DSI SCIENTIFIC NETWORK

Understanding the use and provision of DSI

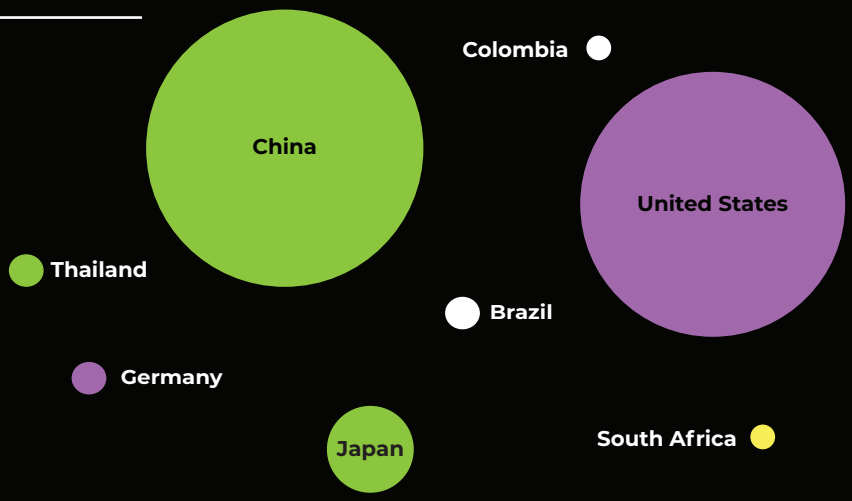
A multidirectional flow of information

Effective and equitable sharing of Digital Sequence Information (DSI)[1] between countries is crucial for researchers to generate knowledge to protect biodiversity, advance sustainable development goals and address public health challenges. Analysis of the global patterns of access and use of DSI in scientific publications shows that the provision and use of DSI is a multidirectional flow of information between all countries in the world. However, there are inequalities between countries in how much DSI is provided and used, which point to the need for capacity-building and development to fill knowledge gaps.

How much DSI do countries provide? [2]

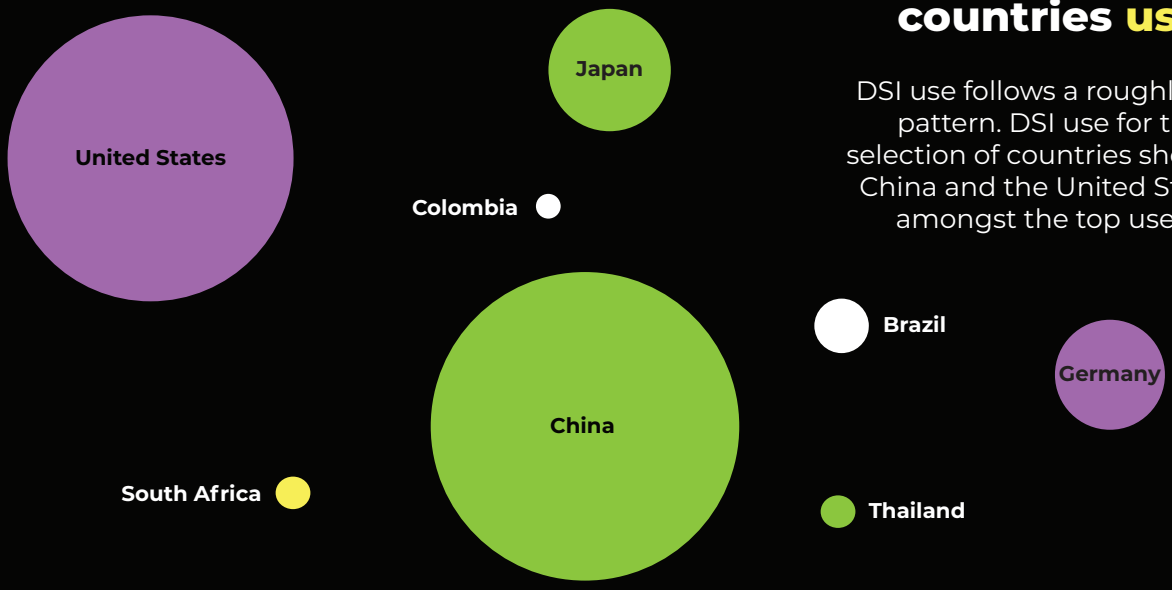
Nearly all countries contribute genetic resources from which DSI is produced, but not all contribute in equal measure to the global dataset.

On the right, a selection of countries that provide DSI in different proportions, including some of the largest providers of DSI: the United States and China.



How much DSI do countries use? [3]

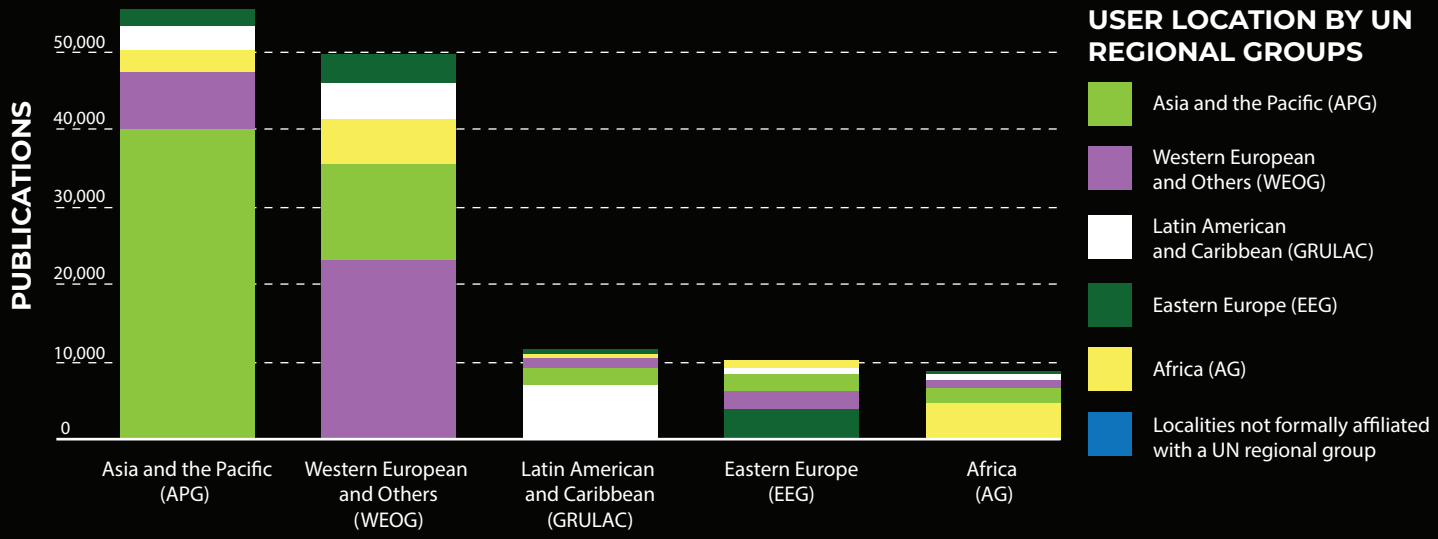
DSI use follows a roughly similar pattern. DSI use for the same selection of countries shows that China and the United States are amongst the top users of DSI globally.



In general, DSI provision and use seems to take place in roughly similar proportions, with countries who produce less DSI also using less data. [4] [7]

How is DSI provided and used across regions?

Researchers tend to use mostly "local" rather than "foreign" DSI. For example, the largest users of DSI provided by countries in the Latin American and Caribbean region are countries in this region. Similarly, DSI produced in Western Europe and North America is used predominantly by countries in this region. This means that while all countries are interdependent, researchers produce more publications with DSI that is sourced from their own country and region.



COUNTRIES OF ORIGIN FOR THE DSI [8]

DSI provided by countries in Western Europe, North America and the Asia-Pacific region is used three times more than DSI produced by other regions.

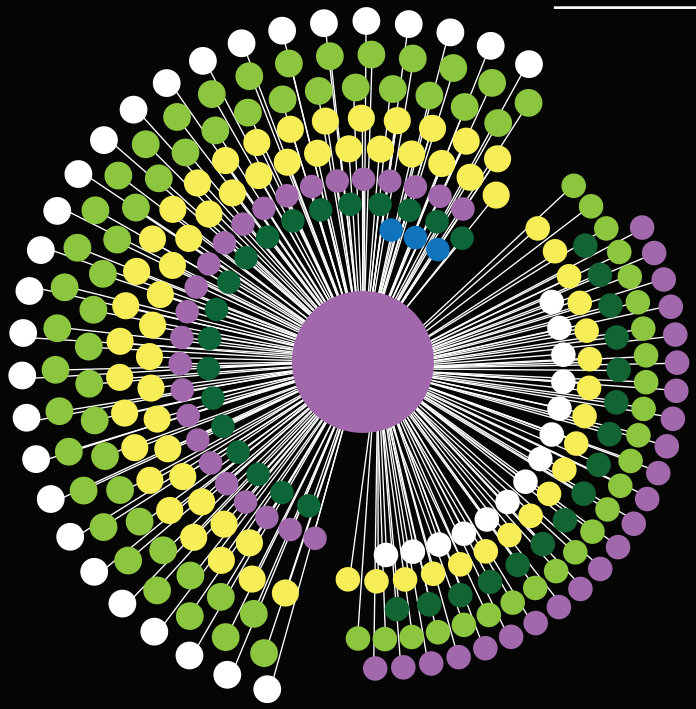
Overall, countries located in Latin America, Africa and Eastern Europe produce less DSI-related publications.

All countries use DSI from a variety of different countries and regional/ economic settings. Australia for example uses DSI from North America and Europe, as well as from Latin America and the Caribbean.

How is DSI provided and used between countries? [5]

Australia

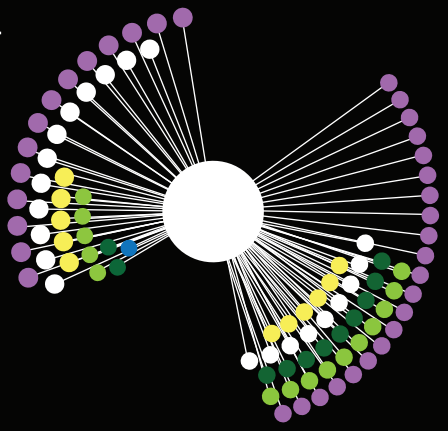
Australia provides DSI to **173 countries.**



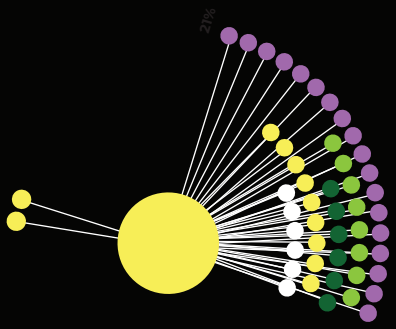
Australian scientists use DSI from **97 countries.**

Costa Rica

Costa Rica provides DSI to **39 countries**.



Costa Rican scientists use DSI from **55 countries.**



Gabon provides DSI to **2 countries**.

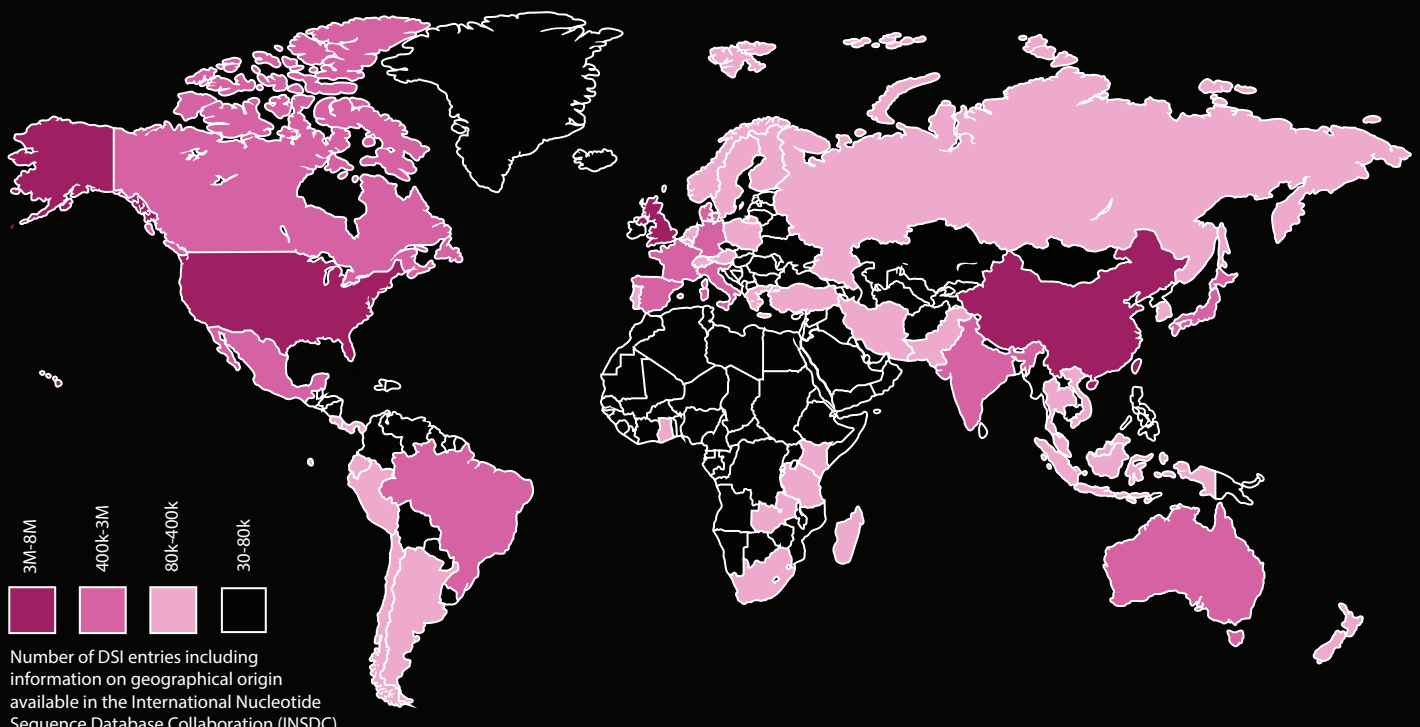
Scientists from Gabon use DSI from **47 countries.**

Gabon

Country-based patterns of DSI provision and use ultimately show no evidence of a unidirectional provider-user relationship between countries.

Mapping global DSI provision

A global analysis of DSI provision by country shows that while a lot of knowledge is generated for North America, Europe, China and Australia, we have limited data and information from parts of Africa, Latin America and Asia.



Number of DSI entries including information on geographical origin available in the International Nucleotide Sequence Database Collaboration (INSDC).

Building researchers' capacity to do more analysis and generate more DSI to "fill in the blanks" is key to our ability to benefit from DSI as a tool to protect biodiversity and human health.

Investing in DSI-related capacity-building and development is needed to increase the generation and use of DSI in low-and middle-income countries (LMICs)[6] across Latin America, Africa and Asia. This is crucial to address inequalities in global DSI provision and use. It would enable knowledge gaps to be filled, and positively impact our ability to conserve and protect biodiversity in these regions.

A system that enables effective and equitable sharing of DSI would benefit researchers worldwide – particularly those in low-and middle-income countries – and positively impact our ability to achieve the objectives set out in the Global Biodiversity Framework (GBF) and protect human health.

NOTES

1. Digital Sequence Information, or "DSI", is a policy term that refers broadly to genomic sequence data and other related digital biological data. This includes the details of an organism's DNA and RNA, which determine its characteristics and unique traits.
2. In this infographic, we use the term "provider" to indicate the country of origin of the genetic resource that originated the DSI. This does not reflect where the sequencing was done or the entity that made the research/ funding investment.
3. In this infographic, the term "user" is used to indicate the country location of the authors citing DSI in scientific literature publications.
4. The visuals on this page compare relative DSI use and provision by country compared to the total use and provision of DSI.
5. In this section, countries are represented by dots which are color-coded according to their UN regional group affiliation. Localities which are not formally affiliated with a UN regional group, such as Antarctica, are represented in blue. The same color-coding system is applied throughout this infographic.
6. Here we use the term LMICs to designate countries classified as low income, lower middle income and upper middle income according to the World Bank country classification by income level.

REFERENCES

7. WilDSI Data Portal. https://apex.ipk-gatersleben.de/apex/wildsi/r/wildsi/home. Accessed June 23, 2024
8. Scholz, A. H. et al. Myth-busting the provider-user relationship for digital sequence information, *GigaScience* (2021). https://doi.org/10.1093/gigascience/giab085

Norad

W i L D S I

This infographic was developed by the DSI Scientific Network in collaboration with the WiLDSI project, led by the Leibniz Institutes DSMZ and IPK Gatersleben, and the generous support of the Norwegian Agency for Development Cooperation (NORAD). The DSI Scientific Network is a global network of researchers speaking out for sensible policies on DSI. For more information, visit our website: www.dsiscientificnetwork.org.