The Case For Biolinuxes

And other pro-commons innovations

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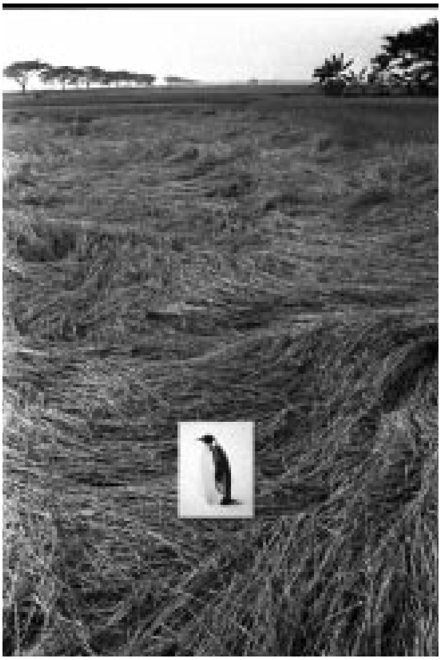

Due to the lack of Vitamin A, more than a million children die every year and many more are affected. To overcome this, scientists have developed “golden rice”, and this variety of rice has sufficient quantities of beta-carotene, a good source of Vitamin A. When a study was done to look at the Intellectual Property Rights (IPR) issues involved in utilising the relevant technologies for the production of this rice, it revealed that about 30 groups of patents have been issued over various processes and products needed to produce this variety. In other words, unless the IPRs are waived, or at least licences are given without expecting any royalty, the rice will never be available at affordable rates.

This is just one example.

Over the last few years, the tendency to apply for patents and other Intellectual Property claims has grown so rapidly that today no researcher can be sure whether the processes they use are patented, and whether they are unknowingly infringing somebody's patents. Patents now cover a wide variety of processes, research tools, techniques etc. It is estimated that patents related to rice were less than hundred per year till 1995 but they jumped to more than six hundred per year between 1996 and 2000. The increase in the number of patents coupled with broad patent claims has emerged as a major challenge to researchers all over the world.

IPRs for plants and plant varieties are a relatively recent development. In many countries they are still not covered by any IPR regime, although the USA permits even the patenting of plants. This is not surprising since until the Uruguay Round, IPRs on plant and plant varieties was not an issue discussed under GATT; the inclusion of IPRs on plant and plant varieties under TRIPS has much more to do with development trends in biotechnology, and private sector investment and involvement in the seed industry. The US Plant Variety Protection Act (PVPA) of 1970 made it possible to provide patent-like protection for both sexually and asexually propagated plants. Under PVPA a certificate of protection can be granted to anyone who applies for it, provided the plant in question fulfills the criteria of novelty, uniformity and stability.

Different countries have different norms for evaluating claims for patentability. Plant Breeders' Rights were first proposed in 1956, and in 1957 the French government organised a conference to discuss the issue. The Convention, signed in Paris on 2nd December 1961 by Belgium, Denmark, the Federal Republic of Germany, the Netherlands, Italy and the United Kingdom, resulted in the founding of *Union Pour La Protection des Obtentions Vegetables* (UPOV). Although these countries ratified the convention, there was no consensus on the crops to be covered. The stated objective therefore, was that the Convention would eventually work for the inclusion of all crop plants but that to begin with, each state was to make its own decision to cover or leave out specific crops. The TRIPS Agreement is based on the assumption that plants may be considered inventions, and hence can be made eligible for protection under IPR regimes.

For the purposes of granting patents, an innovation must result in an invention, although the definition of an invention is vague. In case of plants, an invention can be claimed only if it is proved that no such variety exists in nature. Under the UPOV Treaty, protection could be given for plants and seeds as long as the plant constituted a new, stable and homogenous variety.

But matters relating to patents and patentable matter took a decisive turn after the landmark decision given in *Diamond vs Chakrabarty* by the United States Supreme Court, which declared that "everything under the sun made by man was patentable". Thus the distinction between inanimate and living things, for the purpose of being eligible for patent production, was reduced to whether it was a handiwork of man or not, and anything under the sun, as long as it was man-made and fit the parameters of an invention, could be patented. This ruling was affirmed in subsequent cases (*ex parte* Hibberd, 1985 and *ex parte* Allen, 1988) and the scope for granting patents was widened in Europe by a landmark case in

1983. With these two decisions, it is possible to get patents for plant varieties and modified micro-organisms irrespective of the technique involved (genetic engineering or plant breeding).

According to article 27(2) of the European Patent Convention (EPC), member states are permitted to exclude from patentability such inventions, the prevention of whose commercial exploitation is necessary for protecting the *ordre public*/morality (including human health, plant or animal life and environmental damage). But patentability cannot be denied for the reason that such exploitation is illegal in the member state. The necessary condition has to be understood in the context of decisions given by GATT involving cases under Article XX (a), (b) and (d), and the decisions of WTO's Dispute Settlement Understanding. A reading of the decisions indicates that it is difficult to provide exclusion on the grounds of *ordre public* or morality or on human health grounds. The European Patent Convention does mention *ordre public*/morality, but the extent of *ordre public*/morality exclusions and their meaning is not clear. TRIPS too does not explicitly outlaw patenting life in general on these grounds.

Hence it is difficult at this juncture to understand how the WTO Dispute Settlement will interpret 'intention'. According to Paragraph 3 of this text, members may exclude from patentability: "diagnostic, therapeutic, and surgical methods for the treatment of humans or animals; 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 effective *sui generis* system or by any combination thereof".

Legislation on Plant Breeders' Rights, patentable matter and plants, and plant varieties has been influenced by developments in science and technology. Laws have tried to stay tuned with breakthroughs in science by expanding the scope and coverage of the subject matter of IPRs. How the provisions of TRIPS will be interpreted will depend on developments in both legislation and in science and technology. Developments in biotechnology and genetic engineering have altered the boundaries between animate matter and inanimate matter. Genetically modified organisms – plants modified to have specific traits – are becoming more and more common.[1]

As a result of these kinds of developments, and others such as consolidation in the agrochemical sector, the global seed sector is becoming an area in which multinational corporations (MNCs) dominate the inputs needed by farmers – be they seeds, herbicides, insecticides, genetically modified seeds or other agrochemical inputs. For example, just five companies control 75% of the global vegetable seed market. Two companies – Dupont and Monsanto – together have a 73% share in the US corn seed market. In case of genetically modified crops also, the top three companies control more than 75% of the market. Over the past decade there have been so many mergers and acquisitions in this sector that today a company like Monsanto has a stake in almost in every crop and in every region of the world.

The tendency to get broad patents has resulted in what is called 'anti-commons'. In 1968, Hardin argued the "tragedy of commons". Today, Heller and Eisenberg have argued that people actually under-use scarce resources as too may owners and too many claims block each other.[2] Proliferation of patents results in researchers having to obtain licences from too many parties in order to use materials and processes; so while in theory it may seem that stronger patent protection will foster innovation, in practice it may not be so at all. Rather, stronger patent protection makes companies seek broader claims and restrictive licensing practices. In certain industries like biotechnology and pharmaceuticals, patents matter even more. But stronger patent protection does not mean that varieties will be available for longer periods than before, or that the number of varieties will increase significantly. According to a study, the average age of wheat varieties in the UK has come down from more than six years in the late 1960s to less than three years in the early 1990s.

In fact, plant breeding as an organised industry is not even two hundred years old, but farmers have been experimenting, conserving and disseminating varieties since time immemorial. The sheer diversity in the varieties of every food crop is the handiwork of these farmers who, over centuries, have improved upon what nature created in the first place. But these time-tested practices of seed saving and exchange and trade in seeds by farmers have now become issues of debate. Under the revised UPOV treaty of 1991 it was left to the national lawmakers to permit the right to use saved seeds.

This decline in diversity and the hegemony of the MNCs is being challenged in many ways. I will briefly describe them and point out their relevance.[3]

One way is to organise farmers and recover and retrieve seed varieties that were in use or that are still in use, and popularise them among farmers. This helps farmers not only in rediscovering old varieties, but also in preserving them.

Another possibility is to switch over to organic agriculture, use sustainable agricultural practices and reduce dependency on modern plant varieties. This also means that farmers and communities start re-using varieties which have fallen into disuse, or varieties which are used marginally.

Another solution is to develop new varieties and work with farmers, taking into account their specific needs and demands. This method – known as Participatory Plant Breeding – is a solution whose logic can be extended from the development paradigm of open-source and free software.

Farmers have developed seed varieties by experimenting over centuries and sharing the improved varieties with others. As a result of this continuing experimentation, testing, selection, propagation and exchange, diversity was made possible. Participatory plant breeding tries to mix the best in modern science with the wisdom of farmers in order to develop varieties that are both farmer-friendly and meet the needs of different agro-climatic zones. Participatory plant breeding is also a learning process. Farmers evaluate seed varieties by various criteria and decide what to choose and which improvements to make. Participatory plant breeding can also be used to make traditional varieties more suited to meet the needs of today's farmers.

These three methods are not exclusive choices. They can be used together to conserve biodiversity and to develop new varieties. An obvious question can be: if these possibilities are already available, why are they not widely used? The answer would have to be that policy frameworks do not give them much importance. Moreover, the sheer size of the

Research and Development budgets of the MNCs is so enormous that even governments are found wanting. For example Monsanto has a bigger R&D budget than what the government of India allocates to the Indian Council for Agricultural Research (ICAR).

Open-source software, free software and GPL[4]

Over the years, free software movements have proved that good quality software can be made widely available without costing the earth, and that software can be developed to meet the wide variety of systems in use. In the process they have questioned the hegemony of Microsoft and the myth that there are no alternatives to wintelism.[5] In fact, the Internet would not exist but for open-source and free software.

Copyleft is an innovation that tries to overcome barriers that restrict the freedom of users and the exclusivity of claims, based on the principle that software is for the public good and should be available in the public domain. Further improvement in the software should not be at the cost of developers or users. Thus, under Copyleft, both the code and the freedom associated with it come together and are legally binding. Copyleft is put to use in different forms, and one such form is the GNU General Public Licence (GNU GPL).

Recent studies have questioned the notion that stronger patent protection is a must for software development. Rather, it has been observed that strong property rights can limit the provision of complex public goods like software.[6] We need to see the issue of open-source and free software as a part of the larger political issues of access to information and technologies, rather than merely as issues relating to software and IPRs.[7]

What could a biolinux model look like?

A biolinux model will also be based on the logic that farmers are both users and innovators of technology, coupled with the idea of Copyleft. A biolinux model can be applied for the development of plant varieties, agro machinery and sharing of information and knowledge. A biolinux model for a new variety developed using participatory plant breeding will be as follows. The variety will be made available with a GPL or a similar document explicitly stating rights and claims. The varieties will be in the public domain or covered under plant breeders' rights without restricting the rights of others to experiment, innovate, share the seeds or exchange seeds. There will be no restriction on using this to develop new varieties or to experiment with but it is essential that the variety derived from this should also be available without any monopolistic claims and restrictions on further development.

Implementing such an idea can be done in many ways. There can be an agency which can coordinate such activities and act as an agency for bringing together breeders and farmers and for guiding farmers on aspects related to IPRs. There could be a common pool to which farmers can contribute and from which they can ask for samples; and this common pool of germ plasm can also exchange materials with others under Material Transfer Agreements (MTAs).

There can be crop specific agencies which collect information, support innovations and provide support to breeders and farmers working in participatory plant breeding. Such agencies can also draw on the collection of germ plasm in various CGIAR centres, national gene banks and facilitate the development of new varieties. UN agencies or private foundations can buy important patents to ensure that important technologies are available in the public domain and both public sector and small farmers benefit from this. There can be a clearing-house mechanism to facilitate access to information on IPRs, patents issued and technologies in the public domain, and to keep track of developments related to agricultural biotechnology.[8] What is needed is a detailed examination of the IP and access policies of various CGIAR centres, centres under ICAR, agricultural universities etc. Based upon this examination, these institutions can be requested to formulate IP policies that ensure that varieties developed by them are available to other breeders and farmers under a licence similar to Copyleft principle.

In case of open-source and free software also there is much scope for trying out such strategies. Just like farmers, users also vary and often have a very good idea about what exactly they need.

Of farmers and software users

Like farmers, software users have criteria to evaluate a software. Their requirements vary. Just as there are farmers who cultivate in small land holdings, often using their family as labour, there are users who need a suitable software without a steep learning curve, that doesn't cost the earth and which can run on systems which fit their budgets.

The market for such software may not be huge and in many cases the potential will be exploited only in the future. It is a Catch-22 situation – the user does not get the appropriate software because it is not available off the shelf, and the developer is reluctant to invest money because the market size is too small or he has no idea of the exact needs of the users. One way to break this vicious circle is development of software that can be tested first with users, evaluated by them, modified and tested again and then the final version released. But once a product is tested and found suitable by users then it is easy to refine it further, make it functional in different Operating Systems and release it. Here too the developer can certainly apply for IPRs over the product. He can price it in such a way that one version of the application is available freely, or its source is in the public domain and this version can easily meet the essential needs of an average user. The sophisticated version targeted for use in institutions, government departments and corporate sectors can be priced higher. As the source of one version is in the public domain, that will enable further development. Obviously, a condition that the source of the developed application remain in the public domain can be imposed.

To facilitate such a process it is essential that the users and developers are brought together and enter into a dialogue. Further, depending upon the complexity of the application, the development of software can be split across various groups. One possibility is to develop the core of an application, say an Indian language word processor, and test it with various users and refine it and use the core as the base to build a better software. The source code of the core should be public. Various groups should be at liberty to build upon it and use it for product development. The funding for this first and critical stage can come from the government which, as a matter of policy, will give preference to products built upon this core, or using this application.

We need applications which are small, functional and beautiful without bloatware. Such applications can be developed by adopting methods from participatory plant breeding. For example, a version of Linux that is sturdy with an interface in an Indian language, which can be run on a Pentium PII will be very useful to many students who want to learn Linux and experiment with it. Such a version of Linux with icons and help in Indian languages will enable many to understand and appreciate Linux better. In the process the language will also be enriched. IT will never reach the masses unless IT is made available to them in their mother tongues. One way to overcome the problem is to develop software tailored to specific needs and requirements. Software like Star Office or Easy Office in Indian languages with source code in the public domain will allow for higher access and further innovation.

In Tamil there is a software called *Murasu* with the facility to send e-mail. Murasu is an editor and word processor and there is no need for any special templates. The English keyboard is sufficient and the software has facilities for conversion to other Tamil software formats also. As a result it is easy for any user to write in Tamil, even exchange e-mail in Tamil, without much difficulty. Murasu is available for free downloading and hence it is widely used. Such innovative products should be developed for other Indian language applications also. Moreover there is an urgent need for browsers and search engines which will display results in Indian languages. Such products will be possible only if there are efforts to make software available in the public domain – as free software or as open-source products.

We have a good pool of human resources and every year the colleges and various institutes of technology produce hundreds of graduates in computer science and electronics, not to speak of the MCAs, MTechs and PhDs. If at least some of them are chosen and organised as groups to develop software in Indian languages, with user participation, the next five years could see the creation of a substantial base.

Just as the thousands of varieties of rice were made available by the hard work and intelligence of countless number of farmers who, over the centuries, enhanced, conserved and created the diversity we need to develop flavours, biolinux and other models will facilitate development on innovations which are not anti-commons but, in fact, pro-commons and which facilitate further development. In such models, there is much scope for creativity to flourish, knowledge to enrich civilisation and making the best of both modern science and the knowledge and wisdom of farmers.

Finally our visions of information society and knowledge society should not be mere imitations of what Bill Gates thought. What is good for Microsoft need not necessarily be good for us. We need to think of developing institutions and innovations that work against anti-commons trends. Rather we need a society where knowledge is not available to only those who can pay for it.

This essay should be read as a part of an ongoing work, more as a work in progress than as a completed piece. I am working on a much larger piece wherein I will be bringing in some points which I could not discuss in this article. I thank the folks at Sarai, particularly Jeebesh for insisting that I write for the Reader. *I have benefited much from his comments on an earlier version. The usual disclaimers apply.*

NOTES

1. The literature on this is large. I have cited only a few. For more details please write to me.
2. See the article by Rangnekar.
3. See Whealy (2001); Tripp and Pal (1998); *Biotechnology and Development Monitor* No 42, Bunders et al (1996); The Crucile II Group (2001); Sperling and Loevinshon (1996) for details. Again the literature on this is vast, I have cited only a few.
4. For reasons of space I am not discussing this in detail.
5. For a discussion on Wintelism see Hart and Kim (2001).
6. See Bessen (2001) and Pfaffenberger (2001). I am not familiar with the mathematical/econometrics part of the article by Bessen.
7. On this see "Information as a global public good: A right to knowledge and communication", downloadable from http://danny.oz.au
8. For discussion on this see Michaels (1999), www.southernvoices.nl; Douthwaite et al (2000); Ayers (1998)

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