the right of such breeders in respect of the registered variety, the particulars of the denomination of each registered variety, its seeds or other propagating material along with specification of salient features thereof and such other matters as may be prescribed²⁵." Do "the particulars of the denomination" include a detailed scientific explanation of the resource that would allow someone "skilled in the art" to reproduce the "invention"? India certainly has the right as a sovereign state to formulate their own laws relating to PGR, but the ability to defeat a claim outside of India based on the varieties being documented in a traditional knowledge database or community biodiversity register may or may not constitute the requirement of novelty with regards to a patent. This is regardless of the fact that it may be novel within the context of a PBR. More concretely however, the PPVFR states that a PBR cannot be awarded if the application for protection does not provide information on where the genetic material was found, and what the parental lineage is of the variety. This amounts to full geographic disclosure being conditional on accessing a PBR, which is perfectly within the right of India to pursue²⁶.

4.5.1 How Is Benefit Sharing Addressed Within The PPVFR?

With regards to the sharing of financial resources that either result from the successful commercialisation of local knowledge or the transfer of local varieties to state or private parties for breeding, the PPVFR introduces a National Gene Fund. The purpose of the Fund is to collect funds for original holders of the genetic resource. Article 26.5 of the PPVFR states how these amounts can be estimated.

BOX 4: HOW WILL THE VALUE OF THE RESOURCE BE DETERMINED IN THE PPVFR?

- By the extent and nature of the use of genetic material of the claimant in the development of the variety relating to which the benefit sharing has been claimed;
- By determining the commercial utility and demand in the market of the variety relating to which the benefit sharing has been claimed.

The rationale for the fund is to act as a source of financial resources based on payments made, either via a license or via benefits accrued, by those parties wishing to access genetic resources owned by farmers or other groups in India. The Act states that the Fund will contain transfers relating to a variety of situations²⁷.

²⁴ Refer to UPOV 1991, Article 15.5(b). The PPVFR adopts the UPOV definition of an EDV almost exactly.

²⁵ Refer to Article 13.1 of the PPVFR, which can be found at <http://www.grain.org/docs/india-pvp-act-2000-en.PDF>.

²⁶ Refer to Article 18.1 (e) of the PPVFR.

²⁷ Refer to Articles 35.1, 41.4 and 45.1 of the PPVFR.

BOX 5: WHAT KIND OF TRANSFERS WILL THE FUND CONSIST OF?

- The benefit sharing received in the prescribed manner from the breeder of a variety or an essentially derived variety registered under this Act or propagating material of such variety or essentially derived variety, as the case may be;
- The annual fee payable to the authority by way of royalty for resources acquired from a breeder of a variety registered under the Act;
- The compensation that may arise if a successful claim is presented arguing that the genetic material was sourced from local communities;
- The contribution from any national and international organisation and other sources.

4.5.2 *What Kind Of Seed Can Be Saved?*

Article 39.4 of the PPVFR states the following regarding the kind of seed that farmers can save;

[Farmers] [s]hall be deemed to be entitled to save, use, sow, resow, exchange, share or sell his farm produce including seed of a variety protected under this Act in the same manner as he was entitled before the coming into force of this Act; **Provided that the farmer shall not be entitled to sell branded seed of a variety protected under this Act.** Explanation: For the purpose of clause (iv) branded seed means any seed put in a package or any other container and labeled in a manner indicating that such seed is of a variety protected under this Act (emphasis added).

What farmers are entitled to within the context of saving seed does not stray very far from the definition of Farmers' Rights as presented in section 3.3; it is the caveat that follows the entitlement that does. The implications of "branded seed" are somewhat vague in the PPVFR. Some have interpreted it as referring to any variety that, when acquired, was not purchased in a container or bag that exhibited any brand name (personal communication, Dr. Suman Sahai: 2002). For instance, if one farmer had purchased a branded variety of seed last season, sowed it, harvested it, saved it, and then exchanged it with another farmer, the farmer is completely free to do so under the auspices of the PPVFR, as long as it is not in a branded package. This is regardless of the fact that the seed was "branded" at the initial point of acquisition by the first farmer.

In concluding this section, one last point requires attention. While India has adopted the PPVFR as law and it is currently in force, as of April 2002, India applied for accession to UPOV. Seemingly contradictory in many ways, can the two agreements exist side by side? With respect to Farmers' Rights, a central component to the PPVFR, probably not. Given that the only version of UPOV that potential members can be party to is the 1991 version, and that this version has made "plant back rights" an exception, it is unlikely that the two can coexist with respect to Farmers' Rights. The rationale for India wanting to accede to UPOV regardless of the ten-year process that led up to the PPVFR is unclear, though many critics and observers believe that Indian seed industry lobbies urged the government to adopt UPOV to ensure more protection over the new varieties that they develop. Given that both frameworks are relevant in light of the current possibility of each being implemented, how will these legislative frameworks affect the welfare of farmers?

5. AN EVALUATION

UPOV and the PPVFR share one common trait; both frameworks provide a *sui generis* option for the protection of plant varieties. However, there is one fundamental asymmetry: Farmers' Rights. Nowhere in UPOV are Farmers' Rights mentioned, neither in the 1978 or 1991 versions. The only aspect akin to Farmer's Rights in UPOV are "plant back rights", but again, this exception is left to the discretion of member states and only applies to seed on the plot of land worked by the user of the seed. This negates exchange. While India could certainly

pursue the exception in UPOV 1991, it is unclear as to whether or not exchange would be disallowed.

TABLE 7: A COMPARISON OF UPOV 1978, UPOV 1991, AND THE PPVFR

	UPOV 1978	UPOV 1991	PPVFR
Farmers' Rights	No, not mentioned	No, not mentioned	Yes, central to the raison d'être of the PPVFR (Chapter VI)
Plant Back Rights	Yes, allowed farmers to save and replant a portion of seed protected by a PBR	No, limited in UPOV 1991 and at the discretion of UPOV member states	Yes, via Farmers' Rights
Benefit Sharing	No, not mentioned	No, not mentioned	Yes, via the National Gene Fund (Article 45)
Plant Breeders' Rights	Yes, central to the purpose of UPOV	Yes, central to the purpose of UPOV	Yes, via Chapter III

India's submission to accede to UPOV was based on their desire to join the 1978, rather than the 1991 version of the agreement. The main rationale for this distinction was due to the government's belief that the 1978 version was better suited to the realities faced by Indian farmers, while balancing the need for protecting the ownership interests of India's nascent private sector seed industry. However, neither UPOV 1978 or 1991 are CBD compliant. That is, neither version contains any provisions for benefit sharing in cases of the successful commercialization of PGR held by farmers. Perhaps the government's counter to this allegation would be the existence of the recently passed Biological Diversity Act (2001), which, among its provisions, contains a three-tiered (National, State and *Panchayat*) benefit sharing mechanism. Yet regardless of this, neither version of UPOV contains any mention of Farmers' Rights, save for the weaker plant back rights that exist in UPOV 1978. But these plant back rights are not rights. They are merely exemptions, and as such, give no guarantee that farmers will be able to avail of the stipulations that Farmers' Rights would provide. Given the fact that farmers do save composite varieties of seed (and to a lesser extent local varieties of seed), the ability to freely save seed is crucial.

At the time of this writing, it is still unclear as to whether or not India's application to join UPOV 1978 will be accepted, and what implications this will have on the currently in force PPVFR. UPOV 1978 is technically closed to applications. UPOV was willing to make an exemption to India as they want them "on board", so to speak, and made this exemption in light of that desire. Currently, India's application to join UPOV is still being deliberated upon in Geneva. Moreover, the filing of a Public Interest Litigation (PIL) by the Delhi based NGO Gene Campaign has postponed any final decision at UPOV indefinitely. The PIL was filed on the basis that UPOV would violate Farmers' Rights as enshrined in the PPVFR, which was in force at the time of the Indian government's application to join UPOV 1978. The PIL has been accepted by the courts, and Gene Campaign is currently awaiting a reply from the government regarding the matter.

5.1 THE PPVFR

The PPVFR is successful in balancing the interests of both breeders and farmers by offering protection over innovation that occurs in each. However, there are some concerns regarding this balance; in certain instances, concerns arise as to how the concessions given to both may run in opposition to each other, and the text does not offer sufficient explanation as to how these conflicts can be resolved.

The most significant concern within the context of this study lies in the PPVFR's treatment of allowing farmers to save seed, **provided it is not branded**. This raises a series of questions regarding the primacy and assertion of ownership, particularly with respect to seed varieties

produced outside of India. Consider the following: a variety of, for example, cotton, is developed by a multinational firm (i.e. Mahyco) and is initially provided protection under the IPR legislation of one country, for instance, the US²⁸. Assume that American farmers have acquired this seed with the explicit promise that they will not save the seed from the cotton plant via a legal contract (as is often the practice). If this seed were to be marketed in India, could Monsanto assert its limitations of “planting back” this seed as they have in the US, or would it be subject to the stipulations of Article 39 (iv) of the PPVFR that relates to branded seed? Is there the possibility of conflict between the domestic legislation of India and the ownership that a firm would want to assert over their property as they have in the country in which they are based? Considered in this way, this article may effectively place a barrier between the Indian market and those who wish to offer their seed for sale with the condition that it not be saved. This could be legally argued as a barrier to trade, subject to the dispute settlement mechanism of the WTO.

Recent experiences in Canada have shown that it is of little consequence whether or not seed is branded or not²⁹. Proprietary ownership over PGR is determined by most private sector seed suppliers in developed countries via its’ precise genetic composition. Anyone growing seed that can be positively identified via its genetic makeup as being the property of a private firm, either via a patent or PBR, can be prosecuted if a contract prohibiting the further use or dissemination of this seed had been agreed upon. This is regardless of whether or not it is in a branded or non-branded package. In light of these concerns, the Act may have been strategically written so as to discourage those private sector firms wishing to curtail seed reuse and dissemination from entering the Indian market, given the far less stringent laws on reuse that the PPVFR presents. However, given consolidation within the seed industry globally and the partnerships that exist in India (i.e. Monsanto-Mahyco), it may be naïve to think that including provisions on reuse would limit the entrance of these firms, as experiences with Monsanto and Bt Cotton show.

Breeders Rights as defined in the PPVFR (and largely based on UPOV 1978) detail penalties for the infringement of these rights. Specifically, these rights are most often based on the packaging of the variety itself; that is, varieties protected under this Act are given explicit recognition in terms of brand names and other such indications (but not necessarily a formal IPR) of ownership, and as such, are offered protection. To “copy” the packaging or other elements of the seeds’ outward appearance would infringe on the rights provided by the Act. However, within the context of seed that is saved from an initially branded package but disseminated after farmer propagation as a “non-branded” variety, such safeguards against “copying” may not matter. In an international context, PGR is often positively identified for IPR purposes by its’ precise genetic makeup, or DNA fingerprint, which is the responsibility in India of the National Bureau of Plant Genetic Resources, or NBPGR³⁰. Within the context

²⁸ Mahyco refers to the Maharashtra Hybrid Seeds Company Limited; established in 1964, it is India’s largest private sector seed firm. It is also Monsanto’s partner firm in India, and markets technologies developed in part by Monsanto, including Bt Cotton. However, Mahyco is not longer marketing Bt Cotton due to the failures that the crop exhibited this year.

²⁹ Specifically, readers are encouraged to visit www.percyschmeiser.com for a current example of how the outward appearance of seed or its’ packaging is of little consequence in terms of an assertion of ownership. Mr. Schmeiser, a canola farmer in Saskatchewan, Canada, was found to have traces of Monsanto’s Round Up Ready canola in his field; this fact was concluded by Monsanto after analyzing his crop. However, he asserts that he never consciously purchased any Monsanto products, and that the Round Up Ready canola entered his crop either due to cross pollination from either neighboring farms or passing trucks carrying harvested Round Up Ready canola. As of now, the case was appealed at the Supreme Court of Canada and is still underway. Without a doubt the outcome of this case will provide landmark evidence against future situations such as this; currently there are 1500 such cases filed by Monsanto against farmers who allegedly are using their property without permission. Thus, while his canola crop could be considered non-branded, in the eyes of Monsanto it is of no consequence; the fact remains that traces of their product were in his fields, and this was determined by the genetic makeup of his crop, not its’ outward appearance, packaging or name.

³⁰ An interview with an official of the NBPGR (who asked not to be identified for this study) yielded insights on the capability of the Bureau in cataloguing and identifying varieties of seeds. Specifically, of the 250,000 varieties held by the Bureau, only 1,400 have been identified by their precise genetic composition. This lacking identification is due to, in the opinion of this official, funding constraints and the high costs involved in the process of identification. As a

of offences, penalties and procedure (Ch. X.B), the main medium of identification is “denomination”, defined as any combination of letters in any language that identifies the PGR. However, the PPVFR also describes “essential characteristics”, which concerns the precise genetic make up of the PGR. Yet, within the context of offences, there is no mention of the infringement of rights by using these “essential characteristics” as the main determinants of prior art. This is crucial within the context of novelty claims, and affects the efficacy of the Act in providing ownership to both plant breeders and farmers. As pointed out earlier, prior art often hinges on information that would allow someone skilled in the art to reproduce the invention, which would be achieved by disclosure of the “essential characteristics” as per the wording of the PPVFR. In light of this, and the PPVFRs focus on “denomination” over “essential characteristics”, the efficacy of the PPVFR in providing claims of prior art in an international context is weak. It is not well suited in countering instances of “biopiracy”³¹.

That said, the existence of the National Gene Fund is indicative of some desire to ensure that if either the varieties themselves (i.e. those that are repackaged) or parental varieties (i.e. EDVs) are sold by private firms, some monetary benefits will be transferred to original holders. However, determining precisely who these owners are can be extremely difficult, considering that some varieties have been used by families, and, due to dissemination over time, communities, for hundreds of years. In such cases, it may not be possible to transfer benefits to *one* party; indeed, any attempts to do may trigger competitive reactions within and between communities. However, this is not necessarily the fault of the legislation itself, but a broader concern regarding benefit sharing mechanisms within the context of PGR as a whole. One potential way to mitigate this could be to create a more centralized fund that applies to certain regions where particular varieties are found. Moreover, these transfers should not be limited to monetary benefits, but should also include non-monetary benefits as well (i.e. irrigation facilities, schools). However, the PPVFR does not make it clear as to how these funds will be utilized, or even how the management of these funds will be undertaken, nor by whom³². Finally, it does not provide a mechanism to determine how the benefits will be calculated; presumably this will occur on an ad hoc basis. If this is the case, it is inefficient and leaves significant room for variation; in particular, it leaves room for private firms to utilize their leverage and lobbying power to keep these benefits at a minimal level. Ideally, the guidelines provided by the appendix to the Bonn Guidelines should be used as a proxy for determining this amount, as it facilitates a more standardized approach³³.

5.2 UPOV

UPOV was introduced in 1961 in a developed country context where the role of public sector breeding activities was diminishing³⁴. Filling this gap were private sector suppliers. These

result, only those varieties deemed of primary importance to India (i.e. rice and wheat varieties) have been selected for identification. Other individuals interviewed for this study, however, were of the opinion that the NBPGR has the funding available, and that it is more a matter of the misallocation of resources. Regardless of which perspective is indeed correct, the current state of the Bureau provides little defense in terms of countering claims of novelty by not being able to present sufficient evidence to prove the existence of prior art.

³¹ The aim of the PPVFR from the outset was not to counter “biopiracy”; such concerns have been addressed within the Biological Diversity Act (2002). This Act explicitly deals with access issues, albeit in a very complicated, cumbersome, and ultimately untenable manner. These shortcomings (and successes) cannot be given the attention required here; interested readers are invited to refer to <http://www.grain.org/docs/india-biodiversityact-2002.pdf> for the full text of the Act.

³² Refer to Article 46.2 of the PPVFR.

³³ The Bonn Guidelines are the result of the deliberations that occurred in April 2002 over the interpretation of Article 15 of the CBD; Decision VI/24 resulted in these guidelines. Briefly, the Bonn Guidelines call for prior informed consent, mutually agreed terms, and the specification of monetary/non-monetary benefits in cases where PGR may exchange hands between communities and other parties.

³⁴ In this section we do not distinguish between the 1978 and 1991 versions of UPOV; that is, we do not consider the implications of each version separately, but rather as a whole. The rationale for this is due to the fact that the main (but not sole) point of divergence for the purposes of this discussion between the two is in the context of exemptions. The 1991 version treats breeders’ and farmers’ exemptions differently. With regards to breeders, the 1978

private sector firms wished to have protection over their research and development, and PBRs were an ideal method by which to achieve this, since varieties developed by the private sector can far more easily meet the UPOV requirements of novelty, distinctiveness, uniformity and stability, as opposed to farmer-bred varieties which, generally speaking, are not as stable or uniform. However, in countries like India, two thirds of the total labour force is engaged in agricultural activities. Thus, affordability and availability of seed is crucial to the economic well being of the country as a whole, as opposed to developed countries where only two to five percent of the work force is engaged in farming. In light of these proportions and the de facto monopoly power and resultant pricing strategies that PBRs accommodate, the public sector in countries like India still has a distinct and much needed role to play in ensuring that seed is affordable and available. While it may be true that public sector varieties should be eligible for protection and that PBRs as enshrined by UPOV presents a platform by which to do so, the construction of the agreement is not suitable in the Indian context, since there is no recognition of farmers' innovations and their rights. As such, UPOV may hinder the ability of farmers to maintain their livelihoods. Given the discrepancies that exist between countries such as India and developed countries with regards to the role that agriculture plays in terms of economic performance, the former require legislation which places the interests of farmers before that of private sector seed developers and suppliers.

PBRs are easier to process and pursue in situations where one party is clearly responsible for breeding activities (i.e. private sector firms, public sector institutions). While these certainly exist in India, it is not the same scale as in countries that have higher instances of industrialized farming, and those parties responsible for breeding activities are not as well defined as informal breeding among farmers is common. Moreover, the application of PBRs to protect this informal innovation in a country like India may not be feasible; farmers may not be able to assert a PBR over their varieties as their capacity to do so is typically lacking, due to lower rates of literacy as compared to the urban context and lacking support to assert these rights. Indeed, this is true within the agriculture colleges surveyed for this study, let alone individual farmers. Also, farmers' varieties may simply not meet the criteria of novelty, distinctness, uniformity and stability that is required for a PBR under UPOV, as they are not propagated in controlled environments as are formal varieties. They may not be considered stable and uniform as a result. Similarly, the novelty criteria within the context of a PBR may not be applicable, as farmers' varieties are often found on the market, albeit repackaged and branded otherwise. Thus, while an attractive option, awarding a PBR to farmers' varieties may not be feasible in practice.

That said, the private seed sector in India is growing. Farmers, provided they can afford it, very often want new technologies and new varieties. Thus, the demand exists, and if one subscribes to basic principles of microeconomic theory, supply will grow to meet that demand, particularly in a market such as India where there are a burgeoning number of small seed sellers creating a fairly competitive market. In light of this, it certainly may be beneficial to offer some sort of protection to encourage innovation, and PBRs can serve this purpose. However, at this point, those private sector firms engaged in their own research and development activities are in the minority. Often, firms repackage farmers' varieties, or those varieties developed by the state; that is, some private sector seed suppliers have long-term agreements with certain predetermined farmers to purchase their seed for resale, or simply repackage seed originally acquired from the state (i.e. Pusa varieties of wheat). In light of this, the need for formal protection in India's current context is not as pressing as it was in

formulation allows breeders free access to varieties as an initial source of variation; the 1991 version follows along similar lines, with the caveat that EDVs cannot be used as source material without the permission of the owner if they are protected. As for farmers, the 1978 formulation allowed farmers to save and replant a portion of their seed (i.e. plant-back rights, which could be limitedly construed as farmers' rights), or to exchange limited amounts seed with other farmers. In the 1991 version, this exemption is removed and is left to the discretion of member states as an option, and this only applies to seed on the farmers' own plot; that is, exchange is not allowed. This exemption by no means constitutes farmers' rights, but is the only real concession available in UPOV with regards to farmers saving seed. Since both the 1978 and 1991 make no explicit mention of farmers' rights, we do not consider them separately.

developed countries during the early 1960s, as there is not as pressing a need to do so. Indeed, it is not as though seed suppliers are facing losses in their reselling activities and would benefit from firmer protection laws. Rather, these firms are relatively successful. Also, cases where seed suppliers purchase seed from farmers for resale under their brand name could be construed as an example of benefit sharing that predates the CBD or the Seed Treaty, since these farmers derive monetary benefit for their innovation. However, demand may dictate firmer protection over these varieties as the Indian seed industry develops further. In this sense however, the PPVFR still is a more suitable option for India than UPOV, as it attempts to both provide protection over formally developed varieties, as well as addressing farmers' rights and retaining (albeit in a questionable manner) the ability of farmers to save seed.

6. CONCLUSIONS

In light of the experiences faced by farmers and the nascent policy that surrounds their acquisition of seed, certain conclusions can be made. **First**, the emergence of farmers purchasing seed on a regular basis has often only been within the past three to five years. Farmers can afford to buy these new varieties as the increased yield that results from them allows higher amounts of both income (if they choose to sell portions of their harvest) and personal consumption, thereby providing the food security that was lacking with older, local varieties alone. The current state of play regarding this acquisition of newer varieties is changing very quickly, if one considers the experiences of the past five years as proxy for what the future holds. In short, one can safely assume that more farmers will follow suit and abandon older varieties of seeds in favor of newer ones. Thus, any law aimed at protecting the ability of farmers to save seed may be rendered superfluous in the not too distant future.

Second, a distinction has to be made regarding the rationale for those who do continue to grow local varieties of seed. On the one hand, there are those farmers who do not have recourse to growing newer, high yielding varieties, either due to income constraints or distance from a market offering these seeds, and grow predominantly local varieties as a result. On the other hand, there are those farmers who, due to the fact that they have excess income or land, choose to grow local varieties primarily due to personal satisfaction. This latter group of farmers typically consume these local varieties, with the exception of aromatic local varieties of rice that fetch higher prices on the market than HYVs and are thus sold.

Third, instances of farmers saving seed have been greatly exaggerated in the literature. It has been often stated that over 80% of seed used by farmers are from farmers' own saved stocks³⁵. The experiences of farmers considered in Jharkhand do not reflect these statistics; this study found that for every two farmers who grew, and most importantly, saved local varieties, there were three who did not. Also, those who grow local varieties rarely grow only local varieties; typically, they grow new varieties as well. However, claims alleging that the vast majority of seed in India is available due to farmers saving and disseminating them cannot be immediately discarded; rather, they must be interpreted as not being entirely specific in their treatment of exactly which seeds are saved. These claims often do not make the distinction between local varieties of seed that have been saved over generations and those varieties that have been initially purchased and then saved (i.e. HYV/composite varieties). Certainly, the evidence provided in this study does point to the fact that farmers do save HYV/composite varieties. But to utilize this saving behavior as a basis for an argument that the main source of seed in India is from farmers' saved stock is misleading. HYV/composite varieties of seed are purchased, on average, every three years, and this has been the case since their

³⁵ There are various citations in the literature that allege this figure (i.e. between 70%-85%). See for instance Swaminathan (1998), Lambrecht (1998), Shiva (2002), or Sahai (2003:5).

introduction. However, to reiterate the first conclusion, it must be said that these instances of farmers purchasing seed on a regular basis are relatively recent.

Fourth, while India's *sui generis* legislation succeeds in balancing the interests of both farmers and formal breeders, the section on those who violate the primacy of protected seed via "copying" or repackaging seed is problematic. In terms of violations, the main vehicle by which seed is identified in the PPVFR is by its "denomination" (i.e. the name of the seed given by the brand) rather than its "essential characteristics" (i.e. its genetic makeup). Given that firms have pursued and do pursue those who use their protected varieties without their prior permission, and that these firms identify these varieties by their "essential characteristics", simply implicating those who "copy" seed by the identifying the seed by its "denomination" will prove insufficient. Prior to the PPVFR, seed could freely be repackaged, as the registration process at the state level did not identify the seed by anything except the outward physical appearance of the standing crops. This will not change with the PPVFR now being in force.

Fifth, the PPVFR disallows farmers to save "branded" seed. However, if a firm wished to disallow farmers to save what is effectively their property due to the IPRs conferred onto them, any arguments claiming that the seed was acquired from a package that depicted no brand while originally acquired in a branded package and thus outside the realm of private ownership is, at best, tenuous. This has particular application to firms outside of India; due to greater amounts of capital at their disposal, these firms can identify seed via its genetic makeup rather than any assertion of a brand name, thus putting those who choose to save these varieties at risk of litigation. In this way, if not correctly and fully understood by end users (i.e. farmers), the provision of allowing the saving of seed, provided it is not branded, may actually do more harm to farmers than good, considering situations where seed that is protected via an IPR is saved by farmers.

Sixth, some sort of protection is required to ensure that incentives are provided for innovation within India's fledgling domestic seed industry, particularly for those firms that pursue their own research and development. However, simply joining UPOV ignores the fact that there are still a significant number of farmers who depend on saved seed, be they composite varieties or local varieties. Thus, UPOV should be avoided in favor of the PPVFR, and efforts should be sustained to ensure that India does not become party to UPOV. India is still in a transitional period in terms of moving from an agrarian to a more diversified economy, and as such should avoid any regime that hampers the ability of farmers to save seed. Granted, India's application is for UPOV 1978 which does contain limited "plant back rights", but these are insufficient to truly protect the interests of farmers as they are *ad hoc* in nature and subject to the lobbying capacity of private sector interests rather than anything firmly enshrined in law that would, technically, serve the interests of the nation as a whole, farmers in particular.

Finally, the goal of conferring PBRs as enshrined by the PPVFR to farmers' varieties will only be achieved if significant effort is lent to the cataloguing of farmers' varieties, which should be coordinated centrally by the NBPGR and undertaken at the ground level by state and *panchayat* level authorities. In light of situations surveyed for this study, the current capacity to do so at all three levels is severely lacking. However, before any efforts are undertaken to address this lacking capacity, it should be clarified as to whether or not farmers' varieties actually meet the requirements that a PBR requires; namely, novelty, distinctiveness, uniformity, and stability.

7. RECOMMENDATIONS

- **The central government should formalize standard material transfer agreements between those who hold PGR and those who wish to access it.** Use the Appendix of the Bonn Guidelines as a set of norms to minimize heterogeneity for any MTA between parties.
- **The central government must make efforts to provide evidence of prior art to defeat spurious claims of novelty.** Ensure that significant effort is lent to the identification of the varieties held by the NBPGR in order to characterize them, in the terminology used by the PPVFR, their “essential characteristics” (i.e. their DNA fingerprint, or precise genetic makeup).
- **The state governments should ensure that the agricultural extension officers do their job, and the central government must ensure that state governments have sufficient resources by which to employ enough agricultural extension workers.** If new varieties of seed are made available on the market, ensure that proper instruction is given to farmers on how to use them and any other accompanying factor inputs; extension workers clearly have the knowledge by which to achieve this task, but are understaffed, are constrained by large workloads, and consequently have low levels of motivation to perform their crucial tasks.
- **The state and *panchayat* level governments should ensure that, at the block level, state developed seed reaches farmers at the rate at which it was subsidized.** That is, provide a culpability mechanism that farmers can use if this does not occur, and make these prices transparent to all, farmers in particular.
- **Provide incentives for farmers to cultivate local varieties of seed.** Future breeding efforts require a wide base of biodiversity to source parental varieties from. The Food Corporation of India (FCI) should provide competitive market rates for the procurement of local varieties to ensure that these varieties are grown.
- **Those who compile traditional knowledge databases should not make them publicly available.** Unless proper measures are taken to ensure that the knowledge contained in these databases can constitute the prior art in a legal sense, making them available to all may exacerbate instances of commercial utilization of PGR outside the scope of any formal guidelines. Without the proper systems in place to ensure the equitable transfer of knowledge, such transfers may be exploitative rather than of benefit to the original holders of this knowledge.
- **Pursue actions to place the onus of full disclosure on the party who pursues formal protection over PGR.** Given the significant costs incurred in pursuing legal action against those who do not seek PIC or any other ABS mechanism when procuring PGR, the onus should be on firms themselves to provide full disclosure on any patent application. This way, the national patent office can then direct a narrower, more accurate search when deliberating over whether or not the application satisfies the novelty criterion.
- **Consider the implications of the patent regime proposed within WIPO.** The SPLT within WIPO offers the spectre of rendering any flexibility that exists within the *sui generis* option superfluous due the broad rules it presents for asserting formal IPR over PGR. Efforts should be directed to keep abreast of these developments as they are of potentially tremendous consequence to not only India, but all countries who are now making the mandated amendments to their IPR regimes in light of TRIPS minimum standards.
- **Avoid UPOV.** While the PPVFR certainly has its drawbacks and point of concern, it at least achieves a balance of sorts between the interests of farmers as well as breeders. Both parties require protection, and the PPVFR makes an attempt at providing this. This is in contrast to UPOV, which offers nothing to farmers apart

from the possibility of exemptions at the discretion of the state. In light of this, UPOV should be avoided in the Indian context.

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APPENDIX: INTERNATIONAL AGREEMENTS

A.1 THE WORLD TRADE ORGANIZATION AND TRIPS

The agreements that comprise the WTO (there are over 30) provide minimum standards that all member states are to meet. There are three main categories that WTO standards apply to; goods (i.e. lumber or food products), services (i.e. a night at a hotel), and intellectual property rights (i.e. patents or PBRs). The latter applies most directly to the current discussion; the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) is of particular relevance. The WTO considers TRIPS as addressing five main issues:

BOX A.1: WHAT DOES TRIPS ADDRESS?

- How basic principles of the trading system and other international intellectual property agreements should be applied;
- How to give adequate protection to intellectual property rights;
- How countries should enforce those rights adequately in their own territories;
- How to settle disputes on intellectual property between members of the WTO;
- Special transitional arrangements during the period when the new system is being introduced.

Source: WTO (2003)

Within TRIPS, the most relevant (and contentious) article to the current discussion would be Article 27.3 (b). The Article states that members may exclude 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. However, Members shall provide for the protection of plant varieties either by patents or by an effective *sui generis* system or by any combination thereof.

Most debate on this article has focused on the term *sui generis* and the implications of what the terms mean. The term itself is Latin for unique or without equal; the implications of this are that member states, while required to provide some sort of system to protect plant varieties, have the choice of either a patent system, or something else entirely, with the only requirement that it be “effective”. Moreover, while member states can exclude plants and animals from patentability, the exclusion does not apply to micro organisms. This is to say that while an entire variety of plant can be excluded, perhaps a particular genetic component of the plant (i.e. a genetic component that has significant commercial potential) can be protected via a patent. This of course raises the question of whether or not simply isolating a particular genetic resource from a plant then differentiates it from a plant, thereby enabling it to fit within the realm of what is patentable. Ultimately, this is a distinction that national governments are to make for themselves.

The lacking clarity that surrounds Article 27.3 (b) has led to a review of the Article to establish precisely what the distinction are between plants and animals on the one hand, and micro-organisms on the other, and the difference between essentially biological processes and microbiological processes, as well on more clarification on what “essential” means. This review was mandated to begin four years after the inception of the WTO in 1995; however, since that time progress has occurred at a very slow and laborious pace, due mostly to a paucity of common ground between WTO member states. Two polar perspectives characterize this divide; on the one hand, the Africa Group has submitted a proposal to the WTO stating that the patenting of all living matter should be banned completely under TRIPS, and that Farmers’ Rights be included in any *sui generis* option. On the other hand, the US submitted a proposal stating that all “inventions” should be patentable, including plants and animals³⁶. While the concerns surrounding Article 27.3 (b) may have initially been focused primarily on definitions (i.e. what is “effective”, what does *sui generis* mean), more recent debates have focused on a wider breadth of issues. With regards to the current discussion, the ownership of PGR and Farmers’ Rights have received a significant amount of attention with regards to their incorporation in any *sui generis* option.

A.2 THE CONVENTION ON BIOLOGICAL DIVERSITY

The CBD, while legally binding, does not serve as a substitute for national legislation. It is a terms of reference or best practice for the 187 member states who are party to it, and it is hoped that CBD member states will undertake reforms within their national legislation to

³⁶ India has rejected the Africa Group position due their concerns that such a ban would hamper the Indian biotechnology industry. It lies somewhere in between the two ends of the spectrum, though more towards the African position due to their insistence on Farmers’ Rights.

become more in line with what the CBD outlines. In essence, what the CBD has achieved is a shift from the common opinion that genetic resources are part of the common heritage of humanity, to a regime that recognizes these resources as being subject to the sovereign ownership of the nations that hold them.

BOX A.2: THE THREE MAIN OBJECTIVES OF THE CBD

- The conservation of biological diversity;
- The sustainable use of its components;
- The fair and equitable use of the benefits arising out of the utilization of genetic resources.

The relevance of the CBD here is within the context of the ownership and transferral of resources, namely local seed varieties. Recall that public and private actors often use local varieties of seed as the basis for new varieties of seed. However, provisions for benefit sharing between the holder of the resource (i.e. a farmer who holds and uses local varieties) and those who wish to acquire the resource (i.e. a state agricultural college, a private firm seeking parental varieties to create new varieties) are lacking in India. The CBD, by construction, seeks to ensure that these benefits move to those who hold the resources via the third and last objective, the fair and equitable use of the benefits arising out of the utilization of genetic resources.

TRIPS primarily exists to facilitate easier assertion of formal IPR via the creation of a “level playing field” of IPR regulation; its objectives are primarily trade based. The CBD on the other hand is concerned with the conservation, sustainable use, and equitable benefit sharing of biodiversity. Though the objectives of TRIPS and the CBD differ, there is flexibility to incorporate the objectives of the CBD into the implementation of TRIPS minimum standards via the *sui generis* option. The last objective of the CBD, best encapsulated in Article 15 of the Convention, has been formalized recently as the Bonn Guidelines on Access to Genetic Resources and Fair and Equitable Sharing of the Benefits Arising out of their Utilization. The Bonn Guidelines are voluntary, but do comprise the first widely accepted criteria for the licensing of access to genetic resources; it is expected to be influential in the formation of national legislature around these issues, particularly within the context of the *sui generis* option.

BOX A.3: THE MAIN OBJECTIVES OF THE BONN GUIDELINES

- The facilitation of prior informed consent of both the national government of the country of origin of the resource for transmittal as well as indigenous and local communities;
- The development of mutually agreed terms to facilitate legal certainty and the minimization of cost;
- The specification of non-monetary and/or monetary benefits the collector will provide, and whether, and under what conditions, the collector may transfer the collected genetic resources to another party.

The relevance of the Bonn Guidelines to this discussion relates to the transfer of local varieties; from holder (i.e. farmers) to breeders (i.e. agricultural colleges, private firms). Given the instances of this transfer discussed earlier, it is relevant to ensure that guidelines relating to the Access and Benefit Sharing (ABS) of PGR guidelines are considered. Along with this are concerns relating to Farmers’ Rights, promoted both at the CBD but also via the Seed Treaty.

A.3 FAO AND THE SEED TREATY

The International Treaty on Plant and Genetic Resources for Food and Agriculture culminated in November 2001 after almost seven years of negotiations³⁷. The main objective of the Seed Treaty is the “conservation and sustainable use of plant genetic resources for food and agriculture and the fair and equitable sharing of the benefits arising out of their use, in

³⁷ For the sake of brevity, we will refer to the ITPGFRA simply as the Seed Treaty from this point onwards.

harmony with the Convention on Biological Diversity, for sustainable agriculture and food security³⁸.” The treaty also establishes a multilateral system of access and benefit sharing for plant genetic resources for 64 food crops; these crops were chosen as they account for approximately 85% of global human nutrition (ETC 2001a)³⁹. It proposes to achieve this through “information exchange, technology transfer, capacity-building, and the mandatory sharing of the monetary and other benefits of commercialization of products incorporating material accessed from the Multilateral System” (FAO 2003). Broadly speaking, what the seed treaty has helped to ensure is the free access of non-commercial breeders to germplasm for breeding efforts, something that would be far more cumbersome within the confines of numerous bilateral agreements, as well as recognizing the breeding efforts of farmers who contributed to these parental varieties. The main reasons for a multilateral as opposed to a bilateral system can be summarized as follows.

BOX A.4: WHY IS A MULTILATERAL AS OPPOSED TO A BILATERAL SYSTEM FOR ABS DESIRABLE?

- Agriculture in all countries depends largely on genetic resources that originated elsewhere;
- Future advances in crop improvements, which are needed for sustainable agriculture and food security requires continued access to a wide genetic base without major restrictions;
- Due to movements of people and resources over the past millennia as well as to modern collecting efforts, the genetic resources of major crops are widely distributed *ex situ* both in genebanks and in production areas.

SOURCE: Halewood (2003)

This list of 64 crops broadly applies to all germplasm held by the contracting states as per the list, but also applies to PGR held *ex situ* in the collections held by the International Agricultural Research Centres (IARCs) of the Consultative Group on International Agricultural Research (CGIAR). However, access within the multilateral system is limited. Only those wishing to access PGR for “research, breeding, and training for food and agriculture are permitted”. Those wishing to use PGR within the multilateral system for “chemical, pharmaceutical and/or other non-food/feed industrial uses” are not allowed access. Article 12.4 of the treaty refers to a

standard material transfer agreement, which shall be adopted by the Governing Body and...[will] contain the benefit sharing provisions set forth in Article 13.2 (d) ii and other relevant provisions of this treaty, and the provision that the recipient of the plant genetic resources for food and agriculture shall require that the conditions of the MTA shall apply to the transfer of plant genetic resources for food and agriculture to another person or entity, as well as to any subsequent transfers of those plant genetic resources for food and agriculture.

What this essentially means is that if a signatory of the seed treaty wishes to access one of the resource outlined in the 64 plants identified, then the party is subject to pay an equitable share of the benefits arising from the commercialization of that resource. The exact amount will be determined by Article 19.3 (f), which outlines that the Governing body must establish “an appropriate mechanism” to determine these amounts. Of course, this payment is not required for resources that have previously been determined to be available without restriction; in such a case, the treaty can only “encourage” payment (ETC 2001). It is not explicitly clear why these particular crops were isolated in this list, though many argue that vested interests regarding the commercial viability of certain crops have led to their being included in the list, and have precluded any concerns regarding food security and the maintenance of biodiversity (ETC 2001b).

Rather than presenting Farmers’ Rights within the context of the International Human Rights mechanism as outlined by the UN, the Seed Treaty has relegated them to being subject to national legislation. Article 9.3 states that “nothing in this Article shall be interpreted to limit any rights that farmers have to save, use, exchange and sell farm-saved seed/propagating

³⁸ Refer to Article 1.1 of the Seed Treaty, which can be found at <http://www.ukabc.org/ITPGRRe.pdf>.

³⁹ For the full list of crops, refer to ETC (2001b), p. 6.

material, **subject to national law and as appropriate** (emphasis added).” Thus while the Seed Treaty is legally binding, ultimately the decision to implement Farmers’ Rights at the domestic level lies squarely on the shoulders of sovereign states, who may or may not choose to enact legislation that strengthens these rights within their *sui generis* legislation. Moreover, other domestic legislation may place more stringent IPR mechanisms before Farmers’ Rights, thus making these rights impossible to implement. These rights may be superseded due to the primacy of TRIPS compliant standards for IPR protection adopted by WTO member states, but in the future may also be marginalized by the ongoing reforms taking place in the World Intellectual Property Organization.

A.4 THE WORLD INTELLECTUAL PROPERTY ORGANIZATION

The World Intellectual Property Organization (WIPO) is in a somewhat curious position. The relevance of the organization diminished considerably after the implementation of TRIPS as the one international agreement relating to Intellectual Property Rights. Because WIPO essentially acts as a organization that dictates procedure rather than law, its relevance in current debates has been overshadowed by TRIPS. WIPO in itself is an administrative treaty only; it has 129 contacting parties, the majority of which are developing countries. However, within the context of this discussion WIPO is indeed relevant, and for two reasons. The first being the Intergovernmental Committee on Intellectual Property and Genetic Resources, Traditional Knowledge and Folklore (IGC), and the second being the three main pillars of the WIPO patent agenda; the Patent Law Treaty (PLT), the Patent Cooperation Treaty (PCT) and the Substantive Patent Law Treaty (SPLT). We will consider these in turn.

The IGC was established at the 26th General Assembly of WIPO in Geneva in September 2000. The mandate of the IGC is to “provide for a forum where governments can discuss matters relevant to three primary themes” (WIPO 2002).

BOX A.5: THE THREE THEMES RELEVANT TO THE IGC

- Access to genetic resources and benefit sharing;
- The protection of traditional knowledge, innovations and creativity;
- The protection of expressions of folklore.

Clearly, the objectives of the IGC are quite similar to those detailed in the Bonn Guidelines, and there are ongoing efforts to ensure that the CBD and the IGC harmonize their efforts. The second session of the Committee in 2002 resulted in efforts to create a mechanism that would facilitate international patent searches by requesting all WIPO member states to contribute to a database comprising prior art. More specifically, the committee requested the secretariat of WIPO to compile an inventory of existing traditional knowledge-related periodicals, gazettes or newsletters which document and disclose traditional knowledge data, and an inventory of existing online traditional knowledge-related databases (CBD 2003). However, as mentioned in section 3.1, there are concerns regarding prior art databases and their efficacy in challenging prior art at the national regulatory level. Yet clearly, the objective of such a harmonization of prior art databases is rooted in making attempts to document traditional knowledge, which could be used to facilitate an international search when processing patent applications.

WIPO adopted the Patent Law Treaty (PLT) in June 2000. The objective of the treaty is to harmonize the procedure by which patent offices process patent applications. To facilitate that aim, the treaty presents a set of standardized requirements for national and regional patent offices to adhere to when processing applications. At this point, there are only four parties who have ratified the treaty; 10 are required for it to come into force⁴⁰. Preceding the PLT is the Patent Cooperation Treaty (PCT), which was adopted in 1970. This Treaty is

⁴⁰ Refer to Article 10 of the PLT, which can be found at <http://www.wipo.int/clea/docs/en/wo/wo038en.htm>.

distinct from the PLT in that it provides an opportunity to file one application that would then be processed by WIPO among different countries. A party wishing to seek protection via a patent would have the option to only file it once at WIPO, who would then process the application simultaneously among all WIPO member states. Ultimately, the decision rests with national governments as to whether or not the patent will be granted; the advantage to those wishing to pursue a patent under the PCT is that the system allows for less paperwork and an international prior art search. This is where the database proposed by the IGC could be utilized.

The process of reforming the PCT began in 2000, as a result of the formation of the PLT. (Correa 2002). The main thrusts of the recent reforms have been to make the process easier, efficient and more cost effective. However, it has become apparent that these are not the only driving forces. Many WIPO members (particularly the US) have expressed their desire for the PCT to “move away from its current, non-binding patentability opinions and adopt procedures where substantive rights could eventually be granted via the PCT” (WIPO 2001a). Since the adoption of the PCT, efforts within WIPO have been focusing on creating a mechanism to harmonize not only the procedural elements of the patent process, but also the basic rules of patenting.

The first draft of the Substantive Patent Law Treaty (SPLT) was tabled in November 2001; a revised draft was completed in May 2002 (GRAIN 2002). What is unique about the SPLT is that, unlike TRIPS, it goes beyond setting minimum standards for WTO member states to adhere to regarding what can be patented. The SPLT has the potential to actually state what can or cannot be patented, and does not have (at least at this early stage) the *sui generis* option that Article 27.3 (b) of TRIPS has. Thus, there is little room for movement. The SPLT is of particular concern with regards to what will constitute the prior art. If there is one uniform standard by which novelty-defeating prior art is to be measured by, one can only speculate that it will follow those norms currently pursued by the US, Japan and the EU, namely a technical specification that allows one skilled in the art to produce the “invention”. Note that the IGC has not laid down any specific guidelines that state what form submissions to the database proposed in the second meeting will take.

As mentioned in section 3.1, simply stating the resource as being utilized in the past without providing a technical explanation does not constitute the prior art in many developed countries. The concern here is that the SPLT would define what is patentable under much more narrow lines than what is currently the norm, with particular consequences on which biological resources can fall under the realm of what is patentable under national law. Currently, authority regarding what can and cannot be patented lies squarely on the shoulders of national governments. Moreover, the ability to incorporate the Bonn Guidelines or the Seed Treaty into any domestic regulation could be curtailed by the SPLT. The SPLT has the potential to supersede national legislation, thereby creating a situation where national law is less relevant, if not irrelevant altogether. Indeed, a recent proposal submitted by some developing countries in WIPO suggesting to incorporate Article 27.3 into the SPLT was opposed by the US on the basis that TRIPS already provides minimum standards, while the SPLT aims at “establishing best practices at an international level” (WIPO 2001b). The concern here is the potential binding nature of these best practices.