

# POPRC-9/8: Guidance on how to assess the possible impact of climate change on the work of the Persistent Organic Pollutants Review Committee

*The Persistent Organic Pollutants Review Committee,*

*Recognizing* the scientific evidence of climate change impacts and interactions with chemicals and the need for such interactions to be considered in the review of the chemicals proposed for listing in Annexes A, B and/or C to the Stockholm Convention on Persistent Organic Pollutants,

1. *Adopts* the guidance on how to assess the possible impact of climate change on the work of the Persistent Organic Pollutants Review Committee,<sup>1</sup> the approach to the consideration of climate change interactions with the chemicals proposed for listing in Annexes A, B and/or C to the Stockholm Convention set out in annex I to the present decision and the recommendations developed on the basis of the guidance, as amended at its ninth meeting and set out in annex II to the present decision;

2. *Decides* to use the guidance and approach referred to above in its future evaluation of chemicals proposed for listing in Annexes A, B and/or C to the Stockholm Convention;

3. *Also decides* to forward the recommendations developed on the basis of the guidance on how to assess the possible impact of climate change on the work of the Persistent Organic Pollutants Review Committee to the Conference of the Parties for consideration at its seventh meeting.

## Annex I to decision POPRC-9/8

### Approach to the consideration of climate change interactions with the chemicals proposed for listing in the annexes to the Stockholm Convention

#### I. Introduction

1. Climate change is predicted to have an impact on the environmental fate of persistent organic pollutants and the risks that they pose to the environment<sup>2</sup> and will therefore be relevant to consider when reviewing chemicals proposed for listing under the Stockholm Convention.<sup>3</sup>

2. The interactions between persistent organic pollutants and climate change relevant to consider in the review of chemicals proposed for listing are described in chapter 4 of the "Guidance on how to assess the possible impact of climate change on the work of the Persistent Organic Pollutants Review Committee" (hereinafter referred to as "Guidance").<sup>4</sup> The information is summarized in table 1 below.

**Table 1. Summary of potential climate change impacts and interactions with persistent organic pollutants according to the Guidance on how to assess the possible impact of climate change on the work of the Persistent Organic Pollutants Review Committee**

Climate change impact	Induced change	Type of study	Reference chapter in the Guidance
Temperature effects on water solubility of the chemical	Exposure of biota	Laboratory studies or field studies	4.2 (b) and (e)
Salinity effects on the bioavailability of the	Exposure of biota	Laboratory studies or field studies	4.2 (b) and (e)

<sup>1</sup> UNEP/POPS/POPRC.9/INF/15.

<sup>2</sup> UNEP/AMAP 2011; UNEP/POPS/POPRC.9/INF/15.

<sup>3</sup> UNEP/POPS/POPRC.9/INF/15.

<sup>4</sup> UNEP/POPS/POPRC.9/INF/15.

<b>Climate change impact</b>	<b>Induced change</b>	<b>Type of study</b>	<b>Reference chapter in the Guidance</b>
chemical			
Changes in primary production	Exposure of herbivores and zooplankton	Modelling or field studies	4.2 (c) and (e)
Changes in persistent organic pollutant levels in prey or food	Exposure of predators or humans	Modelling or field studies	4.2 (c), (d) and (e)
Change of prey by predators	Exposure of predators	Field studies	4.2 (c) and (e)
Migration of new species	Exposure of biota in the new region	Field studies	4.2 (a) and (e)
Releases from new sources	Exposure of biota and humans	Field studies	4.2 (a) and (e)
Remobilization from secondary sources	Exposure of biota	Modelling or field studies	4.2 (a), (d) and (e)
Changes in solar irradiation	Photolytic degradation rate of the chemical	Modelling or evaluations based on fate properties	4.3 (a) and (c)
Temperature changes in air, water, soil or sediment	Abiotic degradation, photolytic degradation or microbial degradation	Modelling, field studies or laboratory studies	4.3 (a), (b) and (c)
Changes in pH in water, soil or sediment	Microbial degradation and activity	Modelling, field studies or laboratory studies	4.3 (b) and (c)
Changes in salinity in sea water or fresh water	Microbial degradation	Laboratory studies or field studies	4.3 (b) and (c)
Temperature effects on uptake rates and elimination rates	Accumulation levels and rates in organisms	Modelling, laboratory studies or field studies	4.4
Changes in food web structures	Accumulation levels up the food chain and across food webs	Modelling or field studies	4.4
Temperature effects on volatilization of the chemical	Environmental distribution and transport of the chemical, including long-range transport	Modelling, monitoring and/or evaluations based on fate properties	4.5 (a), (b) and (c)
Changes in wind pattern and strength	Atmospheric transport of airborne particulates and the chemical	Modelling, monitoring and/or evaluations based on fate properties	4.5 (b) and (c)
Changes in rainfall dynamics	Transport pathways, rate of environmental transport and transport medium	Modelling, monitoring and/or evaluations based on fate properties	4.5 (b) and (c)
Migration of new species	Transport of the chemical to new regions	Field studies	4.5 (b) and (c)
Temperature-induced changes in toxicokinetics and toxicodynamics	Chemical uptake rate, physiological and metabolic processes in the biota	Laboratory studies and/or field studies	4.6 (a) and (c)
Chemical toxicant exposure interacting with climate change impact, such as increased temperature	Homeostatic temperature regulation and physiological adaptation to heat stress and susceptibility to hazardous substances in biota	Laboratory studies and/or field studies	4.6 (a) and (c)
Chemical toxicant exposure interacting with climate change impact, such as altered salinity	Physiological cost and ability to maintain osmoregulation	Laboratory studies and/or field studies	4.6 (a) and (c)

<b>Climate change impact</b>	<b>Induced change</b>	<b>Type of study</b>	<b>Reference chapter in the Guidance</b>
Chemical toxicant exposure interacting with climate change impact, such as increased ultraviolet radiation	Biomolecular, cellular and physiological alterations in organisms making them more susceptible to contaminants and exacerbation of adverse effects of hazardous substances	Laboratory studies and/or field studies	4.6 (a) and (c)
Chemical toxicant exposure interacting with climate change impact, such as increased hypoxia	Adverse effects of hazardous substances through interfering with physiological processes in organisms	Laboratory studies and/or field studies	4.6 (a) and (c)
Temperature induced effects on biotransformation of chemical in biota	Formation of toxic metabolites in biota	Laboratory studies and/or field studies	4.6 (a) and (c)

3. In specific situations, it may also be appropriate for the Committee to consider climate change impacts when considering possible socio-economic impacts on society<sup>5</sup> in the risk management evaluation for a chemical under review (Annex F).<sup>6</sup> The present document aims to describe a simplified and practical approach to how information on climate change interactions with the chemicals proposed for listing can be presented and applied by the drafter in the development of a proposal for listing a chemical in Annexes A, B and/or C (Annex D), a risk profile (Annex E) and a risk management evaluation (Annex F).

4. The approach is based on the "Handbook for effective participation in the work of the Persistent Organic Pollutants Review Committee", and the background for the approach is described in chapter 5 of the Guidance.

## **II. Methodology for consideration of climate change impacts and interactions with chemicals under review by the Persistent Organic Pollutants Review Committee**

5. The approach is based on the methodology used by the Committee in the review of chemicals proposed for listing. It is a systematically narrative review, which is science-based and aims to describe the state-of-the-art science using the weight-of-evidence approach. The review shall be nuanced, trying to get all aspects of relevance integrated in a balanced manner, including positive and negative findings, and give weight to possible risks in a precautionary manner. Quantified criteria should be combined with qualitative methods. Furthermore, it should be prioritized to obtain information from all regions and relevant stakeholders.

6. The information on climate change impact on and interactions with persistent organic pollutants shall be applied by the Committee chemical by chemical and be based on chemical-specific data. If data on climate change impact is not available for the chemical under review, consideration should be given to data on climate change impact on analogous substances if relevant and available. The analogous substances' identity, phase or form, physiochemical profile, structural similarities and potential differences with the chemical under review should be documented, together with a justification for using the information. If relevant, the environmental fate properties, mode of action and metabolic pathway in organisms should also be included. Further information on analogous substances is available in chapter 6.3 of the Guidance.

7. The uncertainties and ranges of possible changes in the chemical, physiological or biological factors due to climate change will be different for every chemical under review, type of impact, ecosystem, species, population, scientific test/observation and region. Quantification of the various possible effects and uncertainties in the scientific findings must therefore be based on the documented uncertainties in the data reviewed.

<sup>5</sup> UNEP/AMAP 2011.

<sup>6</sup> UNEP/POPS/POPRC.9/INF/15.

8. If possible, the regional differences in climate change as observed and projected by the Intergovernmental Panel on Climate Change (IPCC) should be taken into account in the evaluation.<sup>7</sup>

9. All relevant evidence should be taken into account, but some evidence should be given more weight in the overall conclusion. The evaluation of the information provided on climate change interactions with the chemical shall be based on the quality, relevance, and reliability of the data (for further advice, see also chapter 6.3 of the Guidance. Peer reviewed scientific data should take precedence and priority should be given to the most recent data. The decision of which data is given more weight shall be based on the precautionary approach, based on a scientific evaluation of the data at hand and transparently described.

### **III. Basic scheme for taking into account climate change interactions with chemicals**

#### **Step 1 - Collection of relevant information**

10. Relevant information to be collected is described in step 3 below, and background information is summarized in chapter II of this document. The “Handbook for effective participation in the work of the Persistent Organic Pollutants Review Committee” describes the methodology of data collection and information sources for the three different review processes.<sup>8</sup>

#### **Step 2 - How to integrate the relevant information**

##### **(1) Proposal for listing a chemical in Annexes A, B and/or C**

11. If information on climate change interactions with the chemical under review adds to the reasons for concern and the need for global control, it should be presented in the chapter containing the statement of concern (cf., Annex D, para. 2) in the proposal for listing a chemical in Annexes A, B and/or C.

##### **(2) Risk profile**

12. Relevant information, if available, should be presented in the following chapters of a risk profile:

- 2.1 Sources;
- 2.2 Environmental fate;
- 2.3 Exposure;
- 2.4 Hazard assessment for endpoints of concern.

13. If climate-change-associated effects on a substance add to the concern that the chemical poses to the environment and human health and is important for the consideration of global management, it should be highlighted in chapter 3 of the risk profile, Synthesis of the information.

##### **(3) Risk management evaluation**

14. Relevant information related to the impact of measures taken during the whole life-cycle of the chemical, including waste and disposal implications, should be presented in the following chapter of a risk management evaluation, if available:

- 2.4 Summary of information on impacts on society of implementing possible control measures.

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<sup>7</sup> The uncertainties in the findings of observed and projected climate change impacts are given in the technical summaries developed by the IPCC.

<sup>8</sup> UNEP/POPS/COP.4/INF/9. The document describes the methodology of data collection and information sources for the three different review processes. In tables 3 and 4 in the handbook, a non-exhaustive list of public and private databases and other sources of information is provided.  
<http://chm.pops.int/Convention/POPs%20Review%20Committee/Publications/tabid/345/Default.aspx>

15. Information on whether the recommended strategy provides co-benefits and mitigation measures to reduce emissions of greenhouse gases and persistent organic pollutants through proper life-cycle management may be included in chapter 3 of a risk management evaluation, Synthesis of the information.

### **Step 3 - Applying the information on climate change interactions with chemicals in decision-making**

#### **(1) Proposal for listing a chemical in Annexes A, B and/or C**

16. Climate change impacts in a real-life exposure scenario are related to environmental conditions in the field and do not change the conclusions on the chemicals' intrinsic properties, such as persistence, toxicity, ability to bioaccumulate or to undergo long-range transport, measured under standardized conditions. The climate change impact will therefore not interfere with the conclusion on the persistent organic pollutant properties of the chemical under review. It may, however, impact the releases, degradation, transport and fate of contaminants in the environment, accumulated levels of contaminants in organisms, their bioavailability to organisms and the vulnerability of organisms to the contaminants, and therefore add to the reasons for concern and need for global control. The adverse effects of the chemical under review on organisms may in addition interfere with their ability to adapt to changes in the environment such as increased temperatures, changes in salinity or loss of ice due to climate change. The interactions are described more in depth in the Guidance, which can be used to evaluate when interactions between climate change and the chemical under review should be included in the statement of reasons for concern in the proposal.

17. Differences in climate between regions add to and increase the variability and complexity of the environmental system and make it harder to extrapolate from the laboratory to studies in the field, as well as from findings in one region to another. The conditions of obtaining the data and, if possible, region-related findings, are therefore important to describe when presenting the data.

18. Examples illustrating how the climate change impact on the chemical under review can be evaluated in the proposal are given in chapter 5.1 (e) of the Guidance.

#### **A. Persistence**

19. Climate change impacts on the degradation of substances are summarized in Table 1 above and are described in more depth in chapter 4.3 of the Guidance. When considering the relevance for the statement of concern, the findings on climate change impact on the degradation of the chemical under review should be evaluated in an integrated manner, together with other information relevant for the persistence criteria 1 (b) (i) and (ii) of Annex D to the Convention.

20. Under the criterion 1 (b) (i) of Annex D to the Convention, half-lives for water, soil and sediment are set. The standardized laboratory test methods for persistence of a chemical give empirical estimates of the chemical's biodegradation potential under standardized conditions. They can be used as a guiding tool to evaluate the persistence of a substance in comparison with the numerical half-lives for persistence (1 b (i) of Annex D to the Convention) and with half-lives of already listed persistent organic pollutants.

21. Under criterion 1 b (ii) of Annex D to the Convention, "[e]vidence that the chemical is otherwise sufficiently persistent to justify its consideration within the scope of this Convention", field studies or monitoring data can be used to consider if the criterion is fulfilled.

22. Information that may be relevant for the statement of concern (cf., Annex D, paragraph 2) can include, but is not limited to, findings of increased environmental half-lives or decreased degradation because of changes in climate factors from laboratory tests, monitoring or field studies. The climate factors relevant to the evaluation of climate change impacts on degradation are temperature, solar irradiance, pH, salinity and microbial activity.<sup>9</sup>

#### **B. Bioaccumulation**

23. Climate change impacts on the accumulation of a substance in organisms and food webs are summarized in table 1 above and are described in more depth in chapter 4.4 of the Guidance. When considering its relevance for the statement of concern, the information on

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<sup>9</sup> UNEP/POPS/POPRC.9/INF/15.

climate change impacts should be evaluated together with other information relevant for the three bioaccumulation criteria 1 (c) (i)–(iii) of Annex D to the Convention in an integrated and balanced manner.

24. Under criterion 1 c (i) of Annex D to the Convention, numerical values are set for bioconcentration factors (BCFs) or bioaccumulation factors (BAFs) in aquatic species. The standardized laboratory test method for bioaccumulation of chemicals uses aquatic species and gives empirical estimates of the chemicals' bioaccumulation potential under standardized conditions. The methods can be used as a guiding tool for evaluating the bioaccumulation of a substance in comparison to the numerical BCFs or BAFs for bioaccumulation (criterion 1 c (i) of Annex D to the Convention) and to BCFs or BAFs of already listed persistent organic pollutants. Criterion 1 c (ii) of Annex D to the Convention asks for other reasons of concern, such as high bio-accumulation in other species, high toxicity or eco-toxicity. The third criterion of Annex D, 1 c (iii), includes monitoring data in biota indicating a bio-accumulation potential of global concern.

25. The factors relevant for the evaluation of the climate change impacts on accumulation in organisms and food webs are changes in temperature and food web structure.<sup>10</sup>

26. Information that may be relevant for the statement of reason of concern and need for global control (cf., Annex D, para. 2) should address data of concern on, but not be limited to:

(a) Laboratory studies showing changes in BCF and BAF values with increased temperatures in organisms;

(b) Changes in levels in biota along with increased temperatures in their surrounding environment from field studies or monitoring;

(c) Field studies showing changes in trophic structure resulting in changes in biomagnification in top predators;

(d) Data from field studies of different trophic levels from the same area and changes in biomagnification or levels in top predators with differences in temperature;

(e) Monitoring results showing contaminant levels in food webs in combination with auxiliary information such as temperature, total organic content (TOC), diet, etc. over a time period indicating a change in bioaccumulation or biomagnification;

(f) Climate change interactions with the chemical under review that change the adverse effects of the chemical, showing high toxicity or eco-toxicity.

27. The interlinkages of climate change and the adverse effects of a contaminant are described in chapters 4.6 and 4.1 (c) of the Guidance. The application of the criteria when evaluating the climate change impact on a chemical under review is described below.

### **C. Long-range environmental transport**

28. The interlinkages between climate change and the long-range environmental transport of persistent organic pollutants are summarized in table 1 above and are described in more depth in chapter 4.5 of the Guidance. When considering its relevance for the statement of concern, the information should be evaluated in an integrated manner, together with other information relevant for criteria 1 (d) (i)–(iii) of Annex D to the Convention.

29. Criteria 1 (d) (ii) and (iii) are more relevant for the evaluation of climate change impacts on environmental transport and transfer of a chemical than is criterion 1 (d) (i) of Annex D. Criterion 1 (d) (ii) relies on monitoring data and criterion 1 (d) (iii) relies on environmental fate properties and modelling results and sets a numerical value for persistence in air.

30. The factors relevant for the evaluation of climate change impacts on environmental transport are changes in temperature, wind strength and pattern, rainfall dynamics and migration of new species.<sup>11</sup>

31. Information that may be relevant for the statement of concern (cf., Annex D, para. 2) can include, but is not limited to:

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<sup>10</sup> UNEP/POPS/POPRC.9/INF/15.

<sup>11</sup> UNEP/POPS/POPRC.9/INF/15.

- (a) Changes in volatility of a substance with increased temperature;
- (b) Modelling taking into account the climate change impact on environmental transport and fate;
- (c) Monitoring data showing air concentrations of a contaminant together with data from monitored weather systems in the region, its environmental fate properties and known effects of climate change.

**D. Adverse effects**

32. The projected interactions between the adverse effects of a substance and climate change impact are summarized in table 1 above and are described in more depth in chapters 4.6 and 4.1 (c) of the Guidance. When considering its relevance for the statement of concern, the information should be evaluated in an integrated manner, together with other information relevant for criteria 1 (e) (i) (evidence of adverse effects) and 1 (e) (ii) (indication of the potential for damage) of Annex D to the Convention.

33. The factors relevant for the evaluation of climate change impacts on environmental transport are changes in temperature, salinity, ultraviolet radiation and hypoxia.<sup>12</sup>

34. Information that may be relevant for the statement of concern (cf., Annex D, paragraph 2) can include, but is not limited to:

- (a) Laboratory studies or field studies showing the impact on the vulnerability of organisms to the chemical or bioavailability of the chemical due to changes in temperature, salinity, ultraviolet radiation or hypoxia;
- (b) Laboratory studies or field studies showing the impact on the vulnerability of organisms to temperature changes, changes in salinity, ultraviolet radiation or hypoxia due to exposure to the chemical under review;
- (c) Laboratory studies exploring the climate change impact on the adverse effects of a chemical, including comparisons of the levels used in the laboratory to measured levels of the compound in the environment experiencing climate change;
- (d) Laboratory studies exploring the effect of changes in environmental parameters on the adverse effects of a chemical, only if the changes are relevant to describing the climate change impact;
- (e) Field observations of changes in environmental parameters due to possible or observed climate change impacts and their impact on the adverse effects of a chemical in the environment;
- (f) Detections of increased levels of a chemical under review with changes in environmental parameters due to climate change in endangered species, vulnerable populations, human body (blood, milk, fatty tissue) and changes in exposure due to climate change in the development stage of a species.

**(2) Risk profile**

35. Climate change interactions with persistent organic pollutants are complex and a wide range of ecological and physiological processes and end points have to be taken into account. Climate change is predicted to alter the environmental distribution of contaminants due to changes in environmental transport, partitioning, carbon pathways, accumulation and degradation process rates, as well as their bioavailability and organisms' susceptibility to hazardous substances. Persistent organic pollutants, on the other hand, are predicted to interact with physiological, behavioral and ecological adaptations to climate change and thereby influence the ability of organisms, populations, communities and ecosystems to withstand and/or adapt adequately to climate change.

36. A risk profile shall further elaborate on, and evaluate, the information referred to in Annex D, and include, as far as possible, any additional information following the criteria in Annex E. Climate change impacts are of particular relevance to the evaluation of the

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<sup>12</sup> UNEP/POPS/POPRC.9/INF/15.

environmental fate and transport (Annex E, subparagraph (c)) and the hazard assessment (Annex E, subparagraph (b)) of a potential persistent organic pollutant in the risk profile.

37. In addition the following criteria will be relevant when addressing climate change impact and interactions with a chemical under review in the risk profile: sources (cf., Annex E, subpara. (b) (iii)), exposure in local areas (cf., Annex E, subpara. (e)); monitoring data (cf., Annex E, subpara. (d)), and national and international risk evaluations and risk assessments (cf. Annex E, subpara. (f)).

38. Examples illustrating how climate change interactions may be handled in the risk profile for a chemical under review are given in chapter 5.2 (e) of the Guidance.

#### **A. Hazard assessment**

39. Relevant information on the interactions between a chemical under review and climate change that are relevant for the hazard assessment for the endpoints of concern can include, but are not limited to, documented data derived from field studies, monitoring and laboratory studies on:

(a) Climate change interactions with the adverse effects of the chemical, including data relevant for criteria 1 (e) (i) and (ii) of Annex D and the background information summarized in table 1 above;

(b) Impacts of climate change on exposure to persistent organic pollutants of biota and humans, including the background information summarized in table 1 above;

(c) The effects of multiple stressors (figure 2 in the Guidance), including exposure to persistent organic pollutants and climate change, on vulnerable species and populations, including all considerations described in chapter 4.1 (c) of the Guidance.

#### **B. Evaluation of environmental fate and transport**

40. Relevant information on the interlinkages between the chemical and climate change when analysing data to ascertain the environmental fate of the chemical can include, but is not limited to, documented data derived from field studies, modelling, laboratory studies and monitoring on:

(a) Differences in the impacts of climate change in different regions and ecosystems, as well as impacts on environmental partitioning, including all the considerations described in chapter 4.1 (a)–(b) of the Guidance;

(b) Climate change impacts on environmental reservoirs, contaminated sites and landfills, as well as the spread of biovectors, as described in chapter 4.2 (a) of the Guidance;

(c) Climate change impacts on degradation, including data relevant for criteria 1 (b) (i) and (ii) of Annex D and the background information summarized in table 1 above;

(d) Climate change impacts on uptake rates, rates of biotransformation and excretion, bioaccumulation and biomagnification, including data relevant for the criteria 1 (c) (i)–(iii) of Annex D, and the background information summarized in table 1 above;

(e) Climate change impacts on the environmental transport of persistent organic pollutants, including data relevant for criteria 1 (d) (ii) and (iii) and the background information summarized in table 1 above.

#### **C. Other criteria of relevance to Annex E**

41. In addition, the following information will be relevant for the evaluation in the risk profile stage:

(a) Climate change impact on releases from sources (cf., Annex E, subpara. (b) (iii)) and on exposure in local areas (cf., Annex E, subpara. (e)), including the background information summarized in table 1 above;

(b) Available monitoring data, including climate change impact on levels (cf., Annex E, subpara. (d));

(c) National and international risk evaluations and risk assessments taking into account climate change impact (cf., Annex E, subpara. (f)).



### **(3) Risk management evaluation**

42. According to the report “Climate change and POPs: Predicting the impact”<sup>13</sup> it is important that decision makers explore and disseminate information on possible mitigation activities and the co-benefits of managing persistent organic pollutants, other contaminants and climate change in an integrated manner. This relates specifically to the consideration of positive and/or negative impacts on society of implementing possible control measures in Annex F, subparagraph (c), considering the whole life-cycle of a chemical and waste and disposal implications in Annex F, subparagraph (d). For example, it might be appropriate to discuss the effect of mitigation activities on emissions of greenhouse gases or climate change impacts with relevance for the strategy of waste management and disposal of a chemical, such as extreme weather events.

43. Examples illustrating how climate change interactions may be integrated in the risk management evaluation for a chemical under review are given in chapter 5.3 (c) of the Guidance.

44. Relevant information when considering the positive and/or negative impacts on society of implementing identified possible control measures can include, but are not be limited to:

- (a) Impacts on emissions of greenhouse gasses;
- (b) Impacts on energy consumption;
- (c) Co-benefits for the elimination or reduction of releases of greenhouse gases and a chemical under evaluation;
- (d) Regional risk and national reduction measures aiming at the reduction or elimination of both greenhouse gases and the chemical;
- (e) Assessment of co-benefits of mitigation activities, including reduction of greenhouse gases and releases of the chemical.

#### **References**

UNEP/POPS/POPRC.9/INF/15. Guidance on how to assess the possible impact of climate change on the work of the Persistent Organic Pollutants Review Committee (Persistent Organic Pollutants Review Committee, 2013).

UNEP/POPS/COP.4/INF/9. Handbook for effective participation in the work of the Persistent Organic Pollutants Review Committee. (Persistent Organic Pollutants Review Committee, 2008).

UNEP/AMAP 2011. Climate change and POPs: Predicting the impacts. Report of the United Nations Environment Programme/Arctic Monitoring and Assessment Programme expert group. (Secretariat of the Stockholm Convention, 2011).

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<sup>13</sup> UNEP/AMAP 2011.

## **Annex II to decision POPRC-9/8**

### **Recommendations prepared on the basis of the Guidance on how to assess the possible impact of climate change on the work of the Persistent Organic Pollutants Review Committee,<sup>14</sup> Climate change and POPs: predicting the impacts,<sup>15</sup> and the fourth assessment report of the Intergovernmental Panel on Climate Change**

The Persistent Organic Pollutants Review Committee recommends that the Conference of the Parties to the Stockholm Convention on Persistent Organic Pollutants:

1. Note:

(a) That climate change is predicted to increase the transport of persistent organic pollutants to the Arctic and other remote regions;

(b) That climate change is predicted to exacerbate the adverse effects of persistent organic pollutants in regions with increasing environmental temperatures and salinities, in particular in subtropical and tropical regions;

(c) That extreme weather events such as flooding and heat waves, which have been registered more frequently in many regions, will have implications for the management of contaminated areas, stockpiles and waste;

(d) That climate change is predicted to alter the environmental distribution of contaminants, including persistent organic pollutants, owing to its impact on carbon pathways and changes in chemicals' environmental transport, partitioning, accumulation and degradation process rates, as well as their bioavailability and organisms' susceptibility to hazardous substances;

(e) That persistent organic pollutants are predicted to interact with physiological, behavioral and ecological adaptations to climate change and thereby influence the ability of organisms, populations, communities and ecosystems to withstand and/or adapt adequately to climate change;

(f) That consideration of multiple stressors is important when evaluating the risk posed by persistent organic pollutants, since the vulnerability of organisms to them depends on multiple stress factors, including exposure to multiple hazardous substances and climate change impacts;

(g) That careful scientific consideration in the hazard assessment undertaken in developing a risk profile in accordance with Annex E to the Convention of all environmental stress factors, including toxicological interactions and climate change interactions with a chemical proposed for listing, is likewise important;

(h) That exploring and assessing opportunities for co-benefits and mitigation measures to reduce emissions of greenhouse gases and persistent organic pollutants are equally important;

(i) That promoting an approach to identifying and addressing the combined effects of climate change and exposure to persistent organic pollutants is needed and, to that end, an exchange of information between the Persistent Organic Pollutants Review Committee and the Intergovernmental Panel on Climate Change may be needed to provide important data and facilitate the assessment of the combined effects of persistent organic pollutants and climate change;

(j) That updating of the guidance on how to assess the possible impact of climate change on the work of the Persistent Organic Pollutants Review Committee, based on experience in applying the guidance and the approach to the consideration of climate change interactions with

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<sup>14</sup> UNEP/POPS/POPRC.9/INF/15.

<sup>15</sup> United Nations Environment Programme, Arctic Monitoring and Assessment Programme, Stockholm Convention on Persistent Organic Pollutants (2011).

the chemicals proposed for listing in the annexes to the Stockholm Convention set out in annex I to decision POPRC-9/8, as well as on the availability of new scientific findings and new reports by the Intergovernmental Panel on Climate Change, the Arctic Monitoring and Assessment Programme and/or the United Nations Environment Programme, as well as other regional and national reports and assessments, will be needed;

(k) That climate change impacts and interactions with contaminants are particularly relevant to the Committee's consideration of the chemicals proposed for listing in Annexes A, B and/or C to the Convention, in particular subparagraphs (b) and (c) of Annex E, on hazard assessment and environmental fate, respectively, subparagraph (c) (v) of Annex F, on movement towards sustainable development, and paragraph 2 of Annex D, on the statement of reasons for concern and the need for global control;

(l) That knowledge regarding climate change interactions with persistent organic pollutants is particularly limited in developing countries and that some effects may therefore go unnoticed if developing countries are not assisted;

(m) That further efforts and guidance are therefore needed to enable developing countries to participate effectively in the Committee's review of the chemicals proposed for listing in the annexes to the Convention;

(n) That it is important that monitoring activities address climate change interactions with persistent organic pollutants, especially in developing countries;

(o) That the identification of areas of uncertainty and gaps in information, knowledge and data on climate change interactions with persistent organic pollutants at the global level, and in particular in developing countries, is important;

1. Encourage parties:

(a) To consider and make use of the information provided in the guidance on how to assess the possible impact of climate change on the work of the Committee and the approach to the consideration of climate change interactions with the chemicals proposed for listing in the annexes to the Convention when evaluating the risks posed by persistent organic pollutants and developing mitigation measures;

(b) To apply the draft approach to the consideration of climate change interactions with the chemicals proposed for listing in the annexes to the Convention when drafting proposals for listing chemicals in Annexes A, B and/or C according to Article 8 of the Stockholm Convention;

(c) To strengthen regional and national monitoring and research programmes in developing countries and include climate change impacts and interactions with persistent organic pollutants in such programmes;

2. Invite parties:

(a) To provide the Committee with information on climate change interactions with chemicals under review;

(b) To explore and assess opportunities for co-benefits and mitigation measures to reduce emissions of greenhouse gases and persistent organic pollutants;

(c) To make available information on climate change interactions with persistent organic pollutants for further revisions of the guidance on how to assess the possible impact of climate change on the work of the Committee and the approach to the consideration of climate change interactions with the chemicals proposed for listing in the annexes to the Convention;

3. Request the Secretariat to broadly disseminate the information contained in the draft guidance on how to assess the possible impact of climate change on the work of the Committee and the draft approach for consideration of climate change interactions with the chemicals proposed for listing among Parties and other stakeholders, including the IPCC.

4. Encourage the Persistent Organic Pollutants Review Committee:

(a) To apply the approach to the consideration of climate change interactions with the chemicals proposed for listing in the annexes to the Convention when drafting risk profiles and risk management evaluations according to annexes E and F to the Stockholm Convention, respectively;

(b) To consider and make use of the information provided in the guidance on how to assess the possible impact of climate change on the work of the Committee when evaluating the risks posed by persistent organic pollutants and developing mitigation measures;

5. Invite the Persistent Organic Pollutants Review Committee to update the guidance on how to assess the possible impact of climate change on the work of the Committee and the approach to the consideration of climate change interactions with the chemicals proposed for listing in the annexes to the Convention, based on its experience in applying the guidance and approach and on the availability of new scientific findings, and to follow up on new reports developed by the Intergovernmental Panel on Climate Change, the Arctic Monitoring and Assessment Programme and others.