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Item 11 of the provisional agenda*
Digital sequence information on genetic resources**

Executive summary of the study on contribution rates, including implications for revenue generation and economic competitiveness, and on national and international standards for the identification of small, medium and large entities

Note by the Secretariat

I. Introduction

1. In paragraph 1 of its decision [16/2](#), the Conference of the Parties to the Convention on Biological Diversity adopted the modalities for operationalizing the multilateral mechanism for the fair and equitable sharing of benefits from the use of digital sequence information on genetic resources, including a global fund, which, according to paragraph 2 of the decision, was to be called the Cali Fund for the Fair and Equitable Sharing of Benefits from the Use of Digital Sequence Information on Genetic Resources. The modalities were provided in the annex to the decision.
2. In paragraph 6 of the same decision, the Conference of the Parties requested the Executive Secretary, subject to the availability of resources, to commission a study on national and international standards for the identification of the small, medium and large entities referred to in paragraph 3 of the modalities annexed to the decision (para. 6 (d)) and a study on contribution rates, including implications for revenue generation and economic competitiveness (para. 6 (e)).
3. Paragraph 4 of the modalities provides that, in the light of these two studies, the Conference of the Parties will establish thresholds and contribution rates at its seventeenth meeting and review them periodically thereafter.
4. In order to support the preparation of the study on national and international standards for the identification of the small, medium and large entities, the Secretariat issued notification No. [2024-116](#), inviting Parties, other Governments, indigenous peoples and local communities and relevant organizations to submit information on such standards.
5. Given the interlinkages between the two subjects and the resources available, both requests were addressed in a single combined study. The present document contains the executive summary of the combined study. The full study is made available as an information document.

* [CBD/COP/17/1/Rev.1](#).

II. Methodology and limitations

A. Study methodology

6. The study examines only the contribution aspect of the Cali Fund mechanism, and, as such, aligns with the principles set out in paragraphs 9 and 10 of decision [15/9](#), as well as the objectives of the Cali Fund. The study does not take into account the allocation formula, distributional outcomes for recipients or non-monetary benefit-sharing, as these are addressed through separate intersessional processes; any interaction between contribution obligations and allocation is explicitly flagged where relevant.

7. The study is organized into three parts, each addressing a distinct element of the two mandates referred to in paragraph 2 of the present report, preceded by a review of the institutional and legal context and of comparable multilateral benefit-sharing mechanisms.

8. Part I, addressing paragraph 6 (d) of decision [16/2](#), draws on the submissions received in response to notification No. [2024-116](#), in which Parties, other Governments, indigenous peoples and local communities and relevant organizations were invited to share views on national and international standards for company size classification.

9. Part II, addressing the revenue generation dimension of paragraph 6 (e) of decision [16/2](#), draws on a working paper from the Grantham Research Institute on Climate Change and the Environment at the London School of Economics and Political Science,¹ which provides firm-level estimates of Cali Fund contributions for 21,690 eligible entities across 100 Convention on Biological Diversity Party jurisdictions, using the Orbis financial database.²

10. Part III, addressing the competitiveness dimension of paragraph 6 (e) of decision [16/2](#), draws primarily on peer-reviewed and grey literature and other submissions to the Convention, supported by a dedicated industry consultation of companies and industry association representatives operating in the seven sectors listed in enclosure I of the annex to decision [16/2](#) and in which large companies are expected to contribute to the Cali Fund, namely pharmaceuticals; nutraceuticals (food and health supplements); cosmetics; animal and plant breeding; biotechnology; laboratory equipment associated with the sequencing and use of digital sequence information on genetic resources, including reagents and supplies; and information, scientific and technical services related to digital sequence information on genetic resources, including artificial intelligence.

B. Limitations

11. Firm-level financial data of the kind required to apply the decision [16/2](#) thresholds are commercially sensitive and not publicly available at the global level, and no data-sharing arrangement between the Secretariat and Parties currently exists for this purpose. The revenue estimates in part II therefore rely on a single independent data source.

12. All estimates presented in the study are illustrative analytical scenarios developed to inform policy discussions; they are not forecasts or expected outcomes. Actual Cali Fund revenue will depend on the future decisions on thresholds and rates of the Conference of the Parties, subsequent national implementation measures, actual participation levels and the ways in which corporate behaviour evolves once the Cali Fund is fully operationalized.

13. Country-level breakdowns of these estimates should be read as indicative of the jurisdiction of firm registration rather than of the location of underlying commercial activity and are subject to further coverage caveats. The eligible population in sub-Saharan Africa, parts of Asia-Pacific and selected large economies from the Organisation for Economic Co-operation and Development is likely understated as a result of database coverage gaps in those regions, whose estimates should be

¹ Agata Makowska-Curran, *From Global Biodiversity Commitments to Local Action: Revenue Potential and Allocation Dynamics of the Cali Fund*, Working Paper No. 450 (June 2026).

² See www.moody.com/web/en/us/capabilities/company-reference-data/orbis.html.

treated as conservative lower bounds. Estimates for Canada and Switzerland are similarly understated, owing to incomplete coverage of unconsolidated accounts for large multinationals headquartered there, while the figure for the United Kingdom of Great Britain and Northern Ireland, which is sensitive to the inclusion of consolidated accounts, should be treated as an upper bound. Country-level estimates should accordingly be treated with more caution than the aggregate figure.

14. Decision [16/2](#) ties both eligibility and the contribution amount to financial metrics, namely assets, sales and profit, rather than to, for example, digital sequence information use itself. No data source currently exists to observe how much of a firm's financial activity is attributable to the use of digital sequence information on genetic resources. This is a limitation of the underlying data landscape rather than of any single study. In the absence of such a measure, the analysis in part II approximates the use of digital sequence information on genetic resources based on sector membership as defined in enclosure I of the annex to decision [16/2](#), combined with assumed participation rates and intensity of digital sequence information on genetic resources use; these are proxies for the use of digital sequence information on genetic resources, not measurements of it, and this distinction should be borne in mind in using the results as a basis for policy. As corporate disclosure requirements evolve and decision [16/2](#) is implemented, data availability on firm-level use of digital sequence information on genetic resources is likely to improve, which should reduce the estimation uncertainty reflected in the wide range of scenarios included in the study.

15. The sector mapping, based on standard industrial classification codes at the most granular level available, cannot clearly separate firms that are directly reliant on the use of digital sequence information on genetic resources from adjacent segments within the same code. Two calibration parameters in the central scenario draw on evidence external to the Cali Fund itself. The participation rate assumptions are calibrated from literature on comparable voluntary environmental and benefit-sharing schemes, since no scheme with the specific design features of the Cali Fund has been observed to date. The intensity of digital sequence information on genetic resources use multipliers, by contrast, are calibrated from sector-level literature only. The intensity of digital sequence information on genetic resources use adjustment is accordingly the most uncertain parameter in the analysis, and this uncertainty is reflected in the width of the scenario range presented in part II. Parties may wish to consider whether these multipliers should be revisited as firm-level or survey-based evidence on use of digital sequence information on genetic resources becomes available.

16. Because the Cali Fund is not yet generating contributions, no participation behaviour can be directly observed. The competitiveness assessment in part III is accordingly prospective, combining structured expert judgment with quantitative anchors from part II where data permit.

17. Several further design parameters in decision [16/2](#) that bear on both revenue and competitiveness outcomes remain unresolved; these are catalogued in section III.B below and reflected throughout the scenario ranges presented in parts II and III, rather than resolved by assumption.

III. Background and context

18. The Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from Their Utilization and other bilateral approaches, designed primarily for tangible genetic resources, raised practical challenges when considered for digital sequence information on genetic resources, given the scale and speed at which sequence data are generated, shared and reused through open-access repositories.³ Furthermore, establishing a multilateral mechanism reflected the collective objective of addressing long-standing equity concerns raised by biodiversity-rich provider countries regarding benefit-sharing from the use of digital sequence information on genetic resources, and of strengthening implementation of the third objective of the Convention on the fair and equitable sharing of benefits. At its fifteenth meeting, the Conference of

³ Bruna Gomes Maia and Sacha Bourgeois-Gironde, "Analysis of the Working Group's recommendations and COP-16 decision 16/2 on digital sequence information", *Global Policy*, vol. 16, No. 4 (September 2025), pp. 751–761.

the Parties adopted decision [15/9](#), in which it established the multilateral mechanism for the fair and equitable sharing of benefits from the use of digital sequence information on genetic resources. At its sixteenth meeting, the Conference of the Parties adopted decision [16/2](#), in which it set out the practical modalities for the mechanism, including the Cali Fund, which was to be administered by the Multi-Partner Trust Fund Office of the United Nations.⁴ The Fund was inaugurated in February 2025. Under the indicative parameters in the annex to decision [16/2](#), entities that exceed at least two of three financial thresholds (total assets of \$20 million, sales of \$50 million and profit of \$5 million, each averaged over the past three years) and operate in one of the seven sectors listed in enclosure I of the annex, and that directly or indirectly benefit from the use of digital sequence information on genetic resources, are expected to contribute 1 per cent of profit or 0.1 per cent of revenue. Contributing entities receive a certificate exempting them from further monetary benefit-sharing expectations for that year. At least 50 per cent of the benefits distributed through the mechanism are earmarked for the self-identified needs of indigenous peoples and local communities.

A. Comparable benefit-sharing mechanisms

19. The study contains a review of four analogous mechanisms, examining how contribution rates are set, the revenue each has generated and the factors shaping compliance:

(a) International Treaty on Plant Genetic Resources for Food and Agriculture,⁵ whose Standard Material Transfer Agreement⁶ charges an effective rate of about 0.77 per cent of sales from commercialized products, has generated \$824,680 in user-based payments over the past 15 years,⁷ reflecting the narrower, commercialization-triggered payment obligation under the Transfer Agreement and the availability and attractiveness of sourcing material outside the Multilateral System of Access and Benefit-Sharing; this experience underpins the lower bound of the revenue scenarios in part II;

(b) World Health Organization (WHO) Pandemic Influenza Preparedness Framework,⁸ which has generated substantially higher participation (\$354.7 million from 17 manufacturers since 2012)⁹ owing to a clearly defined, well-identified contributor base,¹⁰ and its successor, the WHO Pandemic Agreement,¹¹ whose Pathogen Access and Benefit-Sharing System¹² could create overlapping obligations for firms also subject to the Cali Fund, examined further in part III;

(c) Agreement under the United Nations Convention on the Law of the Sea on the Conservation and Sustainable Use of Marine Biological Diversity of Areas beyond National Jurisdiction,¹³ in force since 17 January 2026, establishes a framework for future rule-making rather than an operational payment system for private users, with allocation of monetary benefits from marine genetic resources and digital sequence information on genetic resources left to future decisions of the Conference of the Parties to the Agreement;

⁴ See <https://mptf.undp.org/>.

⁵ See www.fao.org/plant-treaty/en.

⁶ See www.fao.org/plant-treaty/areas-of-work/the-multilateral-system/smta/en/.

⁷ Resolution 3/2025, on the implementation of the Funding Strategy of the International Treaty 2020–2027, adopted in December 2025 by the Governing Body of the International Treaty.

⁸ See www.who.int/initiatives/pandemic-influenza-preparedness-framework.

⁹ WHO, “PIP partnership contributions (2012–2025)”. Available at https://cdn.who.int/media/docs/default-source/PIP-framework/partnership-contribution/pc-collection/pc-total-contributions.pdf?sfvrsn=ce1eb4d1_8 (accessed in May 2026).

¹⁰ Michelle F. Rourke, “Access by design, benefits if convenient: a closer look at the Pandemic Influenza Preparedness Framework’s Standard Material Transfer Agreements”, *The Milbank Quarterly*, vol. 97, No. 1 (March 2019), pp. 91–112; and Anne Huvos, Steven A. Solomon and Claudia Nannini, “The Pandemic Influenza Preparedness Framework as an access and benefit sharing mechanism”, in *Viral Sovereignty and Technology Transfer: The Changing Global System for Sharing Pathogens for Public Health Research*, Rebecca Katz and Sam F. Halabi, eds. (Cambridge University Press, 2020), pp. 193–204.

¹¹ See www.who.int/health-topics/who-pandemic-agreement#tab=tab_1.

¹² See the annex to the WHO Pandemic Agreement.

¹³ A/CONF.232/2023/4.

(d) Mechanism for the sharing of benefits from deep seabed mining of the International Seabed Authority,¹⁴ still under negotiation, informed by a technical report on tiered ad valorem¹⁵ that was commissioned by the Authority, illustrates a wider finding that ad valorem schemes are easier to enforce than profit-based ones, even if they capture less value over time,¹⁶ with the lesson for the Cali Fund being that contribution levels must be weighed against ease of measurement and risk of avoidance.

20. Across these mechanisms, private sector contributions materialize only where scope and use definitions are clear. Unlike the International Treaty on Plant Genetic Resources for Food and Agriculture and the Pandemic Influenza Preparedness Framework, the Cali Fund has no comparable public sector fallback to offset shortfalls in user-based income,¹⁷ making the mobilization of private sector contributions more central to its financial viability than in any of the mechanisms reviewed.

B. Analytical framework: unresolved design parameters

21. The study catalogues nine structural uncertainties in decision [16/2](#), spanning the three stages of the contribution decision, namely whether a firm is eligible, whether an eligible firm participates and how much a participating firm ultimately contributes:

- (a) Structural uncertainties regarding eligibility are:
 - (i) Breadth of the sector list, since a narrower interpretation of which industrial activities directly or indirectly benefit from the use of digital sequence information on genetic resources would reduce the eligible population;
 - (ii) Volatility in eligibility over time, as firms move across the financial thresholds from one year to the next;
 - (iii) Entity-level unit of assessment, namely whether thresholds and contributions are assessed at the subsidiary or the corporate group level, which affects both the number of eligible entities and the amount each contributes;
 - (iv) Boundary between direct and indirect use of digital sequence information, where a broader interpretation would expand the eligible population but would create the risk of double-counting firms across a value chain;
- (b) Structural uncertainties regarding participation and contribution amount are:
 - (i) Information asymmetry, since eligible firms may not self-identify and non-participation cannot be verified;
 - (ii) Legal and regulatory value of the certificate of contribution, where a low value reduces the incentive to participate;
 - (iii) Obligation stacking with other international instruments, identified in submissions to notification No. [2024-114](#) as the most frequently cited barrier to participation;

¹⁴ See <https://isa.org/jm/equitable-sharing-of-benefits/>.

¹⁵ Randolph Kirchain and others, *Report to the International Seabed Authority on the Development of an Economic Model and System of Payments for the Exploitation of Polymetallic Nodules in the Area*, Massachusetts Institute of Technology, Materials Systems Laboratory, 2019.

¹⁶ Kris Van Nijen and others, "The development of a payment regime for deep sea mining activities in the Area through stakeholder participation", *The International Journal of Marine and Coastal Law*, vol. 34, No. 4 (2019), pp. 571–601; and Torsten Thiele, H. P. Damian and Pradeep Singh, "A comprehensive approach to the payment mechanism for deep seabed mining", Institute for Advanced Sustainability Studies, Policy Brief No. 1/2021, January 2021.

¹⁷ In paragraph 16 of the annex to decision [16/2](#), the Conference of the Parties also encourages contributions additional to those provided by commercial users of digital sequence information identified in paragraph 3 of the annex, which could include potential public sector contributions, although no such commitments had been made at the time of writing the full report.

- (iv) Divergence in how Parties implement the mechanism nationally, which could either increase participation through domestic incentive measures or create cross-border asymmetries;
- (v) Cali Fund allocation formula, which may affect participation incentives if contributors perceive the distribution of benefits as unfair.

22. None of these nine uncertainties are expected to raise the revenue of the Cali Fund above the theoretical full-compliance maximum. Full compliance is accordingly best read as a ceiling rather than a central estimate.

IV. Summary of findings

A. Eligibility thresholds

23. Submissions to notification No. [2024-116](#) showed broad support for reliance on existing international frameworks over a tailored Convention on Biological Diversity system, as well as a preference for financial thresholds over employee-based thresholds, on the grounds that ability to pay is the relevant metric for a financial contribution. Several Parties considered that company size could not be defined uniformly across sectors, while private sector observers warned against rigid definitions capturing firms with only indirect dependence on digital sequence information on genetic resources, and non-governmental and academic observers favoured activity-based criteria, such as value derived from digital sequence information on genetic resources. In their submissions, both Parties and observers consistently called for the protection of small and medium-sized enterprises from disproportionate burdens.

24. Benchmarked against the frameworks of Brazil, China, India, Japan, the United States of America, the European Union, the International Finance Corporation of the World Bank Group and the Organisation for Economic Co-operation and Development, decision [16/2](#) thresholds broadly correspond to the criteria for large enterprises, although with notable differences: the assets threshold of \$20 million falls below the European Union medium-sized enterprise balance sheet ceiling of approximately \$50 million; some firms classified as medium-sized under Indian and Chinese legislation would fall within the scope of the Cali Fund; and, unlike almost all frameworks reviewed, the Cali Fund includes no employee criterion. The profit criterion has no direct parallel among the frameworks reviewed. Unlike the frameworks of the United States and the European Union, the current design includes no ownership or affiliation condition, raising a question as to whether the entity-level definition is sufficiently robust against potential restructuring intended to isolate activity related to digital sequence information on genetic resources into smaller reporting entities.

25. Seven design options are identified for consideration by the Conference of the Parties, without a recommendation among them:

- (a) Supplementing the current thresholds with an explicit exemption for small and medium-sized enterprises or a reduced-contribution tier drawn from an existing framework;
- (b) Revisiting the profit criterion, for example by using a profit margin rather than an absolute amount, while noting that it is also a performance metric rather than a size metric and is subject to earnings management and cyclical volatility in ways that revenue and assets are not;
- (c) Calibrating the thresholds to reflect structural differences across Parties, whether by sector or by national firm size distribution, given differences in firm size distribution and sectoral composition; sector adjustment might be more clearly justified for pharmaceuticals, given that sector's materially higher financial metric;
- (d) Introducing ownership or affiliation conditions comparable to those in the frameworks of the United States and the European Union;

(e) Introducing an employee count criterion, alone or alongside the current financial thresholds, which would align the design of the Cali Fund with that of most other frameworks reviewed and ease domestic estimation of exposure by Parties, although this was not raised in Party submissions;

(f) Considering periodic revision of the thresholds, comparable to the practice under Directive 2013/34/EU of the European Parliament and of the Council of 26 June 2013 on the annual financial statements, consolidated financial statements and related reports of certain types of undertakings, whereby article 3 (13) empowers the European Commission to revise the monetary size thresholds by means of delegated acts at least every five years to reflect inflation; this could inform an indexed approach rather than a fixed-United States dollar approach to the thresholds;

(g) Considering transition arrangements, such as a phase-in period or a reduced initial rate, for firms newly meeting the eligibility thresholds or with historically low intensity of digital sequence information on genetic resources use, to ease the administrative and financial adjustment to first-time contribution.

B. Revenue potential and contribution structure

26. Full compliance by all 21,690 eligible entities identified would generate approximately \$3.65 billion per year. Once sector-level participation, ownership structure and intensity of digital sequence information on genetic resources use are taken into account, the central estimate falls to \$929 million per year, representing about one quarter of the full-compliance figure. An uncertainty-adjusted range, informed by the depressed payment ratio observed under the user-based system of the International Treaty on Plant Genetic Resources for Food and Agriculture, spans from approximately \$5 million to \$929 million per year at the same indicative rates, a range determined by unresolved design features rather than the rate level itself. The table below sets out the revenue estimates by scenario.

27. These estimates are drawn from the best available evidence, but because no voluntary scheme with the specific design features of the Cali Fund has been observed, the participation assumptions behind them are necessarily calibrated from other contexts, including the analogous mechanisms reviewed in section III.A above, rather than from the Fund itself. The range in the table should accordingly be read as the plausible bounds implied by that evidence, not as a forecast of the amount that the Fund will raise.

Estimated annual contributions and net present value projections

<i>Scenario</i>	<i>Annual mean^a</i>	<i>Fifth percentile to ninety-fifth percentile range</i>	<i>Percentage of scenario 0</i>	<i>Net present value to 2030^{a,b}</i>	<i>Net present value to 2035^{a,b}</i>
Scenario 0. Full participation	3.65	n/a	100.0	17.2	32.0
Scenario 1. Sector variation	1.16	0.81–1.53	31.9	5.5	10.2
Scenario 2. Sector and firm variation	1.20	0.83–1.60	33.0	5.7	10.6
Scenario 3. Digital sequence information adjustment (central)	0.93	0.59–1.30	25.5	4.4	8.2

<i>Scenario</i>	<i>Annual mean^a</i>	<i>Fifth percentile to ninety-fifth percentile range</i>	<i>Percentage of scenario 0</i>	<i>Net present value to 2030^{a,b}</i>	<i>Net present value to 2035^{a,b}</i>
Scenario 4. Progressive uptake ^c	n/a	n/a	n/a	1.3	4.3

Source: Agata Makowska-Curran, *From Global Biodiversity Commitments to Local Action: Revenue Potential and Allocation Dynamics of the Cali Fund*, Working Paper No. 450 (Grantham Research Institute on Climate Change and the Environment at the London School of Economics and Political Science, June 2026).

Abbreviation: n/a, not applicable.

^a Billions of United States dollars.

^b Net present value at 3 per cent discount rate.

^c Scenario 4 applies a participation scalar rising linearly from 10 per cent of scenario 3 rates in 2026 to 100 per cent by 2035.

28. Revenue modelled under the scenarios is highly concentrated. Pharmaceuticals and information and artificial intelligence services together account for roughly half of full-compliance contributions, despite representing only 40 per cent of eligible firms; under realistic participation assumptions, pharmaceutical firms alone account for 49.6 per cent of contributions, owing to relatively high participation, high intensity of digital sequence information on genetic resources use and a stable revenue base of payers, while information and artificial intelligence falls to 11.1 per cent. At the firm level, the 10 largest contributors account for 8.6 to 12.2 per cent of total contributions, depending on the participation scenario. Geographically, the 10 largest contributing jurisdictions account for an estimated 74 per cent of central-scenario revenue, with China alone representing 26.6 per cent; these figures reflect the jurisdiction of firm registration and should be read as indicative. This concentration reflects current patterns in the use of digital sequence information on genetic resources across the seven sectors listed in enclosure I of the annex to decision [16/2](#), in the industrial activity across jurisdictions and in the assumptions and data underlying this analysis; it is not a predetermined or permanent feature of the mechanism. As use of digital sequence information on genetic resources expands in emerging fields, such as artificial intelligence and synthetic biology, and as national implementation measures and participation evolve following decisions adopted by the Conference of the Parties at its seventeenth meeting, the sectoral and jurisdictional composition of Cali Fund contributions may shift over time.

29. Threshold sensitivity testing shows that revenue responds far less to eligibility calibration than to participation: doubling all three thresholds would exclude 43.5 per cent of eligible firms but reduce contributions by only 7.4 per cent, while halving them would more than double the eligible population (by adding 14,317 eligible firms) but raise contributions by only 5.5 per cent, reflecting the high concentration of contributions among the largest firms regardless of where the threshold is set. The minimum-of-two contribution rule of the Cali Fund, which allows firms to pay on whichever base is lower, protects contributors from volatility at a substantial revenue cost: replacing it with either a pure revenue levy or a pure profit levy would roughly double full-compliance revenue. The timing of participation compounds these effects: cumulative net present value to 2035 ranges from \$4.3 billion under fast uptake to \$150 million under an uptake path consistent with that of the first decade of the International Treaty on Plant Genetic Resources for Food and Agriculture, for an identical theoretical ceiling.

30. Five implications follow from these results, presented as consequences of the design choices before the Conference of the Parties, rather than as recommendations:

- (a) Participation, not the rate level, is found to be the binding constraint on revenue;
- (b) Threshold design functions primarily as a governance and inclusivity decision rather than as a financial one, as neither lowering nor raising the thresholds proportionately raises or reduces

revenue, respectively, given the high concentration of contributions among the largest firms regardless of where the threshold is set;

(c) Rate- and contribution-base design determines who pays and how stable the contributions are,¹⁸ rather than only how much is raised; the minimum-of-two rule protects firms from whichever base would otherwise be costlier for them, but at a substantial revenue cost;

(d) Participation of the pharmaceutical sector is found to be the most significant determinant of both the level and the predictability of Cali Fund revenue under the modelled scenarios;

(e) Geographic concentration in country-level estimates, which are indicative of and subject to data limitations discussed in the main report, suggests that the early performance of the Cali Fund may depend disproportionately on the engagement of a small number of jurisdictions; this makes activities that support participation in those jurisdictions, including resolving the identified uncertainties, particularly consequential to whether the mechanism achieves meaningful revenue in its early years.

C. Competitiveness implications

31. At the indicative rates established in decision [16/2](#), the direct cost burden on eligible firms is modest relative to sector margins across all seven sectors listed in enclosure I of the annex to the decision and is unlikely to generate material cost and price competitiveness effects for most firm types. The principal competitive finding is structural rather than cost driven: the asymmetry between firms headquartered in Party jurisdictions and rivals headquartered in the United States that may face no equivalent obligation, which registers as a high-materiality risk for the most globally active firm types in five of the seven sectors and cannot be resolved through rate adjustment alone, since it is a function of scope rather than rate.

32. The pharmaceuticals sector (3,401 eligible firms; 49.6 per cent of central-scenario contributions), under the modelling scenarios, outperforms every other sector on revenue, assets and profit margin, with a median margin of 10.2 per cent and just over half of eligible firms likely paying on the more stable revenue base. Innovator and vaccine-producing firms retain some pricing power, in particular in the United States, although the evidence on how far a revenue-based contribution would affect research and development spending is weak. The sector's principal additional competitiveness exposure, beyond the non-Party asymmetry described in paragraph 31 above, is the potential overlap with the WHO Pathogen Access and Benefit-Sharing System for vaccine and biopharmaceutical producers.

33. Biotechnology (3,709 firms; 19.2 per cent) shows considerably greater internal variation than pharmaceuticals, with a median margin of 7 per cent and a substantial share of loss-making or near-zero-margin firms whose financial profile is consistent with early-stage, equity-funded ventures. Biopharmaceutical innovators face development costs and failure risk comparable to that of pharmaceutical innovators, which makes regulatory and rate-trajectory uncertainty a material concern for this subgroup in particular.

34. Information and artificial intelligence services (5,217 firms, the largest eligible population of any sector) contribute only 11.1 per cent of central-scenario revenue, down from 25.2 per cent under the full-compliance scenario, the largest such decline of any sector, and record the highest zero-contributor share. The sector's upper segment, cloud and data infrastructure supporting genomics workflows, is dominated by three providers headquartered in the United States controlling an estimated 63 per cent of the global market, giving this sector the highest non-Party competitive asymmetry of any sector listed in enclosure I of the annex to decision [16/2](#). The data available for

¹⁸ The mechanism works as follows: because firms likely pay on whichever base yields less, a firm's profit margin relative to the 10 per cent indifference point set by the two rates determines whether it pays on the more stable revenue base or the more volatile profit base; changing only one rate shifts firms between bases, while proportional changes to both leave the contributor group and its stability unchanged.

this sector also give rise to significant uncertainty over what constitutes activity derived from digital sequence information on genetic resources for eligibility purposes.

35. Animal and plant breeding (4,256 firms; 6.8 per cent) records the widest interquartile range in profitability of any sector, from 0.5 to 17.8 per cent, meaning aggregate figures are less representative of individual firm experience in this sector than in others. Plant breeding for major field crops is highly concentrated, with the five largest global companies capturing an estimated 42.5 per cent of the market, and the sector faces potential future obligation-stacking with the International Treaty on Plant Genetic Resources for Food and Agriculture, which governs many of the same crop species.

36. Laboratory equipment (2,846 firms; 5.0 per cent) competes through integrated platforms combining hardware, consumables and service contracts rather than one-time equipment sales, and sits closer to the 10 per cent revenue and profit indifference threshold than any other profit-base sector, meaning that a meaningful share of firms could pay on either base. Sequencing and molecular-platform firms within the sector are the most clearly identifiable direct users of digital sequence information on genetic resources and carry the clearest eligibility case; the sector as a whole is highly concentrated, with corresponding margin pressure on smaller remaining competitors.

37. Nutraceuticals (1,513 firms; 4.7 per cent) has the lowest median margin of any sector, at 4 per cent, so virtually all eligible firms pay on profit, and the proportionality concern, namely that firms contribute on an all-in financial base regardless of the intensity of digital sequence information on genetic resources use, is especially acute here. Dependence on digital sequence information on genetic resources varies considerably within the sector; botanical and probiotic or microbial supplement producers are the most clearly identifiable direct users of digital sequence information on genetic resources, while the broader functional foods segment is more weakly linked to the use of digital sequence information on genetic resources.

38. Cosmetics (748 firms, the smallest of the seven sectors) contributes 3.7 per cent of central-scenario revenue and records the highest effective contribution rate relative to sector size of any sector listed in enclosure I of the annex to decision [16/2](#). The sector divides into downstream branded firms, which compete on regulatory compliance and brand rather than sequence-based innovation, and upstream active-ingredient developers drawing on plant, marine or microbial sources; the proportionality concern is particularly acute here given contested views on how directly digital sequence information on genetic resources is used across this value chain.

39. Five implications follow from the sector-by-sector assessment:

(a) Proportionality concern is the highest material design-level risk for firm types with indirect or limited dependence on digital sequence information on genetic resources; narrowing the definition of indirect use, or fixing a single point of contribution liability within the value chain, would reduce the risk of the same use of digital sequence information on genetic resources being captured at more than one stage;

(b) Unresolved design parameters generate regulatory uncertainty that is analytically distinct from, and in several sectors more consequential than, the direct cost burden;

(c) Non-binding design limits the most severe outcomes for financially marginal firms but creates a participation asymmetry among peers headquartered in Party jurisdictions;

(d) Competitive exposure varies substantially by sector;

(e) Private sector engagement ahead of the seventeenth meeting of the Conference of the Parties could accordingly benefit from a sector-specific approach.

V. Conclusions

40. The present report provides an examination of the Cali Fund across three dimensions: eligibility and threshold design, revenue potential under alternative participation and design

scenarios, and competitiveness implications for eligible firms across all seven indicative sectors listed in enclosure I of the annex to decision [16/2](#). The findings on contribution rates and competitiveness should be read alongside the broader context underpinning the mechanism, which reflects a negotiated balance between open access to digital sequence information on genetic resources and fair and equitable benefit-sharing.

41. On eligibility and threshold design, the current thresholds, as spelled out in paragraph 3 of the annex to decision [16/2](#), broadly align with criteria for large enterprises across most reference frameworks, although the assets threshold falls below the medium-sized enterprise ceiling of the European Union and the absence of an employee criterion and of affiliation conditions diverges from almost all frameworks reviewed. Three design issues are of potential relevance to the Conference of the Parties: the absence of an explicit exemption for small and medium-sized enterprises or of a reduced-contribution tier; the absence of affiliation conditions, which implies that the entity-level design is potentially affected by corporate restructuring; and the tension between a uniform threshold structure and the significant financial differences across sectors listed in enclosure I of the annex to decision [16/2](#), which are most pronounced for pharmaceuticals. In terms of future work, one possible avenue is to undertake further work on these design issues; alternatively, and taking into account that reference frameworks reflect national or regional circumstances, the Conference of the Parties could simply recognize such frameworks and decide that they should guide the decision as to whether to participate in the Cali Fund.

42. On revenue potential, it was found that, under the modelled scenarios, the scale of the Cali Fund is significantly more sensitive to participation than to the calibration of the actual rates. Participation is also the main binding constraint: the operational value of the certificate of contribution, the level of clarity regarding the scope of the contributions, and how the issue of obligation stacking is resolved will determine how many firms contribute at all, while the indicative rate level will only determine how much each participating firm pays, rather than its decision to participate. Threshold design has important governance implications for Fund revenue while also influencing participation and administrative efficiency. Participation of the pharmaceutical sector is the most significant determinant of Fund revenue projected under realistic participation scenarios. However, these findings remain conditional on the assumptions underpinning the scenario analysis, in particular the sector-specific assumed participation rates, calibration of the intensity of digital sequence information on genetic resources use and firms' contribution behaviour, which vary across the seven indicative sectors listed in enclosure I of the annex to decision [16/2](#) rather than being assumed uniform.

43. On competitiveness, the direct cost burden on eligible firms is modest relative to sector margins at indicative rates. The dominant competitive risk is the potential structural asymmetry with non-Party competitors, which is permanent under the current design and most acute for the globally active, research-intensive firm types that also account for the largest share of Cali Fund revenue. The proportionality concern, where firms contribute on the same financial base regardless of the intensity of digital sequence information on genetic resources use, is the most acute design-level competitive risk for sectors with indirect or limited dependence on digital sequence information on genetic resources. The non-binding design of the mechanism is both its most important protective feature and its most significant constraint: it limits severe outcomes for financially marginal firms while creating the participation dynamics that determine whether the Fund achieves meaningful scale.

44. Several design parameters remain to be refined ahead of the seventeenth meeting of the Conference of the Parties and will materially shape both the revenue potential and the competitive implications of the mechanism: the potential rate revision, the legal value of the certificate of contribution, the resolution of potential obligation stacking with the WHO Pathogen Access and Benefit-Sharing System and the International Treaty on Plant Genetic Resources for Food and Agriculture, the entity-level unit of assessment, and the direct-versus-indirect use boundary for sectors whose eligibility rests on indirect benefit from the use of digital sequence information on genetic resources. Since participation is found to be the binding constraint on revenue under the

modelled scenarios, how these parameters are resolved may determine not only how much the Cali Fund raises but also whether the incentives for private entities to participate are strong enough to raise it in a way that is perceived as equitable and predictable.
