Annex

QUESTIONNAIRE FOR THE TESTING OF THE GUIDANCE ON RISK ASSESSMENT OF LIVING MODIFIED ORGANISMS

GENERAL INFORMATION ABOUT THE TESTING	
Q1. These results are being submitted on behalf of a:	☐ Party. Please specify: <Country's name> ☒ Other Government. Please specify: United States of America ☐ Organization: Please specify: <Organization's name>
Q2. When was the testing of the Guidance conducted?	Please enter date: December 2011
Q3. Type of event where the testing of the Guidance was conducted?	☐ Group event (e.g., workshop, training course, meeting). Please provide the title of the event and name of organizer: <Type here> Type of meeting: ☐ Face-to-face ☐ Online ☐ Individual exercise. Please provide your name, occupation and affiliation: <Type here> ☒ Other: Please specify: Research and regulatory scientists with expertise in the following areas: ecology, plant biotechnology (crops, trees, etc/), microbiology, entomology (especially mosquitoes), plant physiology, and plant pathology, as well as substantial experience in providing training and capcity building in risk assessments.
Q4. Which sections of the Guidance were tested?	☒ Part I: The Roadmap for Risk assessment of LMOs Part II: Specific types of LMOs or Traits: ☒ Risk assessment of LMOs with stacked genes or traits ☒ Risk assessment of LM crops with tolerance to abiotic stress ☒ Risk assessment of LM mosquitoes

OVERALL EVALUATION					
	Very poor	**Poor**	**Neutral**	**Good**	**Very good**
Please indicate the level of agreement you attribute to each of the questions in the left column.					
Q5. How do you evaluate the level of consistency of the Guidance with the Cartagena Protocol on Biosafety, particularly with its Article 15 and Annex III?	☐	☒	☐	☐	☐
Q6. How do you evaluate the usefulness of the Guidance as a tool to assist countries in conducting and reviewing risk assessments of LMOs in a scientifically sound and case-by-case manner?	☒	☐	☐	☐	☐

Q7. How do you evaluate the usefulness of the Guidance as a tool to assist countries in conducting and reviewing risk assessments of LMOs introduced into various receiving environments?	☒ ☐ ☐ ☐ ☐	

PART I: ROADMAP FOR RISK ASSESSMENT OF LIVING MODIFIED ORGANISMS

Please answer each of the questions in the left column with "yes" or "no" and add comments if needed.

Q8. Does the Roadmap provide useful guidance for conducting risk assessments of LMOs in accordance with the Protocol?	☐ Yes ☒ No	Comments: The Roadmap does not provide sufficient guidance regarding the distinction between conducting risk assessments for confined, small-scale environmental releases as compared to large-scale releases. The emphasis is almost exclusively for LM plants, and primarily aimed at large-scale or unconfined releases. Most Parties are likely to be first confronted with questions about small-scale confined releases, but the Roadmap will give the impression that RA for such releases are far more complicated than is the case (based on experience in the many countries that have been doing RA for confined releases over the past two decades)..
Q9. Is the Roadmap useful to risk assessors who have limited experience with LMO risk assessment?	☐ Yes ☒ No	Comments: The comment for Q8. applies here as well. In addition, the Roadmap should provide more context on which LMOs have already been subjected by RA by governments, the nature of the environmental releases conducted (confined vs. unconfined), and the experience of safe use with respect to potential impacts on biodiversity. This is a central theme of the protocol itself, but the Roadmap does not emphasize this. Also, a number of independent scientist groups and governments worldwide have already concluded that using the techniques of modern biotechnology to create LMOs does not present risks to the environment that are necessarily different from the risks posed by non-LMOs. This has been borne out in the many examples of LM plants cultivated in diverse countries for many years, but the Roadmap does not make mention of this at all. In fact, the Roadmap would give inexperienced risk assessors the impression that we have little positive experience in evaluating LM plants.
Q10. Is the Roadmap organized in a logic and structured manner?	☐ Yes ☒ No	Comments: The organization is somewhat logical in following the layout of Annex III in part, but there is insufficient explanation of the logic of the risk assessment steps, the way in which information is actually used to support the asssessment, and the circumstances under which certain information is not needed for the risk assessment.
Q11. Is the Roadmap user-friendly taking into account that risk assessment is a complex scientific and multidisciplinary activity?	☐ Yes ☒ No	Comments: The Roadmap does not appear to be very user-friendly. There are large sections of text that quote the Protocol repeatedly, but there is little information on how the concepts of Annex III have been applied in specific RAs. The Roadmap has an over-abundance of generalized statements, but few

		specific examples to illustrate the point and/or relevance of information that the risk assessor is to use. The Roadmap should more clearly emphasize the need for risk assessors to have a knowledge of the organism being evaluated, rather than the implied emphasis on molecular genetics. One of the lessons learned from experience with LMO risk assessment over the past two decades is the realization that the total phenotype of the LMO is far more informative in the assessment than is the molecular genetic characterization.
Q12. Is the Roadmap applicable to all types of LMOs (e.g. plants, animals, microorganisms)?	☐ Yes ☒ No	Comments: The emphasis is largely on LM plants, yet the Roadmap does not acknowledge the extensive experience gained for confined and unconfined environmental releases of LM plants. This is surprising, since the Protocol emphasizes the value of sharing RA experiences of Parties and non-Parties that have done RAs of LMOs intended for releases, both confined and unconfined, into the environment.
Q13. Is the Roadmap applicable to all types of introductions into the environment (e.g. small- and large-scale releases, placing on the market/commercialisation)?	☐ Yes ☒ No	Comments: See previous comments on Q8-12. In addition, it is not clear why the AHTEG has chosen to try to develop guidance on separate LMO topics (e.g., abiotic stress, stacked traits, mosquitoes) when the main guidance document is incomplete and has not yet completed the testing and revision phase. It would seem more appropriate to provide specific examples in the main guidance itself, if specific examples are warranted, for mosquitoes or certain types of plants. The reviewers find it surprising that so little information is provided in the Guidance on RA for confined environmental releases such as field testing of plants.
Q14. Is there any other issue or concept that you would like to see included in the Roadmap?	☒ Yes ☐ No	Comments: There is insufficient discussion in the Roadmap as to how the risk assessor evaluates the LMO and the existing situation (e.g., the environmental impacts arising from an LMO engineered to resist insect feeding damage versus the environmental impact arising from a current situration in which the use of chemical pesticides impacts biodiversity and human health). This is the comparative information that a risk assessor is typically expected to provide for decision-makers, but this is not developed well enough in the Roadmap. The "Glossary of Terms" needs considerable attention to bring it into better agreement with existing use of terms in other scientific disciplines, guidance documents, etc., as well as to avoid introducing concepts that are not supported in the body of the document. The guidance on choice of comparators is overly prescriptive and does not take into account the questions being addressed in the particular part of the risk assessment (e.g., in some cases, a similar LMO has been used as an appropriate comparator in risk assesssments performed by governments with experience in the RA of LMOs, but the text says otherwise).

Q15. Does the flowchart provide a useful graphic representation of the risk assessment process as described in the Roadmap?	☐ Yes ☒ No	Comments: The flowchart adds items and emphasis that are not consistent with Annex III or the current draft of the Roadmap. In particular, the boxes on "overarching issues" and "planning phase" seem to call for risk assessors to perform certain steps before they can conduct the risk assessment. In the experience of countries that have done risk assessments of LMOs in the context of regulatory decision-making, the items listed in these two boxes do not occur prior to the start of a risk assessment. Placement of the issues of "identifying uncertainty" and "choice of comparators" in boxes prior to "conducting the risk assessment" are likely to confuse risk assessors, since these issues arise in the steps of the risk assessment, and they are influenced by the questions being addressed at various steps (i.e., they are influenced by the context of the questions being addressed at the various steps of the risk assessment). The relationship of the "related issues" to the risk assessment itself is confusing and outside the scope of the Roadmap. The flow diagram uses different terminology than used in the body of the Roadmap, and this makes it more difficult to follow.

PART II: SPECIFIC TYPES OF LIVING MODIFIED ORGANISMS OR TRAITS		
Risk assessment of living modified organisms with stacked genes or traits		
Please answer each of the questions in the left column with "yes" or "no" and add comments if needed.		
Q16. Does this section provide useful guidance when conducting risk assessments of LMOs with stacked genes or traits in accordance with the Protocol?	☐ Yes ☒ No	Comments: It appears that there is nothing unique to the guidance on stacked trait LM plants that would not already have been covered under the main Roadmap guidance. In many ways, the guidance on stacked trait plants is not as well developed from a scientific or conceptual standpoint. As mentioned in the comments above for the main Roadmap, the overall phenotype of the LMO is a result of all the genes, not just those that have been introduced via the techniques of modern biotechnology. This idea is not clearly made in the guidance.
Q17. Is this section of the Guidance useful to risk assessors who have limited experience with risk assessments of LMOs with stacked genes of traits?	☐ Yes ☒ No	Comments: See the comments of Q16. In addition, the guidance does not adquately explain that genetic change does not equate with risk to the environment, since organisms continually experience genetic changes without human intervention. The Guidance does not acknowledge the wealth of experience we have in evaluating the resulting phenotypic changes and their potential impacts on the environment. The discussion in the Guidance on insertional effects from transgenesis is just one instance of a missed opportunity to explain this concept (and the fact that genome changes occur at a much higher frequency in all organisms than the one-time insertion of a transgene construct. There should be more emphasis on the practical step that most risk assessors typically ask if someone else has already done a risk assessment (this is the conceptual underpinning to the mechanism of the Biosafety Clearing House, but this is not explained in the Guidance in a clear fashion that would enable a risk assessor to gain access to another relevant risk assessment).
Q18. Is this section of the Guidance organized in a logic and structured manner?	☐ Yes ☒ No	Comments: There seems to be unnecessary redundancy within the text of the main Roadmap guidance. There is no logic provided to explain why there is a need for a separate section in the guidance on this topic when it provides so little additional information.
Q19. Is this section of the Guidance user-friendly taking into account that risk assessment is a complex scientific and multidisciplinary activity?	☐ Yes ☒ No	Comments: There should be a clearer explanation of the need for traditional plant breeders in the evaluation. There is already a wealth of information from non-LM plants developed to tolerate abiotic stress, and this provides context to evaluate the likely behaviour of LM plants modified for abiotic stress. Related disciplines of plant physiology, plant pathology, and entomology can provide useful context to illustrate the ways in which abiotic stresses affect susceptibility to pests and pathogens.

Q20. Is there any other issue or concept that you would like to see included in this section of the Guidance?	☐ Yes ☐ No	Comments: There should be more discussion examining the scientific rationale as to why a separate RA would be needed for a stacked trait LM plant, if the parental LM plants have already been evaluated. Our experience with plant breeding worldwide does not support such a need, and the Protocol does not presuppose such a need.
Risk assessment of living modified crops with tolerance to abiotic stress		
Please answer each of the questions in the left column with "yes" or "no" and add comments if needed.		
Q21. Does this section provide useful guidance when conducting risk assessments of LM crops with tolerance to abiotic stress(es) in accordance with the Protocol?	☐ Yes ☒ No	Comments: As with the comments on the section on "stacked traits", there should be more discussion examining the scientific rationale as to why a separate RA would be needed for an LM plant modified to tolerate abiotic stress.
Q22. Is this section of the Guidance useful to risk assessors who have limited experience with risk assessments of LM crops with tolerance to abiotic stress(es)?	☐ Yes ☒ No	Comments: As with the comments on the section on "stacked traits," this section on LM plants modified for abiotic stress does not provide sufficient context, nor does it describe relevant comparison with non-LMO plants developed to tolerate abiotic stress. There is extensive scientific literature that could be cited that would place this in clearer context, but this is not part of the Guidance. Likewise, there is no explanation in this section of the Guidance that explains cases in which plants tolerant of abiotic stress have resulted in adverse impacts on biodiversity.
Q23. Is this section of the Guidance organized in a logic and structured manner?	☐ Yes ☒ No	Comments: As mentioned in the comment for Q22, the scientific rationale and logic are not well supported in this section.
Q24. Is this section of the Guidance user-friendly taking into account that risk assessment is a complex scientific and multidisciplinary activity?	☐ Yes ☒ No	Comments: The comments for Q22 apply here as well. The Guidance does not provide information that would lead the reader to seek experts or knowledge gained from the use of non-LMO plants when evaluating LM plants modified to tolerate abiotic stress.
Q25. Is there any other issue or concept that you would like to see included in this section of the Guidance?	☒ Yes ☐ No	Comments: The comments for Q22, Q23, and Q24 apply here, also. There should be clearer explanation of the experience with non-LM plants developed for abiotic stress and how this relates to evaluating the LM plants.
Risk assessment of living modified mosquitoes		
Please answer each of the questions in the left column with "yes" or "no" and add comments if needed.		
Q26. Does this section provide useful guidance when conducting risk assessments of LM mosquitoes in accordance with the Protocol?	☐ Yes ☒ No	Comments: The guidance in this section is not well developed and fails to compare develop RA of LM mosquitoes in the context of current approaches for mosquito (and disease) control. This is perhaps one of the easier examples of LMOs with which to illustrate the consideration of human health under the

		Protocol, but the guidance neglects to illustrate this in a way that risk assessors can see how this aspect is included. The relative benefit in light of current practices (step 5) should be more evident in this type of RA, but it was not a well developed concept in other parts of the Guidance either (a shortcoming that is consistent through the entire guidance document).
Q27. Is this section of the Guidance useful to risk assessors who have limited experience with risk assessments of LM mosquitoes?	☐ Yes ☒ No	Comments: As with other parts of the guidance, this section prescribes what a risk assessor "should" do, but there is weak or non-existent explanation of why this should be done or how it relates to the risk assessment. Scientific expertise in this section seems frequently lacking or confused in the presentation of the text. Many of the "points to consider" are often internally inconsistent with other parts of the text, especially with the discussion of genetic constructs which block fertility.
Q28. Is this section of the Guidance organized in a logic and structured manner?	☐ Yes ☒ No	Comments: This section of the guidance is poorly developed. Scientific rationale or relevance of points to consider is not well supported (see comments above for Q26 and Q27 for examples).
Q29. Is this section of the Guidance user-friendly taking into account that risk assessment is a complex scientific and multidisciplinary activity?	☐ Yes ☒ No	Comments: The section does not adequately describe the current context of trying to control diseases vectored by mosquitoes and how LM mostquito strategies relate to potential effects on the environment and human health.
Q30. Is there any other issue or concept that you would like to see included in this section of the Guidance?	☒ Yes ☐ No	Comments: See comments above for suggestions on issues that should be more fully developed for this section of the guidance.

ADDITIONAL COMMENTS

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

Q31. In summary, the main substantive concerns with the Guidance are is that it is 1) not accurate and 2) not useful.

1) Not accurate, because:

- The Guidance does not adequately reflect the experience worldwide with evaluating the impact of LMOs in the environment; in the current draft it gives the wrong impression that there is little experience with evaluating LMOs, and wrongly suggests that experience with the use of other GMOs, or indeed with the use of other organisms, cannot be used in a risk assessment;

- The Guidance does not adequately reflect the experience worldwide with the safe use of LMOs in the environment.

2) Not useful, because in its current form it raises more questions than it answers. See for example the questions raised in the submissions of the UK, for example.
