

DSI: reconciling genetic information exchange practices with expectations of benefit sharing

Reflections and potential solutions

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Why exchange genetic information?

- **CBD Art. 2:** "Biological diversity" means the variability among living organisms...; this includes diversity within species, between species and of ecosystems.
- Genetics is essentially a comparative discipline – aimed at finding and exploiting similarities and differences between genomes, gene sequences and gene expressions
- Larger datasets increase the probability of meaningful results
- Freely sharing data exponentially increases the value of the shared dataset for all users

Genetic information exchange: an (extremely) brief history

- In the beginning genetic data were scarce and very expensive
- Many users accessing the same data many times over lowered costs and increased value for all involved
- Technological advances exponentially reduced the cost of generating genetic information (<US\$1000/human genome)
- Exponential growth in computing power and connectivity (“big data”) vastly increased ability to access and interrogate huge genetic datasets
- Ready access to large public “baseline datasets”, combined with strong IP protection options, created incentives to keep valuable genetic information secret, or privately owned
- Extent of sharing vs privatisation remains unknown

Public science highly values open exchange

- Vast majority of submission received during DSI consultation process were from scientists arguing passionately for maintaining open access to public databases of genetic information – only consensus at AHTEG
- Publishing data is prerequisite for publishing research results
- Bilateral PIC and MAT model of ABS would drastically increase red tape and reduce public availability of genetic information, impacting:
 - Health
 - Food and agriculture
 - Biotechnology
 - Biodiversity science
 - Environmental management

“... benefits arising from the utilisation...”

- Parties to CBD and Nagoya have legitimate expectations of fair and equitable benefit sharing; for many developing countries this is their main reason (and domestic political justification) for being Parties
- “Utilisation means R&D on genetic and biochemical composition...”
- Initial scans to obtain genetic sequence data require physical access
- The bilateral PIC and MAT architecture of Nagoya means that conditional access is the only way of securing benefit sharing
- For this reason many countries (China, Brazil, Namibia...) already regulate access to genetic information in their national ABS laws
- Technology growth will increase this trend, unless solutions are found

On babies and bathwater

- Bilateral PIC and MAT model of ABS has already been acknowledged as unsuitable for sectors with high public goods potential:
 - Plant Genetic Resources for Food and Agriculture – proposal to extend multilateral system to all PGRFA
 - FAO CGRFA – persistent arguments for multilateral solutions
 - WHO PIP Framework – proposal to extend multilateral system to seasonal influenza; maybe all human pathogens
- Explosive growth in the use of digital genetic information is a disruptive technology in itself; combined with the rapid refinement of precision gene editing (CRISPR-Cas9 etc.) and the rise of synthetic biology is has the potential to rival the agricultural revolution for impact on human existence
- Dogmatic adherence to bilateral ABS can destroy this potential

Possible solutions

- Continuing current practices and asking providers to give up benefits: not politically feasible, never going to happen
- Continuing current practices and boosting provider capacity to benefit from open access: slow, expensive process unlikely to yield satisfactory outcomes within acceptable timeframes (although capacity development can be part of solution)
- Stricter use of PIC and MAT to control utilisation of genetic information by third-party users: worst of all possible outcomes, will slam on the brakes but probably be ineffective, causing resentments
- Acknowledging technological developments are makin bilateral PIC and MAT models of ABS obsolete, and negotiating (a) multilateral solution(s) in the spirit of the SDGs: what are we waiting for?