



Convention on Biological Diversity

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CONFERENCE OF THE PARTIES TO THE CONVENTION
ON BIOLOGICAL DIVERSITY SERVING AS THE
MEETING OF THE PARTIES TO THE CARTAGENA
PROTOCOL ON BIOSAFETY

Tenth meeting

Kunming, China, 11-15 October 2021

and dates to be confirmed

Agenda item 15

SYNTHESIS OF INFORMATION ON DETECTION AND IDENTIFICATION OF LIVING MODIFIED ORGANISMS

Note by the Executive Secretary

I. INTRODUCTION

1. In decision [CP-9/11](#), paragraph 5, the Conference of the Parties serving as the meeting of the Parties to the Cartagena Protocol on Biosafety invited Parties to submit to the Executive Secretary information on:

(a) Their capacities and needs with regard to detection and identification of living modified organisms (LMOs);

(b) A list of laboratories, including information on the specific activities carried out by such laboratories.

2. In response to the above-mentioned decision, the Executive Secretary issued notification [2019-062](#),¹ inviting Parties to submit information by completing an online survey to provide an overview of their national situation regarding the detection and identification of LMOs, including capacity-building needs and challenges. The survey is presented in the annex to the present document.

3. In addition, Parties that have laboratories with the capacity to detect and identify LMOs were also invited to submit more detailed information on their laboratories using the common format available on the Biosafety Clearing-House (BCH).²

II. SYNTHESIS OF INFORMATION

4. The present document summarizes the information submitted by 34 Parties regarding their capacities and needs to detect and identify LMOs in response to notification 2019-062. A summary of the results of the submission of information can be accessed through Microsoft Forms.³ In addition, Parties submitted and updated information on their laboratories on the BCH.⁴ As of 28 August 2020, there were 70 laboratory organization records listed on the BCH.

5. A breakdown per region of the submissions received is presented below:

¹ Ref. No. SCBD/CPU/DC/KG/AM/MW/88235, 23 July 2019.

² <https://bch.cbd.int/en/register>.

³ Microsoft Forms online survey: https://bch.cbd.int/protocol/cpb_detection/submissions.shtml.

⁴ Laboratories submitted to the BCH can be accessed by selecting “Laboratory for detection and identification of LMOs” under “Reference Records” when using the BCH search interface: <http://bch.cbd.int/en/search>.

(a) Africa (12): Angola, Benin, Burkina Faso, Cameroon, Guinea-Bissau, Kenya, Liberia, Madagascar, Malawi, Nigeria, South Africa, Zimbabwe;

(b) Asia and the Pacific (7): Bhutan, China, Iran (Islamic Republic of), Japan, Malaysia, Myanmar, Oman;

(c) Central and Eastern Europe (4): Belarus, Bulgaria, Lithuania, Poland;

(d) Latin America and the Caribbean (3): Grenada, Mexico, Peru;

(e) Western Europe and Others (8): Austria, Denmark, France, Germany, Italy, the Netherlands, New Zealand, Switzerland.

6. In questions 5 to 11 (section 2 of survey in annex), Parties were asked to provide an overview of their national situation regarding the detection and identification of LMOs. In response, Parties provided information regarding their biosafety national authorities and relevant biosafety legislation; this information can be accessed through the BCH.⁵

7. Additionally, to understand the broader context of laboratory infrastructure, Parties were requested to indicate the number of national laboratories with capacity to undertake detection and identification of LMOs, including the number of laboratories that operate with a form of accreditation. As seen in table 1 below, a majority of respondents (91.2%; 31 Parties) indicated having at least one laboratory with capacity to undertake detection and identification activities, 67.6% (23 Parties) indicated having at least one laboratory accredited and roughly a third of the respondents (32.4%; 11 Parties) had no accredited laboratories.

Table 1. Number of national laboratories with capacity to undertake detection and identification of LMOs, and number of these laboratories accredited

Number of laboratories	National laboratories (number of responses)	Accredited laboratories (number of responses)
0	8.8% (3)	32.4 % (11)
1 to 4	58.8% (20)	52.9% (18)
5 to 9	20.6% (7)	5.9% (2)
10 to 20	5.9% (2)	5.9% (2)
Over 20	5.9% (2)	2.9% (1)

8. Similarly, Parties were also asked to indicate the number of laboratories utilized outside the country, as well as the accreditation status of those laboratories (table 2). The majority of respondents (76.5%; 26 Parties) indicated that they were not using laboratories outside their countries. Of the Parties that indicated to be utilizing laboratories located outside of their country (23.5%; 8 Parties), 6 confirmed to be using accredited laboratories. With respect to the three Parties without national laboratories, only one indicated that it was using laboratory services outside their national jurisdiction.

Table 2. Number of Parties using laboratories outside the country

Number	Laboratories outside country (number of responses)	Accredited (number of responses)
0	76.5% (26)	N/A
1 to 2	20.6% (7)	Yes: 5; No: 1; Unsure: 1
3 to 5	2.9% (1)	Yes: 1
Over 5	0% (0)	N/A

9. Additionally, respondents were asked whether their country has the capacity to detect and identify LMOs at the port of entry. Of the 34 responses, 58.8% (20 Parties) stated that they had the ability for detection and identification at their port(s) of entry.

⁵ <http://bch.cbd.int/database/organizations/>; <http://bch.cbd.int/database/laws/>.

10. For questions 12 to 16 (section 3 of survey in annex), Parties were asked about any challenges they face when considering the detection and identification within their national context. Of the 34 responding Parties, 88.2% (30) indicated that they experience challenges in the detection and identification of LMOs. Table 3 presents an overview of the challenges identified by Parties. The main challenges identified were: “Reference and validation materials” (75.9%; 22 Parties); “Financial” (65.5%; 19 Parties); “Equipment” (58.6%; 17 Parties); and “Expertise” (58.6%; 17 Parties).

Table 3. Challenges identified by Parties in response to question 13 of the online survey⁶

Type of challenge	Response rate (number of responses)
Financial	65.5% (19)
Infrastructure	51.7% (15)
Equipment	58.6% (17)
Consumables	41.4% (12)
Personnel	51.7% (15)
Reference and validation materials	75.9% (22)
Expertise	58.6% (17)
Other	10.3% (3)

11. In general, respondents highlighted the lack of financing as a primary concern that impacts the challenges faced in the detection and identification of LMOs. They mentioned that funds are not sufficient for the high cost of consumables (e.g. rapid test kits, reagents, etc.) and validation/reference materials, as well as for the continual maintenance and operations of laboratory facilities. The frequency at which funds are allocated to the laboratories was also mentioned as a challenge. For example, if funds are allocated on an annual basis, they then do not account for high demand periods. Others mentioned that extrabudgetary requirements would be needed to train more personnel or address particular capacity-building needs, such as the modernization of equipment.

12. The respondents also noted that access to validation and reference materials was a severe challenge. In particular, materials for LMOs that are not authorized in their jurisdiction were problematic due to restrictions on obtaining them. Additionally, it was noted that new detection and screening methodologies could not be developed without these materials.

13. Regarding equipment challenges, some noted that there are constraints on the ability and availability to purchase consumables and equipment, which can cause delays in furnishing laboratories and maintaining capacity to detect and identify LMOs.

14. Several respondents mentioned that laboratories lack sufficient number of personnel, which reduces the operational capacity of the laboratories in their countries. It was also pointed out that some regions also lack laboratory networks and formalized protocols, which causes strains on the detection and identification system. Moreover, a lack of training programmes for laboratory personnel and border agents was also mentioned as a challenge.

15. Additionally, some respondents mentioned that the newly developed LMOs often present a technical challenge because current validated methodologies may not be sufficient for detecting and identifying all new or stacked events. Further, some LMOs produced through new biotechnologies (e.g. CRISPR, etc.) cause added technical challenges as current techniques cannot be utilized to detect or identify the resulting LMOs. DNA sequencing methodologies were mentioned in relation to newly developed LMOs, but the high cost was noted.

16. Finally, the lack of functional legal instruments, such as laws and policies, were viewed by some as a challenge to ensure the proper regulation of LMOs.

⁶ A total of 29 Parties responded to this question and multiple selections were allowed as a response.

17. Apart from identifying challenges, Parties were asked to indicate potential solutions and provide more detailed descriptions of how the identified challenges could be overcome. Responses indicated training programmes for laboratory personnel (82.7%; 24 Parties), information exchange with other laboratories (79.3%; 23 Parties), developing regional networks of laboratories (75.9%; 22 Parties) and training programmes for border control officers (75.9%; 22 Parties) as key potential solutions to overcome challenges. Table 4 below provides an overview of Parties' responses in this respect.

Table 4. Potential solutions to overcome challenges on detection and identification of LMOs⁷

Proposed solution	Percentage (number) of responses
Information exchange with other laboratories	79.3% (23)
Developing regional network of laboratories	75.9% (22)
Agreements with academic institutions	51.7% (15)
Scholarship opportunities	65.5% (19)
Training programmes for the laboratory personnel	82.7% (24)
Training programmes for border control officers	75.9% (22)
Financing mechanisms	69.0% (20)
Other	6.8% (2)

18. In general, the Parties that indicated financial challenges (65.5% or 19 Parties in table 3)⁸ also indicated that financing mechanisms could be a potential solution (69.0% or 20 Parties in table 4). However, these Parties had also indicated information exchange with other laboratories and developing regional networks of as other relevant solutions. Similarly, Parties that identified reference and validation materials as a challenge (75.9% or 22 Parties in table 3), tended to also indicate information exchange with other laboratories (79.3% or 23 Parties in table 4) and developing regional networks of laboratories (75.9% or 22 Parties in table 4) as solutions.

19. When providing additional information on alternative solutions for some of the challenges, several mentioned that greater budget allocations could reduce challenges through improved access to reagents, equipment, training programmes and validation/reference materials. With respect to training courses, some Parties suggested that training should emphasize new techniques used for the detection and identification of LMOs, detecting illegal shipments at ports of entry, and the detection and identification of LMOs produced through emerging biotechnologies. It was further noted that training courses should include customs officials in addition to laboratory personnel.

20. Participants also suggested that regional networks of laboratories could be set up to mitigate some of the challenges they are facing. These networks could also facilitate the sharing of information on LMOs, sharing reference materials, participating in the normalization of protocols and building expertise specific within each region. One respondent suggested that networks could be organized such that individual laboratories could specialize in a specific type(s) of LMO(s) or technique(s), as it would be costly for all laboratories to perform a wide range of techniques. Thus, costs could be effectively distributed by designating a laboratory within a network to provide analysis using a particular technique or detection of a less common LMO or genetic element.

21. Regarding LMOs produced through new breeding techniques and synthetic biology, one Party suggested further academic training and global approaches for detecting such LMOs as potential solutions. However, another respondent believed that this challenge does not relate to capacity-building and solutions must be sought elsewhere.

22. From a policy perspective, the ratification of biosafety legal frameworks, improving national regulatory networks, and designating national institutions were all mentioned as ways to improve the

⁷ A total of 29 Parties responded to this question and multiple selections were allowed as a response.

⁸ Percentages in this paragraph are based on the 29 respondents to question 13 (table 3) or question 15 (table 4) as appropriate.

situation in some countries. Additionally, some stressed that mainstreaming efforts should be increased to help policymakers better understand the importance of biosafety.

23. Under questions 17 to 19 of the online survey (section 4 of survey in annex), Parties were requested to provide information on capacity-building activities. Of the 34 responding Parties, 44.1% (15 Parties) indicated that they were involved in ongoing projects and 64.7% (22 Parties) indicated their involvement in future projects to build capacity in the field of detection and identification of LMOs.

24. Specific examples were provided of activities at various stages of implementation. They include:

(a) Training workshops organized by the Secretariat of the Convention on Biological Diversity, including the workshops on detection and identification of living modified organisms for Francophone Africa (Tunis, 2018) and Anglophone Africa (Abuja, 2019);

(b) Participation in the European Network of GMO Laboratories (ENGL) for intra-laboratory testing and validation exercises;

(c) Middle East and North Africa (MENA) network information exchange with ENGL;

(d) A potential laboratory network setup by the South Asian Association for Regional Cooperation (SAARC) Secretariat;⁹

(e) The establishment of a network of laboratories among the member States of the West African Economic and Monetary Union;¹⁰

(f) The United Nations Environment Programme-Global Environment Facility (UNEP-GEF) project for the Southern African Network of GM Detection Laboratories (SANGL);¹¹

(g) UNEP-GEF project “Multi-Country Project to Strengthen Institutional Capacity on LMO Testing in Support of National Decision-making” (2017-2021);¹²

(h) UNEP-GEF project “Development and Institution of a National Monitoring and Control System for Living Modified Organisms and Invasive Alien Species”.¹³

25. Some Parties noted their respective Governments may not hold workshops themselves but make financial contributions to the Secretariat of the Convention on Biological Diversity and GEF for capacity-building initiatives. Others mentioned seeking funding, as well as support from, donor organizations, such as the Food and Agriculture Organization of the United Nations, GEF, the United States Agency for International Development, and the African Biosafety Network of Expertise.

26. Under the last question of the survey (question 20 or section 5 of survey in annex), Parties shared other relevant information regarding the detection and identification of LMOs.

27. One Party mentioned that it maintains and strengthens its proficiency in LMO detection and identification by emphasizing participation in international conferences, making international contacts with experts and investing in research.

28. Within the European Union, French laboratories were highlighted for their ongoing work on detection and identification of LMOs created through the use of new biotechnologies (e.g. gene editing). Noting the challenge to detect and identify these LMOs produced through new breeding techniques, one respondent mentioned that the introduced changes could be very small and may not be known in advance.

⁹ SAARC members include Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka.

¹⁰ Member States include Benin, Burkina Faso, Côte d'Ivoire, Guinea-Bissau, Mali, Niger, Senegal and Togo.

¹¹ Participating countries include Angola, Eswatini, Lesotho, Madagascar, Namibia and Zambia;
http://addis.unep.org/projectdatabases/00952/project_general_info.

¹² Countries: Angola, Democratic Republic of the Congo, Lesotho, Madagascar, Malawi and Mozambique; Executing Agencies - Participating Laboratories: Angola, Democratic Republic of the Congo, Lesotho, Madagascar, Malawi, Namibia and RAEIN-Africa; <http://open.unep.org/project/GEF-5283>.

¹³ Commonly known as the “Cameroon Biosecurity Project”; <https://www.thegef.org/project/bs-development-and-institution-national-monitoring-and-control-system-framework-living>.

Thus, it could be impossible to distinguish from natural processes, chemical mutagenesis, physical mutagenesis or traditional breeding.

29. One Party noted that emerging biotechnologies, such as LMOs containing engineered gene drives, will require additional efforts to build capacity with respect to orienting identification and monitoring towards detecting the gene drive at the ecosystem level.

30. One respondent noted the difficulty to finance and maintain “state-of-the-art” laboratories for the detection and identification of LMOs, particularly for small island developing States, noting that a critical approach to overcoming this challenge would be to develop laboratories at regional and subregional levels to avoid countries from individually investing resources that may be scarce.

31. Regarding equipment, one respondent noted the lack of equipment for detection in the field or on-site testing. Another noted that automated DNA extraction platforms would allow their country to operate better. One Party additionally mentioned the need to establish traceability mechanisms and improve rapid testing capacities at ports of entry to facilitate detection and identification of LMOs on the market.

32. One respondent stressed the need to accredit laboratories after they have benefited from improvements from capacity-building activities, such that they can become financially substantiable and offer LMO detection and identification services for other clients.

33. One Party also recalled [Article 16](#), paragraph 1 of the Convention on Biological Diversity (“Access to and Transfer of Technology”) stating that more attention should be given to the access and transfer of technology related to biodiversity, including biotechnology, for facilitating the implementation of the Convention on Biological Diversity and its Protocols.

Annex

SURVEY FOR THE SUBMISSION OF INFORMATION ON DETECTION AND IDENTIFICATION OF LIVING MODIFIED ORGANISMS

Parties are kindly requested to provide an overview of their national situation regarding detection and identification of living modified organisms, including capacity-building needs and challenges.

In completing the form, kindly consult with the relevant institutions in your country in order to gather the necessary information.

Please note that fields marked with an asterisk (*) are mandatory.

SECTION 1

1. Country*	
2. Author of submission*	
3. Role of author (e.g. national focal point, etc.)*	
4. Author's email address*	

SECTION 2. NATIONAL OVERVIEW

5. Relevant national authority(ies) for detection and identification of living modified organisms (LMOs)	
6. Relevant national legislation or policies for detection and identification issues	
7. Number of national laboratories with capacity to undertake detection and identification of LMOs:*	☐ 0 ☐ 1 – 4 ☐ 5 – 9 ☐ 10 – 20 ☐ >20
<i>(Please use the online reference record "Biosafety Organization, including Laboratory for detection and identification of LMOs" on the BCH to provide more information on national laboratories)</i>	
8. Number of these laboratories that are accredited (e.g. ISO 17025, etc.):*	☐ 0 ☐ 1 – 4 ☐ 5 – 19 ☐ 10 – 20 ☐ >20
9. Number of laboratories utilized outside of country:*	☐ 0 ☐ 1 – 2 ☐ 3 – 5 ☐ 6 – 10 ☐ >10
10. Are these laboratories accredited (e.g. ISO 17025, etc.)?*	☐ Yes ☐ No ☐ Some ☐ Unsure
11. Does your country have the capacity to detect or identify LMOs at port of entry?*	☐ Yes ☐ No

SECTION 3. CAPACITY-BUILDING NEEDS AND CHALLENGES

12. Does your country currently have challenges in the detection and identification of LMOs?*	☐ Yes ☐ No
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13. If yes, please select the types of challenges <i>(select all that apply)</i> :	☐ Financial ☐ Infrastructure ☐ Equipment ☐ Consumables ☐ Personnel ☐ Reference and validation ☐ Expertise ☐ Other
14. Please use the space below to further describe the current challenges and limitations faced, as well as the severity of these issues.	
15. If yes to question 12, what are some potential solutions to address these challenges?	☐ Information exchange with other laboratories and institutions ☐ Developing regional networks of laboratories ☐ Agreements with academic institutions ☐ Scholarship opportunities ☐ Training programmes for laboratory personnel ☐ Training programmes for border control officers ☐ Financing mechanisms ☐ Other
16. Please use the space below to further describe potential solutions to overcome the challenges.	

SECTION 4. CURRENT AND PLANNED PROJECTS

17. Does your country currently have any projects ongoing to build capacity for the detection and identification of LMOs?*	☐ Yes ☐ No
18. Does your country plan to develop or participate in any projects to build capacity for the detection and identification of LMOs?*	☐ Yes ☐ No
19. Please use the space below to provide any further information on these projects or plans.	

SECTION 5. OTHER COMMENTS

20. Other issues or concerns that have not been addressed that are relevant to detection and identification of LMOs:
