In this paper, we add our considerations to Miller’s analysis (this volume) of benefit-sharing and the impact of the Convention on Biological Diversity (CBD) on botanical research. However we will focus on the benefits arising from non-commercial research in botanical institutions rather than those from natural products discovery programs. We also reflect upon some lessons learned from ten years’ experience of using agreements and establishing models for equitable benefit-sharing at the Royal Botanic Gardens, Kew. Kew decided quite early on to take a proactive stance on the CBD, largely because the usefulness of its global collections to science and conservation is dependent on its ability to acquire, use and exchange material legally, in line with all relevant national and international laws and best practice. The adoption of Kew’s first Policy on Access to Genetic Resources and Benefit-Sharing (in 1997) was accompanied by significant changes to its research and curatorial practices, and we continue to review the policy and procedures and their effectiveness.

It is a good time to review the impact of the CBD, as several initiatives of particular significance for botanical research were adopted by the Conference of the Parties at its most recent meeting, in April 2002 in the Hague. Most notably these include the Bonn Guidelines on Access to Genetic Resources and Fair and Equitable Sharing of the Benefits Arising out of their Utilization, the Global Taxonomy Initiative, and the Global Strategy on Plant Conservation (Secretariat of the CBD, 2002a).

Types of benefits shared
Miller presents a matrix of benefit types, distinguishing long-term, short-term and public benefits, each of which might then be indirect or direct, monetary or non-monetary. In his discussion, ‘long-term’ benefits refer mainly to those benefits arising after a product’s successful commercial release, and so are less applicable to non-commercial research. Non-commercial botanical research (in fields such as taxonomy, genetics, physiology, anatomy, ecology, seed-banking and horticulture) has the potential to generate all of the ‘short-term’ benefits listed in Miller’s Table 1, as well as the public benefits of promoting research and
conservation. But we feel something is lost when applying this ‘long/short’ division to non-commercial botanical research. We agree with Miller’s conclusion that ‘short-term’ benefits are often overlooked and undervalued, but want to emphasise also that many leave an important legacy, such as those involving information transfer (for example repatriation of historical specimen data and images) and technology transfer (for example sharing technical expertise and know-how on seed-banking). Training and opportunities to develop formal and informal networks of colleagues and institutions may have particular long-term effect. As an example, Kew’s diploma courses for international specialists (places on which are often offered as part of a benefit-sharing package) have given rise to new in-country courses developed by former students (Hankamer et al., 2002). There is great potential for cross-links and developments between benefit types: shared research opportunities may lead to collaborative published products, such as floras and field guides, that may be in use for decades (and so arguably become a long-term benefit) and assist countries with national implementation of conservation goals (leading to public benefits). The Bonn Guidelines mention short, medium and long-term benefits when referring to commercial research, but go on to group benefits generally simply as monetary or non-monetary, and we feel this helps demonstrate how many important shareable benefits are non-monetary and can arise from non-commercial research.

**Has the CBD helped achieve more equitable benefit-sharing?**

We do not doubt that botanical institutions are increasingly more aware of their responsibilities, obligations and the potential for benefits to arise from their work, and are working on the challenge of the importance of sharing them effectively. Furthermore, countries of origin and stakeholders are becoming more aware of potential opportunities.

The CBD has prompted institutions to develop a number of voluntary codes of conduct and guidelines in order to build trust with governments and partners so that they can continue to acquire and exchange material, the basis of their vital research. Benefit-sharing is on the agenda, where it might not have been previously for non-commercial research in botanic gardens. For example, 28 institutions from 21 countries were involved in the Pilot Project for Botanic Gardens, which resulted in a set of ‘Principles on Access to Genetic Resources and Benefit-Sharing’ to harmonise and guide institutional policies, covering acquisition, use, curation, supply, commercialisation and benefit-sharing (see Latorre García, et al. 2001 and www.kew.org/conservation). More recently, a number of European botanic gardens have developed a Code of Conduct related to the Principles, and a system, the International Plant Exchange Network (or IPEN), that enables gardens signed up to the Code to continue
traditional non-commercial seed exchange (www.botanik.uni-bonn.de/system/index.html). This should prompt more gardens to consider their responsibilities and capacities to share benefits. Institutions in biodiversity-rich developing countries are also beginning to develop institutional policies, sometimes because of pressures from their governments to account for the terms under which they pass on national genetic resources (Laird & Wynberg, 2002), and this process helps to define needs and expectations.

Governments and institutions are increasingly using written agreements to set out expectations for benefit-sharing for non-commercial research. These may take the form of more complex collecting permits that spell out reporting obligations (or more complex terms and conditions), or material transfer agreements (for exchanges between botanic gardens or between institutions and countries of origin), or memoranda of understanding between institutions. Kew’s Millennium Seed Bank Project uses detailed Access and Benefit-sharing Agreements as the basis for setting out prior informed consent (PIC) and mutually agreed terms for its partnerships (Cheyne, 2003). For Kew work involving less sensitive material (e.g. dried herbarium specimens), simpler memoranda of understanding between institutions are used to clarify use and identify benefits. In a growing number of countries it may be difficult for biologists to gain permission for access without some evidence of collaboration with a local institution. Although these measures are generally recent developments, we believe institutional partnerships are invaluable for successful benefit-sharing over the long term as well as the short term. They provide an opportunity to identify interested colleagues, learn about other in-country stakeholders, find out what benefits are most needed, desirable and realistic, and to develop new projects.

**What has been the impact of the Convention on international botanical research?**
The Convention has had a significant impact on botanical research, beyond the scope of this short paper to explore fully. Undoubtedly there are more restrictions on access to, and use of material, and huge areas of uncertainty, which have lead to feelings of distrust and pessimism in the research community (see for example Revkin, 2002). For instance, many biologists would argue that they are spending more time and money on politics than biological research. Procedures for obtaining PIC from governments vary widely between countries and are sometimes non-existent, not transparent, or not designed for non-commercial academic research as Miller points out. Procedures for obtaining PIC from indigenous peoples and local communities are similarly unclear (Laird & Noejovich, 2002). We can only hope that governments will use the new Bonn Guidelines, take some heed of valid criticisms, and that strategies and legislation they develop will be clearer and more practical in future.
Researchers and institutions also need to be much clearer in return about how we use material and what benefits the research will generate and how they can be shared. This is a major challenge for institutions. It is one thing to obtain PIC for a particular project and negotiate mutually agreed terms, but we also need to think more broadly and further ahead to how collections will be used over the long term, back at the institution, and how to share benefits. At the moment, the majority of material in many gardens and herbaria probably pre-dates the entry into force of the CBD, but in 100 years far more material will have restrictive conditions. Terms need to travel around with material as it is used and exchanged, and a link to countries of origin for benefit-sharing needs to be maintained, which requires the development of efficient tracking systems (such as databases and data record systems), inter-institutional communication and staff training (Williams et al., 2003). If institutions can show that they are working hard to share benefits fairly and equitably and that they are not ‘leaky’, trust will be raised in their work and botanical research may be facilitated rather than impeded in the future.

The development of institutional policies and written agreements are leading to changes in how, and what, research is done. Investment in fairer partnerships over the longer term may mean that many institutions cannot work in or with as many countries. For instance, Kew’s policy on benefit-sharing and pressures on institutional resources mean that Kew’s research efforts are now focused on fewer countries, with an emphasis on longer-term, more substantial institutional relationships. This is mutually strengthening over the long term: partners benefit but so does Kew, as its reputation as a trustworthy institutional partner may help weather political change and facilitate and create future research collaborations.

The CBD is also turning some botanical institutions away from research with potential commercial applications, in part because of the cost of staff time and effort to oversee all aspects of such projects and the risk of costly missteps and damaging accusations of biopiracy. As well as a history of physic gardens supplying medicinal plants, botanic gardens have traditionally had intimate links with the horticulture industry (ten Kate, 1999) that are now being weakened or severed entirely. For instance, for the above reasons Kew at present does not supply any plants for potential horticulture trials, and the IPEN does not cover any commercial use or supply of plants in the system.

The CBD has fundamentally changed the idea of open access to material and also to associated information. This throws up a range of issues for institutions to consider. At Kew
we are working on how to honour both our responsibilities to particular partners and countries of origin arising from bilateral agreements and to the broader scientific and conservation community working on global and regional syntheses. We are learning that agreements need to consider the breadth of Kew’s activities, and also that we need to ensure that the wider relevance of these activities is understood by partners. For example, though we carefully guard germplasm collected under Millennium Seed Bank project agreements, its value is greatly decreased if the corresponding herbarium specimens, used to verify the seeds’ identity, are not made available to a range of taxonomic experts. In practical terms this requires that they be incorporated into the main Herbarium collection. Yet by making these specimens available to visitors, we run the small risk that they might on occasion be sampled without authorisation, or that information might be taken from labels without appropriate citation of the source country. If, while negotiating agreements, partners and governments understand the benefits as well as the risks involved, they can make informed and courageous rather than fearful or purely political decisions. It would be a tragedy for biological research if collections are locked down and roped off in future decades and centuries. What we need to ensure is that the biologists using them are from all parts of the world and working in fair - and enthusiastic - collaboration.

Institutions also receive, generate, use and share specimen information and images. The practice of providing free access (at no cost, under no legal agreements) for all non-commercial users is, on the one hand, being facilitated and accelerated by the rise of the internet. On the other hand, it is being challenged by both the increasing application of intellectual property protection (to prevent, for example, the mining and repackaging of databases) and changing CBD-related ideas about the rights of countries of origin and other stakeholders to control the flow of information relating to their genetic resources (Graves, 2002; Laird et al, 2002). Several recent and current projects are exploring how institutions should tackle access and intellectual property issues in the context of increased networking by collections (see for example Owens et al., 2003).

Botanical research has in return also had an impact on the recent development of the CBD. The adoption by the Conference of the Parties of the Global Strategy on Plant Conservation (GSPC) and the Global Taxonomy Initiative (GTI) are very positive steps which have arisen from the botanic garden and taxonomic research communities (Secretariat of the CBD, 2002b,c). The practical, target-oriented GSPC should produce clearer outcomes for plant conservation than previous CBD approaches. The GTI helps legitimise the work of taxonomists and remind policy makers that this non-commercial research and capacity is
fundamental for implementation of all of the CBD’s goals and must be facilitated. Botanical institutions are unlikely to receive funds directly from the CBD to implement the GSPC or the GTI, but their active involvement may help attract funds from other sources.

We wish to emphasise that we are just starting a long learning process in a rapidly changing environment, but we echo Miller in saying we believe the CBD is having a positive effect on research collaboration. For botanical institutions to be able to continue to contribute to the goals of conservation, sustainable use and fair and equitable benefit-sharing, it is vital to communicate clearly and honestly and work in fair and mindful partnership with countries of origin.

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References


