

Intellectual Property Implications for Forestry Research Managers: Striving for Win-Win

Dr. Russell Haines¹

Abstract: Competent management of intellectual property is now a key issue for research managers increasingly driven on the one hand by more commercial approaches to research management, and on the other by the need to enter into partnerships where both inputs and outputs are shared. Products of forestry research activities that are relevant to intellectual property discussions include genetic material, computer software, technological systems, and information and data. Relevant legal instruments for the protection of these include plant breeder's rights, copyright, patents, and confidential information legislation. This presentation considers the elements of each of these and the manner in which they are applicable to forestry research. Relevant issues for forestry research managers are identified for discussion at this forum. These issues include: the ethics of intellectual property management; recognition of a public domain; auditing and valuing intellectual property; access to skills in the management of intellectual property; the extent to which an organisation should be involved in ongoing commercialisation; in-house commercialisation versus partnerships; intellectual property agreements; and the application of royalties in forestry. For most of these, a variety of options is available to the research manager. In many cases, there are no firm rules for determining the appropriate course. Experience is critical, and the opportunities for sharing of experience afforded by a workshop such as this are invaluable.

Although not easily defined in precise terms, the "Intellectual Property" (IP) of an organisation can be broadly conceptualised as the rights relating to products of the creative activity of the organisation and its staff. Creation of these assets has usually involved investment, and the assets have recognised, if not always quantifiable, value. Fundamental to the concept of Intellectual Property is the right to profit from such ideas and effort.

Historically, many forestry research organisations, particularly those operating with public funding, have followed a more or less open access policy. Recent trends, however, have led to some changes:

- Increasing pressure on most research organisations in relation to funding, requiring managers to maximise returns on assets, including intellectual assets.
- Adoption of a more commercial management regime by many research organisations.
- Rapid technological advances, in particular biotechnology.

As a result, many organisations now adopt a much more entrepreneurial approach and are much more cautious about sharing IP.

Countering the above are some trends that render cooperation and sharing more essential than ever:

- Increasing commonality of the issues being addressed. For example, in research fields such as sustainability and genetics, the issues being addressed are increasingly fundamental and not specific solely to sites, species, etc.

¹Director, Queensland Forestry Research Institute, MS 483 Gympie, Qld 4570, Australia. Deputy-Director, Cooperative Research Centre for Sustainable Production Forestry. Tel: (617) 3896-9714. E-mail: hainesr@qfri1.se2.dpi.qld.gov.au

- Increasing need for multidisciplinary approaches, in many cases to the extent that single agencies cannot by themselves cover all disciplines involved.
- Increasing demand, by clients and funding agencies, that cost-effectiveness be maximised, and therefore that duplication be avoided.
- The increasing sophistication of R&D and consequent increasing expense.

Research managers thus face a major dilemma in relation to IP: the need to be cooperative in an increasingly competitive environment. This paper is intended to provide a basis for discussion on ways of addressing this dilemma. Covered in this presentation are the types of IP generated by forestry R&D activities, the ways in which IP can be commercialised, and issues to be addressed in IP management.

The Nature of Intellectual Property

The 1967 Convention establishing the World Intellectual Property Organisation (WIPO) defines Intellectual Property to include the rights relating to:

- literary, artistic, and scientific works;
- performances of performing artists, phonograms and broadcasts;
- inventions in all fields of human endeavour;
- scientific discoveries;
- industrial designs;
- trademarks and related designations;
- protection against unfair competition; and
- all other rights resulting from intellectual activity in the industrial, scientific, literary or artistic fields (McKeough and Stewart 1997).

The Trade Related Aspects of Intellectual Property Rights (TRIPS), an important international convention, applies the term Intellectual Property to include copyright and related rights, trade marks, geographical indications, industrial designs, patents, layout designs of integrated circuits, and undisclosed information (McKeough and Stewart 1997). For several of these sometimes poorly defined “rights,” little or no legal protection is available, and the extent of protection certainly varies from country to country.

Intellectual Property in Forest Research

According to the very broad definitions applied here, products of forestry R&D activities that might be subject to Intellectual Property discussions include genetic material, computer software, technological systems, and information and data.

Genetic Material

Traditional tree breeding programs generate improved genetic material in the form of superior provenances, selected parents, superior half- and full-sib families, proven seed orchard parents etc. Seed orchards are typically made up of many clones, and breeding populations are very large. In the most advanced programs for certain species, clonal testing programs have identified outstanding clones for commercial deployment in clonal plantations. Increasingly, the most advanced programs will be managing clones that have undergone genetic modification through recombinant DNA procedures.

Many countries have introduced Plant Breeder's Rights (PBR) legislation, based on the International Convention for the Protection of New Varieties of Plants (UPOV) of 1978 and 1991. The general criteria to be satisfied for registration include:

- novelty;
- distinctness, that is, the variety must be clearly distinguishable from other commonly known varieties (modern techniques using molecular markers are greatly facilitating the demonstration of distinctness);
- uniformity in the defining characters;
- stability after repeated propagation; and
- the involvement of a breeder, although breeding is defined to include discovery and selective propagation.

PBR confers a temporary monopoly (20 or 25 years) to reproduce the propagating material of the variety and to stock, sell, import, or export the material. An application for registration should prevent another breeder in a UPOV country from obtaining a grant of PBR for an indistinguishable variety. PBR can be interpreted to cover "essentially derived varieties" but does not prevent use of the protected variety by a breeder to produce new varieties.

In theory, PBR could be obtained for seed orchard parents or parents in the breeding population. This would be of limited value, however, as it would not prevent other breeders from using the genotypes in breeding programs to produce new varieties. It would also be expensive to obtain PBR for the large numbers of genotypes typically involved. For forest tree species, PBR is of most relevance to breeding programs that have generated, for commercial deployment, small numbers of widely adapted clones.

Patent laws of some countries permit granting of patents for novel DNA sequences; constructs containing genes isolated from nature; and novel combinations of genes and regulator sequences for plasmids, vectors, modified cells, and new, altered animals and plants (where their production has involved invention). Criteria for the issue of patents generally are more onerous than those applied to PBR, and the process more expensive. The protection offered, however, would be stronger, particularly in relation to preventing use of material to produce new varieties. There continues to be considerable international debate on the ethics of patenting higher life forms.

Although some material is thus amenable to protection through PBR and patents, it is clear that the majority of material in forest tree breeding programs is not going to be registered as such. Clearly there is a value in forest tree

breeding material that isn't particularly amenable to protection under PBR or patents. Research organisations must recognise the value of such material, maintain appropriate inventories, and take appropriate steps to control its distribution.

There is a clear value in research organisations working cooperatively on breeding of species of mutual interest, and forest growers stand to gain through access to improved genotypes. Such exchanges and provision of material in most cases will need to be covered by agreements not involving PBR or patents. Such agreements can be bilateral or multilateral. The breeding cooperatives are longstanding examples of the latter. In addition to standard clauses, agreements need to include provisions regarding: (1) ownership of the genetic material and (2) basis for payment for access to material. Some obstacles associated with commercialisation of improved genetic material of forest tree species include the following:

- Genotype X Environment interactions are frequently important, to the extent that genotypes could not usually be sold into a new area without prior testing. Therefore agreements are required that permit the exchange of material for testing purposes. Such agreements would usually include clauses prohibiting commercial use, repropagation, distribution to third parties, etc.
- Many forest growers do not fully appreciate the advantage of using genetically improved planting stock and are reluctant to pay a margin for it that would reflect its true value. Acceptance of the payment of royalties for improved material, although common for horticultural species, is rare in forestry.

Computer Programs

Included here are programs for seed orchard designs, data entry and management, data analysis, growth models, etc. The value of these is frequently more easily appreciated to potential users, and protection and assignment more straightforward as they are usually covered by copyright legislation.

Technologies and Technological Systems

Inventions may be patented provided that they meet certain criteria:

- The mode of manufacture meets certain standards. Both processes and tangible products qualify.
- The subject of the patent is novel and inventive.
- The invention is useful.
- The invention has not been the subject of secret use.

Patents must be applied for, and there is a formal patent examination procedure. Once accepted, a patent application and detailed specification are published. If subsequently not successfully challenged, the award of a patent prohibits unauthorised copying or use of the invention for a specified period, following which the invention is in the public domain. Many processes and products in the area of forest biotechnology have been patented. Similarly, some areas of processing R&D are amenable to patent protection. Many of the technologies and systems developed by forestry R&D organisations, however, are

not candidates for patent protection and are more appropriately handled as confidential information.

Patents are costly to obtain, particularly if a range of countries is to be involved, and the costs of action against infringements are very high. Some hundreds of thousands of dollars over the life of the patent is the likely investment required for the minimum protection. Protection offered by patent legislation in some countries is notoriously weak.

Information and Data

Intellectual Property generated by forestry research organisations includes traditional experimental data on taxonomic performance, responses to silvicultural treatments, and so on. More recently, marker sequences and other data have become recognised as valuable products of biotechnology research. Legal instruments relating to the protection of such data include copyright and confidential information law.

Copyright

Unlike patents and PBR, rights associated with copyright are inherent and exist from the moment a work is created. There are no formal requirements to obtain copyright protection. The work must meet certain criteria concerning originality and so on. Works meeting these criteria are protected—the form in which the information is presented, but not the information itself. Copyright rests with the author until transferred to another party. In scientific publication, copyright frequently is assigned to the publisher. The owner of the copyright has exclusive rights to reproduce copies of the work, prepare derivative works based on the work, distribute the work, and to perform or display it. It does not restrict use of the ideas or information or the ideas expressed therein. Copyright legislation in several countries is under review, with the intention of better accommodating aspects of electronic communication (Samuelson 1996).

The credentials of a scientist most commonly are established by the number and quality of scientific publications. This introduces a fundamental conflict, in that safeguarding rights through patents or legislation pertaining to confidential information requires that the information has not entered the public domain.

Confidential Information

Common law provisions of many jurisdictions offer protection of undisclosed or secret information. Liability for breach of confidence requires that the information have certain qualities of confidence (e.g., is not already in the public domain), that the information have been imparted in circumstances importing an obligation of confidence, and that there have been an unauthorised use of the information to the detriment of the party communicating it. Information which is already in the public domain, or is communicated without an understanding of the obligation of confidence, is not protected.

It is essential then that R&D organisations undertake inventories of information they hold and determine what information should remain confidential and what can or ought to be in the public domain. Appropriate actions must be taken to ensure that “undisclosed information” is treated accordingly—through appropriate security measures, confidentiality agreements with staff, etc. Sharing of such information with other parties should be subject to appropriate agreements.

Commercialisation of Intellectual Property

Business arrangements that may be used to commercialise IP include the following:

- Sale of Intellectual Property rights, including:
 - sale of PBR and
 - sale of patent rights.
- In return for a negotiated payment, rights are transferred permanently to the purchaser, who then assumes full control over subsequent use.
- Licensing of Intellectual Property rights, which includes licensing of genetic material to a party who then uses it for commercial purposes. The licensor retains ownership, but the licensee is permitted to use the IP in return for license fees or royalties. Such fees can be fixed or based upon production levels. Depending on arrangements negotiated, the licensor may be free to license the rights to other agencies.
- Direct involvement in commercial production and marketing of a product. This can be done alone, or in joint venture arrangements with a partner or partners (frequently from industry). A common example is the involvement of research organisations in the production and marketing of genetically improved seed. Organisations similarly can be partners in the production and marketing of technologies or technological systems.

The above alternatives progressively involve longer term involvement of a research organisation in the commercialisation of IP, a higher level of “downstream” activity, and potentially higher returns in return for acceptance of a higher level of risk.

Implications for Research Managers

It is essential that modern research managers recognise the importance of information and its protection. It has been argued that current systems of IP rights are inadequate to cope with rapid technological changes (e.g., Thurow 1997). The difficulties in agreeing on international conventions, however, indicate that current systems will apply for the immediate future.

Issues that forestry research managers need to consider, and that are appropriate subjects for the sharing of opinions and experience at this workshop, include the following:

- **The question of ethics.** Management of Intellectual Property necessarily involves the balancing of two conflicting social objectives—the promotion of creative activity versus deployment of the benefits throughout society. IP legislation and conventions attempt to address this balance. Different societies will vary in their perception of where the balance should lie.

An extension of the ethical question concerns the rights of developing versus developed countries. This has been a subject of considerable discussion, with many authorities concerned that the former group is increasingly disadvantaged by the international trends with IP (The

Crucible Group, 1994). In many parts of the developing world, attitudes to IP are dictated by economic necessity and cultural factors.

There are several international conventions and agreements that are relevant and mostly in a state of flux. Apart from those mentioned above, these include the Convention on Biological Diversity and the International Undertaking on Plant Genetic Resources. There are many points on which agreement has not been reached, particularly those which related to developed versus developing countries. Research managers need to be aware of these conventions and the negotiations that are underway. Some research managers may be in a position to provide inputs to such negotiations.

- **Recognition of a public domain.** This is partly an ethical issue related to the above. It is frequently argued that, in the interests of expanding society's knowledge as rapidly as possible, certain classes of knowledge should be in the public domain. The Bellagio Declaration of 1993 also emphasizes the importance of the public domain as the "intellectual and cultural commons from which future works will be constructed" and suggests that each intellectual property right in effect fences off a portion of the public domain, making it available to future creators. Clearly it is in global and national interests for a balance to be maintained between public domain and proprietary rights. Apart from this broader ethical question, however, it is also in the interests of individual research organisations to share certain information through a public domain. The challenge for research managers then is to determine which of its IP should be in the public domain, and then to establish clear guidelines on release, bearing in mind that public disclosure precludes most legal protection.
- **Protocols for auditing and valuing Intellectual Property.** This involves the valuation of an organisation's own IP and that of potential partners. Most approaches to valuation rely on capitalisation of the estimated maintainable earnings or NPV of future cashflows deriving from net margins or royalties. Research managers need access to the required skills in valuation.
- **Sources of knowledge and skills in the management of IP.** Research managers need to ensure that they have access to appropriate legal advice in particular.
- **The extent to which an organisation should be involved in downstream commercialisation.** Research organisations generating IP have the options of selling the rights, entering into licensing agreements, or themselves becoming involved in its commercialisation. Research managers need to consider under which circumstances is each appropriate, and whether licensing should involve exclusive vs. non-exclusive relationships.
- **In-house approach versus bilateral versus multilateral alliances.** Research organisations electing to become involved in downstream commercialisation of IP need to consider:
 - the extent to which partnering is appropriate.
 - how to identify the right partners—those with complementary expertise and their assets. Can we make more use of brokering?

- how to identify partners to avoid.
- how to determine equity.
- which form of shared ownership to use:
 - joint ownership—equal undivided share—either party may exercise the rights granted but may not license.
 - tenants in common—each owns part share only, therefore cannot deal with the whole without the agreement of the other.
- management structures for partnerships.
- **Availability of standard agreements to cover access to IP.** The management of IP will be made simpler by access to models that can be used as frameworks. Managers need to consider:
 - the types of agreements required for their business.
 - how to handle international agreements—which jurisdiction?
 - how to protect IP in countries that are not signatories to the international conventions.
- **Promotion of the broader application of royalties in forestry.** The greater acceptance of the payment of royalties, e.g., for genetic improvement, will simplify management protocols for certain types of IP.

The above represent some of the issues that forestry research managers should consider when managing Intellectual Property. In many cases, there are no firm rules for determining the appropriate course. The right answer will vary with circumstance and be influenced also by organisational mandate and culture. Clearly, experience is a critical guide, and the opportunities for sharing of experience afforded by a workshop such as this are invaluable.

References

- McKeough, J. and Stewart, A. 1997. *Intellectual Property in Australia*. Butterworths, Sydney. 525 pp.
- Samuelson, P. 1996. *Intellectual Property Rights and the Global Information Economy*. Communications of the ACM, 39:23-28.
- The Crucible Group, 1994. *People, Plants and Patents*. International Development Research Centre, Ottawa, Canada. 117 pp.
- Thurrow, L.C. 1997. *Needed: A New System of Intellectual Property Rights*. Harvard Business Review, Sept-Oct 1997, p.95-103.