CONCLUSION

A summary of the findings of this research study is provided in this chapter. The directions for further research are also outlined.

Part I

Chapter 1: Biodiversity: Nature and Humanity

Biodiversity is more than a natural phenomenon. It is better to talk of bio-cultural diversity than biodiversity per se in the context of plant genetic resources. Biodiversity is viewed differently by different actors with different objectives and hence the discursive formation is very important. The currents and counter currents in biodiversity discourse arise due to not only different understandings of bidiversity but also different claims over biodiversity and genetic resources. Hence biopolitics of biodiversity at local, national and global levels is important and state plays an important role in biopolitics. The debates over considering biodiversity as Common Heritage of Humanity have given way to treating biodiversity within the national boundaries as resources governed by sovereign rights of the states. Thus while biodiversity can be considered as global commons the state sovereignty is a significant factor. The relationship between biodiversity and IPRs is not evident except in specific contexts. The question of patents and products of nature is inevitable and both judicial pronouncements and legislations have expanded the scope of IP rights and with advent of biotechnology as the capacity to manipulate or engineer organisms has reached unprecedented levels new issues have come to the fore.

The biopolitcs of the biodiversity is crucial to the understanding of the interface between IPRs and biodiversity. Rather the expansion of IPRs is becoming like an enclosure. IP regimes are legal constructs and hence as their scope changes in the context of TRIPS under WTO, biodiversity becomes a contested terrain and hence issues relating to IPRs are also issues relating to appropriation and recovery of the bio-commons. Only a detailed

examination of issues in specific contexts and in a broad perspective can unravel the various dimensions of the interface between IPRs and biodiversity.

Chapter 2: Convention on Biodiversity

The Convention on Biodiversity is an excellent initiative that has much potential to conserve and promote sustainable use of genetic resources. However it still suffers from the birth pangs and the North – South divide haunts its functioning. The ambiguities in the Convention limit its usefulness on one hand, and, on the other hand lack of commitment to finding solutions to biodiversity crisis hampers efforts based on CBD. However CBD has more potential than what is assumed to be. Being the preeminent convention on biological diversity with a holistic understanding and a wide mandate it can bridge the gaps in biodiversity conservation and use. It has brought forth many aspects to the center age and for the first time access and benefit sharing have been recognized as equally important. The recognition of the national sovereignty over genetic resources has ended the common heritage perspective and free (at no cost) access regimes.

Thus while CBD has achieved some results over a decade it has long way to go to fulfill its mandate. The CBD provides an important framework for conservation and space for developing nations to raise their concerns. Although CBD does not lead to *jus cogens* it can be interpreted as a Convention that is moving in that direction.

Part II

Chapter 3: Farmers' Rights

Farmers' Rights as a concept and as a practice has undergone changes over two decades. It has been watered down and it has been left to the national governments to fulfill that. Due to ambiguities in conceptualizing Farmers' Rights it has been interpreted differently by various scholars and its status (is it a legal concept or a political idea or a moral responsibility or just an expression of appreciation) has been unclear. Moreover identifying

the potential right holders and the nature of the benefits/ rights that flow to them has also been controversial. Viewing it as a mere antidote to Plant Breeders' Rights does not take it very far. Although issues of equity and fairness are raised, often in debates for many practical reasons commentators argue that it is not a workable idea. Due to the interdependence of countries on germplasm and other factors a royalty or levy based funding mechanisms have met with resistances, apart from the inherent problems in actualizing them. Thus despite much debate and discussion implementing Farmers' Rights has been a challenging task.

In the absence of an international mandate states are trying to provide for Farmers' Rights using laws even as they try to evolve IP regimes for plant varieties and seeds. If Farmers' Rights is seen more as a bundle of concessions than as a political right backed by legal regimes it results in half hearted commitments to upholding Farmers' Rights. Unfortunately, ground reality is closer to this despite lofty objectives and pronouncements on Farmers' Rights. The dominant technological trajectory is not well suited to upholding Farmers' Rights. Hence although the idea of Farmers' Rights is well articulated the implementation leaves much to be desired at all levels. But Farmers' Rights should be conceived as a right that farmers' are entitled to and not necessarily as a countervailing right. It should be implemented in such a manner that farmer based innovation is also encouraged. And despite all the problems it remains as a concept with much potential for resisting the onslaught of IPRs to curtail the customary rights of farmers.

Chapter 4: The International Treaty on Plant Genetic Resources for Agriculture

The International Treaty on Plant Genetic Resources for Agriculture is a laudable Treaty that creates a Multilateral System for Germplasm Exchange and Transfer. It is the outcome of protracted negotiations over more than a decade and more. The Undertaking was revised to harmonize it with CBD. But with the coming of CBD and TRIPS in to effect the Undertaking has become one of the global treaties that have relevance for plant genetic

resources. The Global Plan of Action was drawn up in 1996 and this forms the basis for conservation and sustainable use as envisaged in the Treaty. The Treaty envisages a Multilateral System for Exchange of Plant Genetic Resources and it has put an end to free access regime. The Treaty also recognizes the national sovereignty over genetic resources. It lays the foundation for benefit sharing but the controversies over interpreting some important terms persist.

It has much potential although at present it is too early to predict the outcome. Unfortunately the ambiguous words and exclusions of major crops limit its usefulness in the initial stages itself. Yet coupled with the Global Plan of Action this Treaty can immensely benefit conservation and promote sustainable use of plant genetic resources if the Parties are committed to the Treaty.

Chapter 5: Bioprospecting, Access and Benefit Sharing, Biopiracy

Bioprospecting was suggested as a win-win protection to protect biodiversity as well as to harness the biological riches and the ethno-botanical knowledge associated with it. It was expected that bioprospecting would help in drug discovery while generating revenues for conservation. This was widely accepted and access and benefit sharing was endorsed by CBD. But some skeptics expressed doubts about the viability of bioprospecting as a conservation measure. Some others questioned whether bioprospecting would be really so rewarding in terms of drug discovery. After a decade or so the record is mixed. While bioprospecting did succeed in some cases the resistance to that also had grown. As a commercial model it has not been particularly successful.

The reservations and opposition by civil society groups and indigenous communities has made bioprospecting a controversial proposition. The advent of the principle that nations have sovereign rights coupled with formulation of national level regimes and regional level initiatives on access and benefit sharing has made the ground reality more complex. So much

so, that even bioprospecting for non-commercial purposes has been affected by this. But the proliferation of access and benefit sharing regimes has not resulted in manifold increase in bioprospecting activities. Rather they have not been very helpful thanks to vague conditions, multiple authorities dealing with this issue and elaborate procedures.

Hence bioprospecting has not survived the hype and has proved to be more problematic than what was anticipated. Moreover although many nations have developed Access and Benefit sharing regimes and laws bioprospecting is not likely to take off in a big way because of ambiguities in laws and the resistance from various quarters. The absence of commercialization of products/drugs is another issue that makes bioprospecting all the more uncertain in future. Regarding IPRs in bioprospecting there is much confusion and access and benefit sharing regimes are often vague about this. Thus although bioprospecting is not useless altogether it has not made much headway because of many factors, including the unrealistic assumptions made in promoting it.

The misappropriation of knowledge and genetic resources associated with them has evoked much opposition. This has been touted as a proof that IPRs do not protect IK/TK or plant genetic resources from misappropriation. There have been few victories in this but that is not sufficient to stop or reduce biopiracy. The case studies point out laws in some countries aid biopiracy indirectly through the definition of novelty and prior art. The lack of uniformity in laws regarding criteria, nature and scope of patent coverage is an important factor in facilitating biopiracy and hence scholars have argued that the 'geographical limitation' in the laws of USA should be eliminated. Thus the debate on biopiracy has resulted in a debate on the limitations of current IP regimes also. One fallout of this is the idea of a database that can be accessed by patent offices to determine prior art and novelty.

Biopiracy will continue unabated until the changes in national laws are brought and there is a universally accepted criteria for novelty, prior art and patenting 'products of

nature'. At present the IPR regime, particularly the US one facilitates rather than bans biopiracy. Some solutions including disclosure of origin have been suggested but these will be necessary but not sufficient. So a solution that brings in changes in the legal regimes is needed. Coupled with an international protocol or understanding or treaty to prevent misappropriation of IK/TK this will result in reduction in biopiracy.

Chapter 6: CBD & TRIPS

Whether CBD and TRIPS are compatible with each other has been a contentious issue. Some countries have argued that there is no discrepancy between both. There are some issues that highlight the inherent tension between both and this has been pointed out by many countries who have submitted proposals for harmonizing both. However for some countries TRIPS is too important an Agreement to compromise upon. Hence to harmonize CBD and TRIPS, solutions can be found only if both North and South arrive at a consensus. But the differences in opinions are too wide to be bridged easily. Some of them stem from the fundamental positions relating to patenting life forms, right of the nations to exclude some categories from patents, the nature and scope of IP protection for plant varieties and interpreting some provisions of TRIPS and CBD. The spillover of the diverging views is reflected in other issues like benefit sharing, access to genetic resources also. Some proposals have been made to harmonize both and countries have tried to frame laws reflecting their positions. A global consensus is necessary on most of these issues to harmonize both. The possibility for arriving at a consensus appears to be remote at present. Protracted negotiations over many years may result in a solution. What is interesting is that some new ideas have been put forth to harmonize both and to reduce the contradictions between both. Some of these ideas (e.g. disclosure of origin) are relevant for other issues also. Hence it is premature to expect any solutions in the short run but ultimately a solution may emerge and it may be a compromise between extreme positions.

Chapter 7: IPRs, Seeds and Plant Varieties

In case of IPRs on plant varieties and seeds the IPR regime cannot be viewed in exclusion of technological developments, public policy and changes in the legal discourse brought by laws and judicial pronouncements. In other words there is nothing natural about the scope of the IPRs on plant varieties and seeds and what constitutes novelty or how to evolve the criteria for defining a variety is more a question of law and policy than science. For example an analysis of the developments in USA on IPRs on seeds and plant varieties show that the expansion in the scope of IPRs has happened due to many factors and a deterministic framework is insufficient to explain the developments. Trends like hybridzation have been followed by technological developments that have enables the seed industry to restrict farmers' rights using IPRs. This has been upheld by law and by judicial interpretations. And more than one form of protection has been upheld. As a result the commodification of germplasm is almost complete and seed is no longer a product of nature. The TRIPS mandates that seeds and plants should be covered but what is the scope of the coverage is controversial. Even before the advent of TRIPS , UPOV had defined the nature and scope of the protection. The changes in UPOV Convention over the years have strengthened the rights of the breeders and new ideas like essentially derived varieties have been introduced. Thus by the early 1990s itself UPOV had set a model and UPOV does not preclude patents on seeds.

TRIPS also does not define what a sui generis system is nor seems to mandate UPOV as the only model. Hence developing nations will have to carefully craft an IPR regime for plant varieties and seeds using the flexilbilities available under TRIPS taking into account the needs of the country and development of agriculture and seed sector. In other words there is no need to follow the path taken by USA or Europe. The technological trajectory has been directed in a direction that strengthens the private sector seed companies and making the

farmer almost totally dependent on them for that crucial input – seed. This need not be the case universally. So it is essential to deconstruct the legal discourse on IPRs and plant varieties and seeds and unravel the shaky foundations of that discourse. Nations have tried to interpret sui generis system through the laws enacted by them. Hence the scope of IPRs on seeds is a question that eludes a clear cut answer. Since developing an IPR regime is also a question of public policy developing nations should debate the pros and cons of any proposed IPR regime before adopting it.

Chapter 8: Traditional Knowledge/ Indigenous Knowledge and IPRs

The task of defining TK/IK is daunting. The importance of IK/TK for development, controversies over misappropriation of IK/TK and the concerns raised by indigenous communities over the use of IPRs to appropriate what they considered sacred or inalienable had resulted in increasing attention to this issue. In case of bio-cultural diversity the importance of Traditional Ecological Knowledge and cultural factors like languages has been widely accepted and the significant contributions by indigenous communities in nurturing bio-cultural diversity has also been acknowledged. The CBD and other international Conventions/Treaties have recognized this. The suitability of IPRs to protect IK/TK is a subject that has evoked a wide variety of responses. While some anthropologists have cautioned about this, some other scholars have explored the possibility of specific IPRs to protect IK/TK. The spiritual and cultural dimensions of IK have been highlighted by some scholars who have argued that there is a need to go beyond IPRs and some have suggested Traditional Resource Rights, communal patents, community intellectual property right regimes as solutions. On the other hand it has been opined that existing IPRs can adequately protect interests of indigenous communities.

Although on IPRs and Traditional Knowledge/Indigenous Knowledge many suggestions have been put forth there is a need for more conceptual clarity in this issue. The

extreme points of view – one totally against IPRs as a means of protection and other using IPRS as the option are necessary but not sufficient to develop new frameworks.

Some of the recent ideas on protecting IK/TK – digital databases and digital libraries, disclosure of origin, database rights, developing a sui generis system sound promising although there are some problems associated with them. Whether misappropriation can be prevented by these technical solutions alone is a controversial issue. On the other hand the scope for an international framework or treaty on IK/TK to prevent misappropriation is a solution in the offing, although such a treaty or framework may be many years away from now.

Since the problems relating to misappropriation of IK/TK also raise some fundamental questions about using IK/TK and the usefulness of IPRS as a mode of protection, perspectives from other disciplines are needed to reframe the debate. However as IK/TK issues are also related to human rights, bio-cultural diversity, rights to livelihoods and culture focusing solely on IPRs is not sufficient. At this juncture the debate has entered a critical and interesting phase.

Thus the chapters as discussed above provide a state of the art review about the issues relating to IPRs and biodiversity, apart from offering suggestions and questions for further exploration. The import of this discussion is that IPRs do have an impact on conservation and sustainable use but that is more context specific than what is normally assumed. Hence a mere rejection on IPRs does not take the debate anywhere except in empty rhetoric.

Part III

Chapter 9: From Rebel Code to Alternative Paradigm

In Part three, an alternative paradigm of IPRs is introduced and is analyzed in detail. The emergence of Open Source Model and the FOSS (Free and Open Source Software) movement as countervailing forces in software and how this has resulted in a rethink about

development, production, distribution, and utilization of software has been examined. But this paradigm has been subjected to research and many interesting ideas have been put forth. These are discussed to show that Open Source Model is emerging as an alternative model whose relevance has grown beyond information technology. Importantly Open Source Model has kindled interest in gift mode of production and in alternative strategies for production and distribution of public goods.

The tragedy of anti-commons and the problems of patenting research tools, gene fragments and the implications of the same for Freedom to Operate (FOT), has been discussed in detail. Although the Freedom to Operate is largely available now thanks to the lack of a universal IP regime the trends in patenting will have a negative impact on FOT sooner or later, everywhere. Some examples from biotech and genomics have been given to argue that the tragedy of anti-commons could be avoided by innovative mechanisms which arose more out of the need for collaboration and facilitating access than out of altruism. It is suggested that these models are relevant in FOT issues also.

Chapter 10: Biodiversity, Open Source and Intellectual Property Rights

In the context of biodiversity and open source some suggestions have been made and the relevance of open source in finding solutions and in developing alternative strategies has been discussed. The dissertation thus has suggested that Open Source Model can be used in the context of plant genetic resources for two major purposes , to obviate/ minimize the negative implications of current IP regimes and to develop alternative IP regimes that are more suited for biocultural diversity. For example in the context of seeds, this dissertation has advocated use of participatory plant breeding, use of Open Source Model coupled with Peer to Peer networking principle to develop seeds that meet the needs of farmers and to further the diversity, without strong IP rights that restrict the rights of farmers. This dissertation has

made out a strong case for further work in this direction and this dissertation is only a preliminary inquiry on this.

Thus the dissertation has tried to address specific issues and has come up with some suggestions, based on an extensive analysis. This dissertation has put forth the view that there is an urgent need to go beyond the current IP regime and to bring in conceptual clarity on various issues relating to IPRs and plant genetic resources. In this dissertation some of the critiques of the IPR regime, particularly TRIPS is taken in to account.

Future Directions of the work

For future research some of the arguments developed in various chapters can be taken up for further analysis. For example the bio-politics paradigm discussed in the chapter on biodiversity can be further researched upon. Similarly some of the questions addressed in the chapter on IK/TK can be examined further in light of the observations made in that chapter. Like wise the Open Source model and its relevance as outlined in the final part provide much scope for further inquiries, both on theory and practice.

A significant contribution of this dissertation, if it can be said so, is the examination of Open Source as a model and as an alternative paradigm for IPRs in the context of plant genetic resources. To say that this has not been attempted before may not be an exaggeration.

However a dissertation is not an end by itself. It is at best a beginning of a beginning, of a long inquiry into the subject matter. It is not even a starting point; it is just a preparation for an intellectual journey. Hence this dissertation is a modest attempt to find answers and suggest solutions to the research problem outlined in the beginning. An intellectual inquiry can be in many forms and can take many directions. It is necessary to raise more questions than what can be answered or handled at a particular time. It is also necessary to go beyond the rhetoric and bring in more light in debates where there is more heat than light.

This dissertation has taken a particular direction and a lot more needs to be done. So this can be considered as a beginning of a beginning, of an intellectual pursuit. Traveling in a road less traveled or charting a new path altogether are challenging as well as interesting, and of course has its own charms. In one sense this dissertation has tried to do that.

With this understanding the Conclusion is submitted.