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: <Country's name> ☒ Organization: Please specify: Center for Environmental Risk Assessment, ILSI Research Foundation
Q2. When was the testing of the Guidance conducted?	Please enter date: 11/30/2011
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: Dr. Andrew F Roberts, Deputy Director, Center for Environmental Risk Assessment ☐ Other: Please specify: <Type here>
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: Some sections of the Roadmap are noticably improved from earlier versions and may be useful if taken by themselves. However they are weighed down by some very confusing, unnecessary and unhelpful sections that ultimately make the Roadmap less useful than many other pre-existing resources that might be used to provide guidance for risk assessments. The most disappointing thing about the Roadmap continues to be a complete failure to acknowledge 15+ years of risk assessment history for LMOs. This document derives no insight from that experience and could have been written in 1995 - with the exception of quotes taken from the Protocol.
Q9. Is the Roadmap useful to risk assessors who have limited experience with LMO risk assessment?	☐ Yes ☒ No	Comments: In addition to the comment in response to Q8, the Roadmap fails to distinguish between different activities such as confined field trials, unrestricted environmental release and imports for food, feed or processing - except in the most perfunctory way. As a general rule, the guidance is too basic to be practically useful and filled with too many complex (and often trivial) concepts to serve as an introductory or educational tool. In particular, the "points to consider," are a mixed bag of relevant general principals and others which are ill thought out and not much related to the text of the section in which they appear.
Q10. Is the Roadmap organized in a logic and structured manner?	☒ Yes ☒ No	Comments: There's nothing wrong with the structure, per se. The section on "Related Issues" stands out as being completely unnecessary. It might also be useful to put the flowchart at the beginning of the document, instead of at the end.
Q11. Is the Roadmap user-friendly taking into account that risk assessment is a complex scientific and multidisciplinary activity?	☐ Yes ☒ No	Comments: There are two challenges to making the roadmap user friendly. First, the language is filled with jargon that is applied inconsistently. The Roadmap is a negotiated document, and unfortunately this does not lend itself to "user friendly" language, but the inclusion of lengthy lists within the text makes it very difficult to read and comprehend. For example, although it may be important to some that the Roadmap imparts the idea that adverse effects can be "direct, indirect, immediate or delayed," this need only be mentioned once early in the document, or even better in the glossary. Sprinkling the phrase throughout the document any time the word "effects" is used is unnecessary and distracting. Second, although there is nothing wrong with the

		structure (i.e. headings and subsections) of the document, the text underneath is often bizarrely disorganized, bouncing from topic to topic without much rhyme or reason, frequently mixing important considerations with highly specific or trivial ones while making no distinctions between them. As a rule, when providing guidance on how to perform an assessment it is better to provide a solid understanding of the foundational elements and then address the various complexities that may arise using case studies or examples. The Roadmap seems to do the opposite, bypassing the foundation in order to pile on potential considerations that may have limited practical applicability.
Q12. Is the Roadmap applicable to all types of LMOs (e.g. plants, animals, microorganisms)?	☒ Yes ☒ No	Comments: Most of the broad concepts included in the Roadmap are equally applicable to other organisms. However, there are sections which unneceessarily delve into details which may not be broadly applicable, and doesn't explain why or how they should be dealt with.
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: The Roadmap largely fails to distinguish between different scales of releases, leaving the user to guess which elements are appropriate for what scale of release. In essence, this is a failure to provide guidance. Again, this is another missed opportunity to make use of the cumulative experience of 15 years of risk assessment dealing with LMOs in the environment. There are ample examples of risk assessments for field trials, and risk assessments for unconfined release which could be used to emphasize what elements are important for each activity, but this has not been done.
Q14. Is there any other issue or concept that you would like to see included in the Roadmap?	☐ Yes ☒ No	Comments:
Q15. Does the flowchart provide a useful graphic representation of the risk assessment process as described in the Roadmap?	☒ Yes ☐ No	Comments: The flowchart is a very nice representation of the generalized risk assessment process. It shows the simplicity of the concepts without a lot of the clutter that is weighing down the text of the roadmap.

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: There is very little of value presented in this section of the document. The fundamental flaw here is the failure to distinguish between the potential for changes at the genomic level and the real potential for those changes to lead to an adverse environmental effect. When organisms are crossed there are many potential interactions within the genome (regardless of whether the organisms are LMOs or not), but rarely does breeding produce an organism with the potential to have an adverse effect on the environment by crossing two parents which are benign. Instead of providing guidance that would inform a useful risk assessment, this section precludes the use of tools like case by case hazard identification and the generation of risk hypotheses (i.e. problem formulation) in favor of experimentation that is unlikely to be informative (lines 737-743) This section compounds the confusion in the Roadmap between choosing a comparator for a comparative risk assessment and choosing appropriate controls for laboratory or field experiments. Further there are lots of dubious and unsupported statements in the document (see lines 647-649, 734-736 for some examples). There is also a disproportionate emphasis on molecular characterization which will likely contribute little to the final risk assessment. Chasing down the detailed minutiae of an organism's genotype is likely to be far less informative for environmental risk assessment than looking at the organisms phenotype in the receiving environment. There is no discussion of the proportionality of some of the phenomena discussed here. For example, the heterogeneity of parental organisms is no more or less a concern for crossing one LMO with another LMO than it is for crossing an LMO with a non-modified relative.
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: As it is currently written, this section provides little to no value to anyone trying to consider LMOs with stacked traits and is far more likely to confuse assessors with limited experience than help them produce a useful risk assessment.
Q18. Is this section of the Guidance organized in a logic and structured manner?	☐ Yes ☒ No	Comments: There is no logic for including a section devoted to "Methods for distinguishing the combined transgenes in a stacked event from the parental LMOs" here. The unlikely scenario being conveyed is that it may be necessary for the purpose of managing risks to the conservation and sustainable use of biodiversity to be able to distinguish between the presence of a gene in a stack or parental LMO. It is very difficult to imagine such a scenario

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: <Type here>
Q20. Is there any other issue or concept that you would like to see included in this section of the Guidance?	☐ Yes ☒ No	Comments: <Type here>

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: The only useful information presented here are the areas that point out that assessment of LMO plants with abiotic stress tolerance is the same as for other LMO plants. The rest of the document is a series of unsupported speculations about the theoretical potential difficulties and the (dubious) supposition of the utility of future technologies to address them. Once again there is confusion between a controlled experiment and a comparative risk assessment. Likewise, there are numerous unsupported statements (see line 1028-1030 for an example)
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: A novel risk assessor is unlikely to come away from this guidance with a good idea of what is required for an ERA of an LMO plant with an abiotic stress tolerant trait. Increasingly complex statistical comparisons between the LMO plant and its comparator are not necessary (and likely counterproductive) for determining environmental risk. This represents a huge lost opportunity to focus on potentially plausible risk hypotheses for stress tolerant plants (such as increased survival and persistence outside of agricultural habitats) and what sort of data would be useful for an assessment.
Q23. Is this section of the Guidance organized in a logic and structured manner?	☐ Yes ☒ No	Comments: The section on the LM plant in "representative environments" is just a complex restatement that the potential receiving environment should be considered in environmental risk assessments of LMOs. It doesn't add anything of value.
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:
Q25. Is there any other issue or concept that you would like to see included in this section of the Guidance?	☐ Yes ☒ No	Comments: <Type here>

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 parts of this guidance document that are useful are the general principles which are already contained in the roadmap. The information specific to mosquitoes is generally uninformative and filled with speculation as to potential adverse outcomes that are unsupported by a scientific rationale (see lines 1159-1162, 1163-1165, 1173-1176,1178-1183, 1185) and does not include any consideration of where LM mosquitoes would fit within the pantheon of other mosquito control activities.
Q27. Is this section of the Guidance useful to risk assessors who have limited experience with risk assessments of LM mosquitoes?	☐ Yes ☒ No	Comments: This section is more of a creative "what if" brainstorming session regarding potential harms that might occur with the use of LM mosquitos. There is nothing wrong with that, but the next step for creating useful ERA guidance is to determine which of those hypothetical harms merits consideration in real risk assessment.
Q28. Is this section of the Guidance organized in a logic and structured manner?	☐ Yes ☒ No	Comments: <Type here>
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: <Type here>
Q30. Is there any other issue or concept that you would like to see included in this section of the Guidance?	☐ Yes ☒ No	Comments: <Type here>

ADDITIONAL COMMENTS
Please add any additional comment you may have regarding the "Guidance on Risk Assessment of Living Modified Organisms" below.
Q31. *There is a consistent and repeated failure in all parts of the document to adequately address the purpose of the ERA - to provide relevant information to decision makers in a timely fashion. The guidance also consistently fails to make use of the years of experience that have been accrued in conducting ERAs for LMO plants. In addition to some dubious statements, there is repeated emphasis on increasing the volume of molecular characterization data to be considered despite 15 years of experience suggesting that this has limited practical utilility. Novel risk assessors making use of this document will come away with the mistaken impression that the solution to their problem is more molecular biology when what is needed is robust, hypothesis driven problem formulation. There are currently many resources available to assist risk assessors, including many cited on links provided here, that provide better guidance than this document.*
