SUBMISSION FROM MEXICO (PARTY)

(Translated from the original in Spanish)

The Government of Mexico submits the following documents in response to Notification SCBD/BS/CG/MPDM/jh/74825, which was issued by the Secretariat on February 4, 2011 to comply with Decision BS-V/12 on Risk assessment and risk management (Articles 15 and 16) adopted at the fifth meeting of the Conference of the Parties serving as the meeting of the Parties to the Cartagena Protocol on Biosafety (COP-MOP 5), and which refers to a **Scientific review of the "Guidance on Risk Assessment of Living Modified Organisms."**

1) FORM FOR THE SCIENTIFIC REVIEW OF THE GUIDANCE ON RISK ASSESSMENT OF LIVING MODIFIED ORGANISMS.

This document is annexed hereto.

2) DOCUMENTATION ACCOMPANYING THE FORM FOR THE SCIENTIFIC REVIEW OF THE GUIDANCE ON RISK ASSESSMENT OF LIVING MODIFIED ORGANISMS, SUBMITTED BY MEXICO.

This contains the complete answers to two of the form's questions.

FORM FOR THE SCIENTIFIC REVIEW OF THE GUIDANCE ON RISK ASSESSMENT OF LIVING MODIFIED ORGANISMS

The Guidance for Risk Assessment of Living Modified Organisms (the "Guidance") was developed through collaborative efforts between the Open-ended Online Expert Forum and the Ad Hoc Technical Expert Group (AHTEG) on Risk Assessment and Risk Management.*

The aim of the Guidance is to further elaborate the methodology for risk assessment of living modified organisms (LMOs) in accordance with the Cartagena Protocol on Biosafety, and in particular in accordance with Annex III of the Protocol.

The Guidance is intended to be a "living document" that will be improved with time as new experience becomes available and new developments occur in the field of applications of LMOs, as and when mandated by the Parties to the Cartagena Protocol on Biosafety.

At the fifth meeting of the Conference of the Parties serving as the meeting of the Parties to the Protocol (COP-MOP), the Parties to the Protocol welcomed the first version of the Guidance and noted that it requires further scientific review and testing to establish its overall utility and applicability to living modified organisms of different taxa introduced into various environments.

The Executive Secretary was therefore requested to coordinate a review process of this first version of the Guidance among Parties and other Governments, through their technical and scientific experts, and relevant organizations.

The following questions are aimed at seeking views to assist the Open-ended Online Expert Forum and the AHTEG in revising the Guidance.

The completed review forms are to be mailed to the Secretariat at: riskassessment.forum@cbd.int . Reviews from Parties and other Governments are to be submitted by their National Focal Points. Reviews from organizations are to be submitted through their head offices.

* Additional information on the development of the "Guidance on Risk Assessment of Living Modified Organisms" may be found in document UNEP/CBD/BS/COP-MOP/5/12 (see "Official Documents" at http://www.cbd.int/doc/?meeting=MOP-05).

i. Reviewer's information

*Please select **only one** of options below*

This scientific review of the Guidance on Risk Assessment of Living Modified Organisms is being submitted on behalf of a:

☒ Party. Please specify: Mexico

☐ Other Government. Please specify: <Country's name>

☐ Organization: Please specify: <Organization's name>

ii. Overall evaluation

*Please select **only one** answer for each section*

Q1. How do you evaluate the level of consistency of the following sections of the Guidance with the Cartagena Protocol on Biosafety, particularly with its Article 15 and Annex III?

	Very poor	Poor	Neutral	Good	Very good
• Roadmap for risk assessment	☐	☐	☐	☒	☐
• Risk assessment of living modified organisms with stacked genes or traits	☐	☐	☒	☐	☐
• Risk assessment of living modified crops with tolerance to abiotic stress	☐	☐	☐	☒	☐
• Risk assessment of living modified mosquitoes	☐	☐	☐	☒	☐

Q2. How do you evaluate the usefulness of the following sections of the Guidance as tools for assisting countries in conducting and reviewing risk assessments of LMOs in a scientifically sound and case-by-case manner?

	Very poor	Poor	Neutral	Good	Very good
• Roadmap for risk assessment	☐	☐	☐	☒	☐
• Risk assessment of living modified organisms with stacked genes or traits	☐	☐	☒	☐	☐
• Risk assessment of living modified crops with tolerance to abiotic stress	☐	☐	☒	☐	☐
• Risk assessment of living modified mosquitoes	☐	☐	☐	☒	☐

Q3. How do you evaluate the usefulness of the following sections of the Guidance as tools for assisting countries in conducting and reviewing risk assessments of LMOs introduced into various receiving environments?

	Very poor	Poor	Neutral	Good	Very good
• Roadmap for risk assessment	☐	☐	☐	☒	☐
• Risk assessment of living modified organisms with stacked genes or traits	☐	☐	☒	☐	☐
• Risk assessment of living modified crops with tolerance to abiotic stress	☐	☐	☒	☐	☐
• Risk assessment of living modified mosquitoes	☐	☐	☐	☒	☐

Q4. How do you evaluate the usefulness of the "Roadmap" as a tool for assisting countries in conducting and reviewing risk assessments of LMOs of different taxa?

	Very poor	Poor	Neutral	Good	Very good
• Roadmap for risk assessment	☐	☐	☐	☒	☐

ADDITIONAL COMMENTS ON THE OVERALL EVALUATION

Please add any additional comment you may have regarding the overall evaluation of the first version of the "Guidance on Risk Assessment of Living Modified Organisms" below.

Q5. The document is found to be in general consistent with Annex III. However, the experts consulted had a wide range of opinions regarding its usefulness (rating it from 'poor' to 'very good'). The experts who are most familiar with the contents of the Cartagena Protocol find that the document touches on aspects that are outside the scope of Article 15 and Annex III (in particular in the Related Issues section) and note that these are aspects that have to do more with decision-making –as a process separate from risk assessment– and that including them in the document could generate confusion. On the one hand, the experts acknowledge that in some points the document explains how Annex III can be applied and that it could serve its purpose as a guide.

PLEASE SEE ANNEXED DOCUMENT FOR THE COMPLETE ANSWERS TO QUESTIONS 5 AND 35, WHICH DID NOT FIT IN THE SPACE PROVIDED.

iii. Section-by-section review

*Please select **only one** of the boxes for each question*

PART I: THE ROADMAP FOR RISK ASSESSMENT	
1. INTRODUCTION	
Q6. Are all the concepts in this section relevant and accurate from a scientific point of view?	☐ Yes ☒ No. Please comment: The phrase "unintended effects may be predictable" is a contradictory concept, or at the very least confusing. Some experts suggest that an example of a predictable unintended effect be provided, perhaps further on in the document, or else that the term be eliminated. The ellipsis in the last paragraph of page 2 (in the English version) is unclear. One of the experts considers that it is incidental and redundant to speak of iterativity of the process or review in the event new data arises, given that the steps involved in risk assessment are determined by the unfolding of a logical process. Another expert noted that the wording of the Protocol in Annex III uses the term "can" ("pueden," in Spanish) and in the document it is translated as "should" ("deben," in Spanish).
Q7. Does this section include all the necessary relevant concepts?	☐ Yes ☒ No. Please comment: Nowhere in the introduction does it say that risk assessment is based on the principle of proving well-defined hypotheses and that it is not a data-gathering process. Nowhere in the introduction is there a justification for the starting point of a risk assessment (the reason for which a risk assessment is conducted); there is no explanation for why this methodology should be applied. The reason is acknowledged in chapter 16 of Agenda 21, in the preamble of the CBD and its Article 19, paragraph 2, and in the preamble of the Protocol, as there is an acknowledgement that, if used properly, modern biotechnology has the potential to contribute to the well-being of humanity. One of the experts notes that the concept of levels of tolerance of certain risks should be included, recognizing that its application can very well be part of each country's decision-making process, and that including more quantitative parameters to characterize risks can contribute to a less ambiguous analysis.
Q8. Are all the concepts in this section expressed in a language that could be easily understood by the target users?	☐ Yes ☒ No. Please comment: Several experts agree that on page 3, in the section that describes the risk assessment process, there needs to be greater emphasis on the fact that risk assessment is done in a comparative manner, preferably in every steps, and that it can take into account existing

experiences that are very significant and that are derived from the use and knowledge of, for example, conventional crop varieties, their relationship with the environment and with their wild relatives across several years, and not just from comparisons with the (near-) isogenic. Additionally, this comparative component can be emphasized with the inclusion of examples and by stressing the importance of experimental data.

"Behavior of a transgene" and behavior of a gene are not proper terms to describe the state of genes. Genes and transgenes do not "behave." In this same paragraph, it is suggested that the Spanish translation of "genetic background" be changed from "antecedentes genéticos" to "contexto genético."

Several experts agreed that the concept of "acceptable scientific quality" is not very useful and can be critical if there is no experience available or the assessment procedure lacks criteria or policies. Examples should be given or an objective method of validation should be used to specify what is understood by acceptable scientific quality, and this same observation applies to published data. The concept of weight of evidence could be considered.

One of the experts considers that the translation used for "receiving environment" (i.e. "medio receptor") is not clearly understood in every Spanish-speaking country, and that options such as "ambiente de liberación" should be considered.

Several experts agree that the section on consideration of uncertainty is very confusing. Greater precision regarding the assessment or determination of uncertainty is necessary in the sense that it is not an independent characteristic nor is it separate from risk assessment. In this section of the document uncertainty is treated as something questionable, when it is precisely what gives rise to risk assessments. According to one expert, it is almost a pleonasm to speak of uncertainty and risk assessment. Any estimation of likelihood or possibility contains a component of certainty or reliance; whose counterpart reflects the uncertainty, and thus such uncertainty is already part of the process. It is suggested that greater emphasis be placed on how uncertainty should be addressed within the risk assessment process: identifying its sources and (qualitatively or quantitatively) dimensioning the impact of uncertainty on the final outcome of the assessment.

It is noted that the uncertainty is not resolved with more information; there needs to be a detailed description of the nature of the type of uncertainty that this characteristic has, to then advise on how that type of uncertainty affects this activity in particular, as one of the sources of uncertainty is lack of information or contradictory information, but the vast majority has to do with the measuring methods, data variability, sample size, etc., and the uncertainty can be characterized using statistical methods.

This section refers in one part to "forms" of uncertainty and in

	another to "sources" of uncertainty. This ambiguity contributes to the confusion surrounding the way uncertainty is dealt with in the document. The concept of uncertainty must be properly dimensioned in the sense that it is something inherent to many biological processes. Recognizing that there is also uncertainty with respect to what will be used as comparator and how those uncertainties have been dealt with could be useful information in this context.

2. THE RISK ASSESSMENT

Step 1: "An identification of any novel genotypic and phenotypic characteristics associated with the living modified organism that may have adverse effects on biological diversity in the likely potential receiving environment, taking also into account risks to human health"

Q9. Are all the concepts in this section relevant and accurate from a scientific point of view?	☐ Yes ☒ No. Please comment: No rationale is given for the relevance of the "horizontal gene transfer," except in the case of bacteria. As it appears in the document it gives the impression that it should be applied to all LMOs; thus, there needs to be a specific indication that it only applies to bacteria. One expert suggested that the last paragraph in each step be eliminated, as it repeats the section that already refers to uncertainty, and it is further unnecessary as it is a component of each and every one of the previous paragraphs.
Q10. Does this section include all the necessary relevant concepts?	☐ Yes ☒ No. Please comment: The term defined at the bottom of page 7 (footnote 17) as "combinatorial effects" is actually called "epistasis" in genetic literature. If "combinatorial effects" is meant to describe something other than epistasis, it should be clarified. It would help to provide examples of why it is important to consider the scale and duration of the release into the environment, as in the initial stages of release of a new LMO - aimed precisely at generating information- the information provided will be less detailed. One expert mentions that it would be important to consider not just the novel characteristics that have been inserted into the LMO but also characteristics that were already present but are now expressed to a greater extent as a result of the insertion, and taking into account the ranges of expression. The concept of baseline information is relevant here, and it should also be clarified that the fact that there is a change does not necessarily mean it is negative, as there are in fact changes that can be positive. Several experts agreed that if the guidance is meant to be applied to all LMOs an effort should be made to include

	examples with other organisms.
Q11. Are all the concepts in this section expressed in a language that could be easily understood by the target users?	☐ Yes ☒ No. Please comment: This section refers to identifying new unintended or unpredicted characteristics (as well as "unintended gene products"), and this is not very clear conceptually, as identifying something that is unintended or unpredicted is like characterizing the unknown. The characterization of potential effects is based on what is known, even if new elements may later arise. There are some concepts, such as gene function or gene products, that are ambiguous or hard to understand. A gene's "function" is to store genetic information, and to express itself or not. The concept of gene products is rather vague and it would be helpful if it was clarified. Proteins are the products of genes and can have many functions.
Step 2: "An evaluation of the likelihood of adverse effects being realized, taking into account the level and kind of exposure of the likely potential receiving environment to the living modified organism"	
Q12. Are all the concepts in this section relevant and accurate from a scientific point of view?	☐ Yes ☒ No. Please comment: With respect to paragraph (b), the concepts of "persistence" and "accumulation" are hard to apply when they refer to proteins, whether toxins or allergens, as they are expected to bind to recipients and produce their effect or else metabolize or degrade, but they are not expected to accumulate. This is a concept that applies to recalcitrant chemical compounds, not to proteins.
Q13. Does this section include all the necessary relevant concepts?	☒ Yes ☐ No. Please comment: One expert recommends considering the use of relevant statistical models and tools to characterize the exposure to hazards. No mention is made of the experience available on co-existence of commercial non-GM varieties and sexually compatible wild species. There is a lack of concrete elements that could reduce the ambiguity in the concepts of likelihood and uncertainty.
Q14. Are all the concepts in this section expressed in a language that could be easily understood by the target users?	☐ Yes ☒ No. Please comment: In this step there is a confusion of terms when "risk" is used as synonymous with "hazard." It is unclear how the description given in this step can be used to estimate the likelihood of occurrence of an event. The document says, "The potential adverse effects identified in step 1 may result in risks, but this depends on the likelihood and the consequence of the effects." It should actually say that the potential adverse effects identified in step 1 can be confirmed or ruled out depending on the likelihood of occurrence and the

	consequence generated by the effects.
Step 3: "An evaluation of the consequences should these adverse effects be realized"	
Q15. Are all the concepts in this section relevant and accurate from a scientific point of view?	☐ Yes ☒ No. Please comment: Some concepts are extremely ambiguous, such as the one mentioned in paragraph (b) of this section. Again, this section gives the impression that the consideration of uncertainty is something separate from the risk assessment, and that it has to be examined in addition to the assessment, when it is in fact already considered in the determination of likelihood.
Q16. Does this section include all the necessary relevant concepts?	☐ Yes ☒ No. Please comment: No mention is made of the experience available on co-existence of commercial non-GM varieties and sexually compatible wild species. It must be related to the comparative analysis performed in parallel.
Q17. Are all the concepts in this section expressed in a language that could be easily understood by the target users?	☐ Yes ☒ No. Please comment: Concepts EC 50s and LD 50s need to be explained. Again the uncertainty component is added without specifying or clarifying how it is measured.
Step 4: "An estimation of the overall risk posed by the living modified organism based on the evaluation of the likelihood and consequences of the identified adverse effects being realized"	
Q18. Are all the concepts in this section relevant and accurate from a scientific point of view?	☐ Yes ☒ No. Please comment: Again, this section gives the impression that the consideration of uncertainty is something separate from the risk assessment, and that it has to be examined in addition to the assessment, when it is in fact already considered in the determination of likelihood.
Q19. Does this section include all the necessary relevant concepts?	☐ Yes ☒ No. Please comment: There is no mention of conducting a parallel comprehensive assessment exercise with the comparator. This happens practically throughout the document.
Q20. Are all the concepts in this section expressed in a language that could be easily understood by the target users?	☒ Yes ☐ No. Please comment: There is no description or explanation of how the overall risk is determined. It is unclear if it is a "sum of partial risks" or what criterion is used to generate or define the overall risk. Stating that there is a single method does not contribute to clarify it either. It should be clarified that what is assessed or considered in this step is the estimated risk related to each of the different initial hypotheses, and it is compared with the risks associated with the comparator.

Step 5: "A recommendation as to whether or not the risks are acceptable or manageable, including, where necessary, identification of strategies to manage these risks"	
Q21. Are all the concepts in this section relevant and accurate from a scientific point of view?	☐ Yes ☒ No. Please comment: As addressed here, the risk based on likelihood of occurrence seems redundant.
Q22. Does this section include all the necessary relevant concepts?	☐ Yes ☒ No. Please comment: The section on repeating the analysis and re-examining the risks is confusing and provides no rationale or examples of cases in which it may be necessary to return to a previous step in the assessment. The monitoring or observation of the LMO in its receiving environment should be included as one of the risk management options for reducing uncertainty. It would be important to clarify that risk management does not eliminate the risks identified, but that through the implementation of measures the adverse effect or likelihood of occurrence can be reduced or mitigated.
Q23. Are all the concepts in this section expressed in a language that could be easily understood by the target users?	☐ Yes ☒ No. Please comment: The concept of "ecological effects of the LMO" is not appropriate; in any case it would be the effects of the LMO on components of the ecosystem or the environment. No elements are given to identify what is understood by manageable risk.
3. RELATED ISSUES	
Q24. Does the "Related Issues" section include all relevant issues related to risk assessment and decision-making process but that are outside the scope of the Roadmap?	☐ Yes ☒ No. Please comment: No, it does not include all the relevant issues. There are many other aspects related to decision-making and tangentially to risk assessment that are not part of it, and which should not be included in the document as they make it confusing.
4. FLOWCHART	
Q25. Does the flowchart provide an accurate graphic representation of the risk assessment process as described in the Roadmap?	☒ Yes ☐ No. Please comment: It makes risk assessment look like a never-ending process. The head of the arrow that stems from the first NO to the Context and Scoping of the Risk Assessment box is missing (in the Spanish version of the flowchart). The two arrows that stem from the second and third YES give the idea that the process needs to start all over again, but the second must only return to step 5 while the third one can go to any of the steps depending on the type of information that arises.

PART II: SPECIFIC TYPES OF LMOs AND TRAITS	
A. RISK ASSESSMENT OF LIVING MODIFIED ORGANISMS WITH STACKED GENES OR TRAITS	
Q26. Are all the concepts in this section relevant and accurate from a scientific point of view?	☐ Yes ☒ No. Please comment: These documents are supposed to provide concepts that are not included in the roadmap, however, this section does not contribute many accurate and scientific concepts and components, and neither does it give additional guidance for risk assessment of LMOs with stacked events generated through conventional crossing or simple or multiple event LMOs.
Q27. Does this section include all the necessary relevant concepts?	☐ Yes ☒ No. Please comment: It is too general and does not provide a guide for a more in-depth assessment of LMOs with stacked events. One expert believes regulatory issues could affect the availability of information for the assessment of stacked event LMOs.
Q28. Are all the concepts in this section expressed in a language that could be easily understood by the target users?	☐ Yes ☒ No. Please comment: See answer to Question 10.
B. RISK ASSESSMENT OF LIVING MODIFIED CROPS WITH TOLERANCE TO ABIOTIC STRESS	
Q29. Are all the concepts in this section relevant and accurate from a scientific point of view?	☐ Yes ☒ No. Please comment: Most components are already covered in the roadmap, and thus are not relevant for a new section.
Q30. Does this section include all the necessary relevant concepts?	☐ Yes ☒ No. Please comment: <Type here>
Q31. Are all the concepts in this section expressed in a language that could be easily understood by the target users?	☐ Yes ☒ No. Please comment: Some examples presented in the document, in particular those pertaining to unintended characteristics, serve to illustrate how the risk hypothesis can be posed very easily, but no emphasis is made on such risk hypotheses being founded on a scientific basis that provides a license or rationale for posing it.
C. RISK ASSESSMENT OF LIVING MODIFIED MOSQUITOES	
Q32. Are all the concepts in this section relevant and accurate from a scientific point of view?	☒ Yes ☐ No. Please comment: The consideration of reservoirs of mosquitoes and related species in release areas should be

	contemplated.
Q33. Does this section include all the necessary relevant concepts?	☐ Yes ☒ No. Please comment: One expert notes that while the potential adverse effects of mosquitoes on the environment should be assessed, the vast majority of the considerations, being extremely conservative, are done at the expense of diseases that affect developing countries, which have no other option than to continue affecting their populations (of mosquitoes and human beings, as well as their water, air, etc.) with pesticides, without clearly mentioning the need to examine this management measure.
Q34. Are all the concepts in this section expressed in a language that could be easily understood by the target users?	☐ Yes ☐ No. Please comment: <Type here>

ADDITIONAL COMMENTS ON THE SECTION-BY-SECTION REVIEW

Please add any additional comment you may have regarding particular sections of the first version of the "Guidance on Risk Assessment of Living Modified Organisms" below.

Q35. The process that Mexico decided on to gather more elements with which to evaluate the Guidance on Risk Assessment of Living Modified Organisms document consisted in asking various stakeholders (with different levels of experience) to provide their feedback on the document and fill out the form. This group included both risk assessors and researchers who at one time or another have participated in committees or groups that have carried out risk assessment activities, as well as related scientists. It is therefore important to point out that the answers to the questions regarding the document combine all the input provided with the aim of contributing to improve it…

SEE ANNEXED DOCUMENT WITH COMPLETE ANSWERS.

DOCUMENTATION ACCOMPANYING THE FORM FOR THE SCIENTIFIC REVIEW OF THE GUIDANCE ON RISK ASSESSMENT OF LIVING MODIFIED ORGANISMS, SUBMITTED BY MEXICO.

Q5. The document is found to be in general consistent with Annex III. However, the experts consulted had a wide range of opinions regarding its usefulness (rating it from 'poor' to 'very good'). The experts who are most familiar with the contents of the Cartagena Protocol find that the document touches on aspects that are outside the scope of Article 15 and Annex III (in particular in the Related Issues section) and note that these are aspects that have to do more with decision-making –as a process separate from risk assessment– and that including them in the document could generate confusion. On the one hand, the experts acknowledge that in some points the document explains how Annex III can be applied and that it could serve its purpose as a guide. On the other hand, some experts agree that conducting a risk assessment requires having a certain degree of knowledge and experience, which are in turn gained in practice by carrying out said process. The document does not acknowledged this and thus it could convey the misleading notion that the process can be completed satisfactorily merely by following the guidance and carrying out the steps it sets out. In this sense, it would advisable for the document to indicate that the risk assessment process requires adequate technical and professional skills and even knowledge in different disciplines. Additionally, reference could be made to documents containing results of risk assessments conducted by countries with experience in this activity, which can enable assessors to concretely visualize the results of risk assessment practice.

Different experts consulted identified components, terms or concepts, and even approaches that could be improved in the document, and in the process of filling out this form emphasis was made on including those aspects that can improve the document.

Q35. The process that Mexico decided on to gather more elements with which to evaluate the Guidance on Risk Assessment of Living Modified Organisms document consisted in asking various stakeholders (with different levels of experience) to provide their feedback on the document and fill out the form. This group included both risk assessors and researchers who at one time or another have participated in committees or groups that have carried out risk assessment activities, as well as related scientists. It is therefore important to point out that the answers to the questions regarding the document combine all the input provided with the aim of contributing to improve it. In some questions the various answers obtained were contradictory, as reflected in the input presented; but most experts consulted concurred in their responses. Feedback from a total of 13 experts was considered. We would have liked to have more answers since having input from different approaches, disciplines, and experiences contributes to enrich the document's analysis or review. However, this was not possible due to time constraints.

Below are the general comments received.

Several experts agree that it would be a good idea to include other examples, including for fish, timber trees, and bacteria released into the environment, among others, to narrow down and define more accurately certain criteria. From this perspective an expert recommends developing additional documents for trees, fish, and microorganisms, while another expert considers that there is no need for more, and that the ones provided in sections (a), (b) and (c) fail to give additional guidance for risk assessment than what is already provided in Annex III and the roadmap section.

One expert considers that the issue of the potential effects on human health could be further developed.

Several experts agree that the issue of uncertainty is not properly addressed, considering that the document itself acknowledges that the international discussion on the issue has not concluded. This causes ambiguity and therefore the concepts of uncertainty will not be understood or applied properly.

Several experts concur in the need to emphasize the comparative component of risk assessment and that it should be applied based on the experience available, especially in the case of cultivated plants.

It is suggested that once the *Guidance on Risk Assessment of Living Modified Organisms* document is reviewed it should be applied in practice and revised from time to time.

Some experts observed that the design of the evaluation form is not entirely helpful in facilitating an examination of the *Guidance on Risk Assessment of Living Modified Organisms* document, but that it was nonetheless completed with the aim of contributing to the process of evaluation in accordance with the mechanism developed by the Secretariat.