Agriculture Guidance

Guidance for assessing the greenhouse gas impacts of agriculture policies

May 2018

Overview of the methodology

---

3. Overview of Agriculture Policies

This chapter provides an overview of the types of agriculture policies, and mitigation practices and technologies, to which this guidance can be applied. The agriculture sector, together with the forestry sector, present a large opportunity for countries to meet their commitments under the Paris Agreement and to reduce GHG emissions from the atmosphere and enhance carbon stocks. This guidance is primarily designed to assess specific policy instruments and associated mitigation practices and/or technologies in the agriculture sector. In this document, policies are instruments that enable or incentivise the implementation of GHG mitigation measures. Measures are the practices and/or technologies that reduce emissions.

3.1 Agriculture policy instruments

This guidance can be used to assess the GHG impacts of a range of policy instruments that enable or incentivise adoption of mitigation practices or technologies in agriculture. Table 3.1 presents examples of common policy instruments to which this guidance can be applied to. Further information about types of policies and actions is provided in the ICAT *Introductory Guide*.

Table 3.1: Common policy instruments applicable to the agriculture sector

Type of policy Instrument	Description	Examples of policy instruments
Regulations and standards	Rules or standards that specify abatement technologies (technology standard) or performance standards (such as minimum requirements for erosion rates, tillage setbacks or nutrient management. They typically include legal penalties for noncompliance.	• Standards for management practices for livestock health and reproduction • Standards for implementing silvopastoral systems • Conservation mandates requiring landowners to place an area equivalent to 10% of cultivated lands into conservation reserve • Laws that promote connectivity between natural ecosystems

Subsidies and incentives	Direct payments, tax reductions, price supports or the equivalent thereof from a government to an entity for implementing a practice or performing a specified action.	• Tax reductions for setting aside agricultural land • Payments for changing agricultural practices • Payments for ecosystem services
Voluntary agreements or actions	Agreements, commitments or actions undertaken voluntarily by public or private sector actors, either unilaterally or jointly in a negotiated agreement. Some voluntary agreements include rewards or penalties associated with participating in the agreement or achieving the commitments.	• Zero net-deforestation commitments • Agroforestry agreements with landowners • National programmes to reduce emissions in a sector (e.g., NAMA) • Low carbon development projects
Information instruments	Requirements for public disclosure of information. These include labelling programmes, emissions reporting programmes, rating and certification systems, benchmarking, and information or education campaigns aimed at changing behaviour by increasing awareness.	• Programmes requiring standardised labelling on environmental attributes of agricultural products
Trading programmes	Programmes that establish a limit on aggregate emissions or pollutants from specified sources, requires sources to hold permits, allowances, or other units equal to their actual emissions or pollution, and allows permits to be traded among sources	• Nutrient trading programmes • Cap-and-trade programmes
Research, development and deployment policies	Policies aimed at supporting technological advancement, through direct government funding or investment, or facilitation of investment, in technology research, development, demonstration, and deployment activities	• Efforts to strengthen formal education of farmers, provide training and introduce new technologies or practices to farmers, provided by extension services or other programmes supported by the government to support improved practices, technology adoption, and even monitoring of activities • Training modules about sustainable production and climate change disseminated through extension agents • Regional workshops to agricultural producers
Financing and investment	Public or private sector grants or loans (for example, those supporting low-carbon	• Low-interest rate loans for farmers that implement sustainable livestock production practices

	development strategies or policies)	

3.2 Mitigation practices or technologies

This guidance can be used to assess a range of mitigation practices or technologies in the agriculture sector that reduce emissions or enhance removals from enteric fermentation and the soil carbon pool. Box 3.1 lists common mitigation practices or technologies in the agriculture sector that reduce emissions or enhance removals from enteric fermentation and the soil carbon pool, and to which this guidance is applicable. These mitigation practices or technologies are enabled or incentivised by the policy instruments described in Section 3.1.

Box 3.1: Common mitigation practices or technologies that reduce emissions and enhance removals in enteric fermentation and the soil carbon pool

Common mitigation practices or technologies that reduce emission intensity from enteric fermentation

- Livestock feeding strategies (e.g., improving the quality forage, processing feeds to improve digestibility, adding grain-based concentrates, providing dietary supplements and feed additives)
- Improved herd management strategies (e.g., changing breed type, reducing herd size and reducing herd age)
- Optimising health and reproductive capacity (e.g., veterinary visits, disease prevention, shelter for animals and following best practices for husbandry)
- Improved pasture management (e.g., maintaining growth of preferred grazing species, removing weed invasions and bare ground, reducing areas where animals do not graze, restoring compacted areas and livestock paths, improving ground water absorption and reducing runoff)
- Improved silvopastoral systems (e.g., intensive silvopastoral systems)
- Improving efficiency in production systems (e.g., reducing herd size while increasing productivity)

Common mitigation practices or technologies that reduce emission and enhance removals from the soil pool

- Switching to no-till or conservation tillage agriculture
- Improving agricultural residues management (e.g., mulching and/or avoiding residues burning)
- Increasing soil stability and reducing erosion (e.g., terracing, contour strips, cover crops and retaining residues on croplands)
- Increasing vegetation cover and/or biomass (e.g., increasing the use of perennial crops)
- Improving agroforestry and/or silvopastoral systems

- Rotational grazing practices to allow pastures to grow stronger and increase soil carbon sequestration
- Changing pasture species selection (e.g., selecting species with higher productivity)
- Increasing sustainable agricultural intensification (i.e., emission reduction per unit of output)
- Establishing conservation of, or restoration of, natural ecosystems
- Rewetting of wetland mineral soils or organic soils previously drained for crop production or grazing

4. USING THE GUIDANCE

This chapter provides an overview of the steps involved in assessing the GHG impacts of agriculture policies, and outlines assessment principles to help guide the assessment.

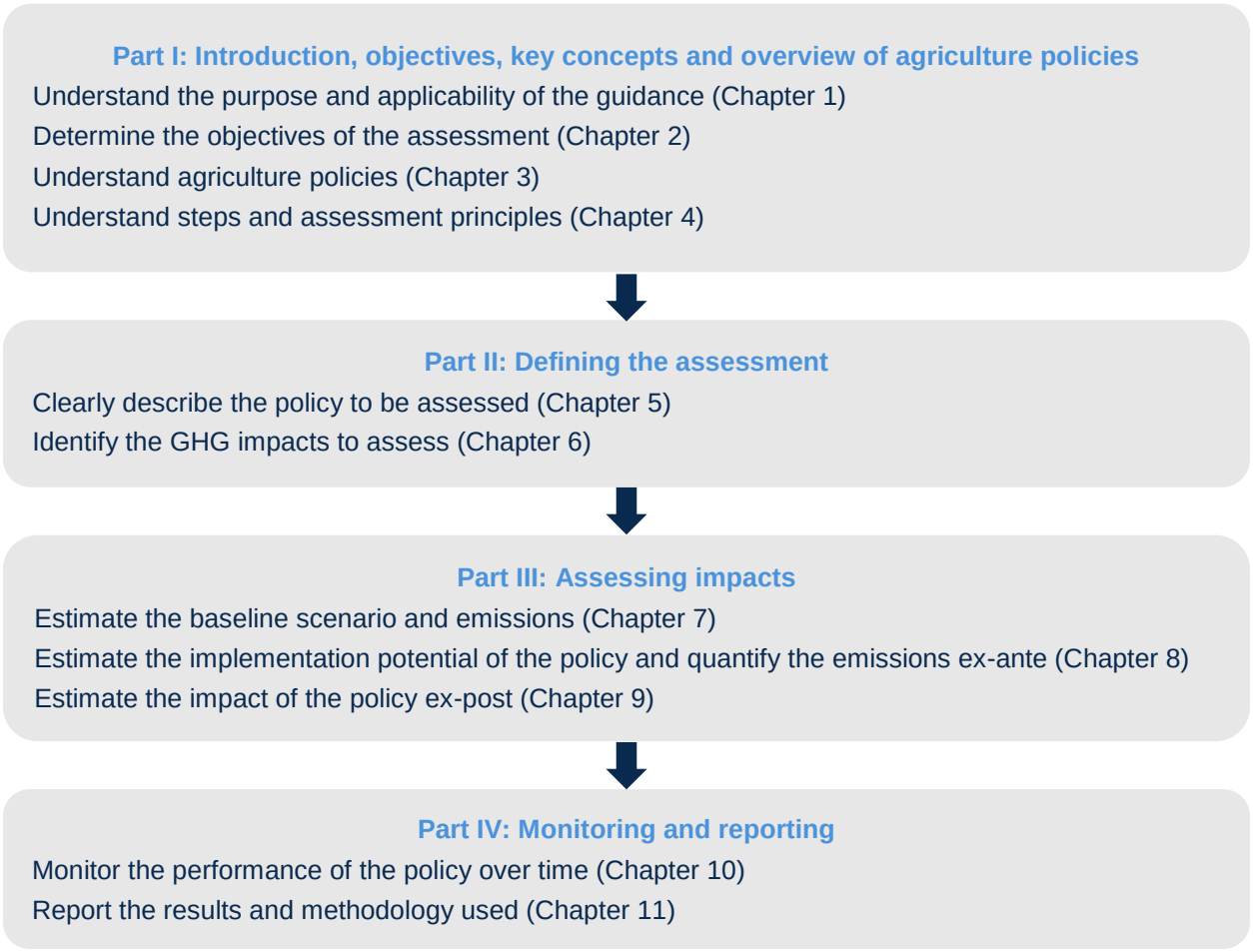
Checklist of key recommendations

- Base the assessment on the principles of relevance, completeness, consistency, transparency and accuracy

4.1 Overview of steps

This guidance is organised according to the steps a user follows in assessing the GHG impacts of a policy (see Figure 4.1). Depending on when the guidance is applied and the approach chosen, users can skip certain chapters. For example, if the user is assessing impacts ex-ante but not ex-post, the user can skip Chapter 8.

Figure 4.1: Overview of steps



4.2 Planning for the assessment

Users should review this guidance and plan the steps, responsibilities and resources needed to meet their objectives for assessing GHG impacts of agriculture policies in advance. The time and human resources required to implement the guidance and carry out an impact assessment depend on a variety of factors, such as the complexity of the policy being assessed, the extent of data collection needed and whether relevant data has already been collected, and the desired level of accuracy and completeness needed to meet the objectives of the assessment.

4.2.1 Choosing a desired level of accuracy based on objectives

There are a range of options for assessing GHG impacts that allow users to manage trade-offs between the accuracy of the results and the resources, time, and data needed to complete the assessment, based on objectives. Some objectives require more detailed assessments that yield more accurate results (to demonstrate that a specific reduction in GHG emissions is attributed to a specific policy, with a higher level of certainty), while other objectives may be achieved with simplified assessments that yield less accurate results (to show that a policy contributes to reducing GHG impacts, but with less certainty around the magnitude of the impact).

Users should choose approaches and methods that are sufficient to accurately meet the stated objectives of the assessment and ensure that the resulting claims are appropriate. For example, whether a policy contributes to achieving GHG emission reductions or whether emission reductions can be attributed to that policy. Users should also consider the resources needed to obtain the data needed to meet the stated objectives of the assessment.

4.2.2 Approaches for assessing the GHG impacts of agriculture policies

This guidance provides two approaches for estimating the GHG impacts of agricultural policies ex-ante:

- **Emissions approach**: This compares the difference in GHG emissions and removals between the policy and baseline scenarios. The difference between policy and baseline scenario emissions and removals is the net change in GHG impact resulting from the policy.
- **Activity data approach**: This focuses on estimating the effect of the policy on activity data by estimating the expected increase or decrease in the area of land in a land category or in the adoption of a mitigation practice that is triggered by the policy. The emissions associated with the increase or decrease in activity data are estimated to give the expected net change in GHG impact resulting from the policy.

Emissions approach

In this approach, users determine the most likely baseline scenario for land use, land-use change and/or livestock and soil management practices, and estimate baseline emissions and removals (Chapter 7). Users then develop the most likely policy scenario by determining the likely implementation potential of the policy (Sections 8.2 – 8.5). Policy scenario emissions and removals are quantified by using the same method that was used to estimate the baseline emissions and removals with parameter values that are adjusted for the policy scenario. The net change in GHG emissions and removals is the difference between policy and baseline emissions and removals.

Activity data approach

In this approach, users estimate the maximum implementation potential of the policy (following the guidance in Chapter 8) based on the causal chain that is developed in Chapter 6. The maximum implementation potential is estimated in terms of activity data. The activity data used for this approach is a parameter that is expected to change in value as a result of the policy. This approach is best suited for policies that target changes in activity data (e.g., heads of livestock or hectares of land).

Users then evaluate how barriers to implementation and other factors may limit the policy's overall effectiveness, and determine its likely implementation potential. The likely implementation potential represents the effects that are expected to occur as a result of the policy (most likely policy scenario). The implementation potential is the area of land in a land category that will be impacted by the policy (e.g., the hectares of cropland that will switch to no-till) or the expected adoption of a mitigation practice (e.g., the number of livestock under a new feeding strategy). Implicitly, these effects are relative to the baseline scenario.

The GHG emissions and removals are estimated based on the increase or decrease in activity data (Section 8.6) with emission factors that represent the policy scenario. Estimating baseline emissions is optional when using this approach and the GHG impacts of the policy can be calculated directly, without explicitly determining separate baseline and policy scenarios. In such cases, users can skip Chapter 7. For policies that affect productivity or efficiency in livestock, emission factors will need to be estimated for either the ex-ante or ex-post policy scenario.

Table 4.1: Advantages and disadvantages of different approaches

Approach	Advantages	Disadvantages
Emissions approach	• Enables more robust and accurate understanding of the GHG impacts of forestry policies • Meets wider set of objectives (related to understanding policy impact) • Meets widest set of stakeholder needs	• Increased time, cost, data and capacity needs, depending on approach taken (simpler to more complex)
Activity data approach	• Gives an understanding of expected GHG impacts • Easier, simpler, requires less time, resources and capacity	• Provides a more informative estimate of the GHG impacts of the policy, which limits the range of objectives the assessment can meet • Risk of over-simplification or limited understanding of relevant impact drivers

Box 4.1: Choosing an approach based on objectives

If the user's objective is to understand the impact of a policy and use that information to meet a variety of objectives—such as informing policy design, improving policy implementation, evaluating policy effectiveness, reporting on policy impacts, and attracting finance based on policy impacts—users should assess impacts using a more robust approach for assessing impacts and obtaining and estimating data.

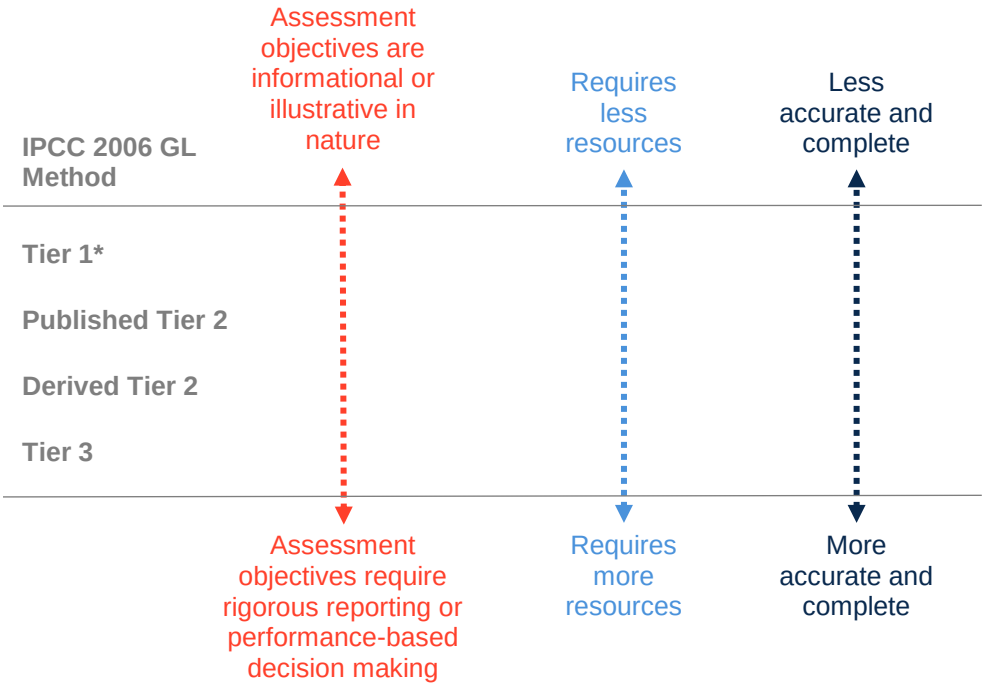
The approach to follow should be guided by the user's objectives, capacity and resources. Some objectives may be achieved with an activity data approach, such as getting an understanding of a wide variety of impacts in a short amount of time to guide decision making. Other objectives may require a more rigorous emissions approach, such as attracting public or private financing to implement an intervention and achieve specific results. The emissions approach to assessing GHG impacts better supports several objectives, but generally requires more time and resources, while the activity data approach is less resource-intensive, but may not fully meet all objectives a user has. In general, users should quantify significant impacts of the policy where feasible.

4.2.3 Methods for obtaining or estimating data

Throughout this guidance, users are provided the option to conduct the livestock GHG assessment using Tier 1 or Tier 2 emission factors. This guidance does not describe higher Tier 3 methods. The use of tiers is consistent with IPCC 2006 GL. It is helpful to become familiar with basic IPCC 2006 GL best practices and tables available therein. This guidance also sets out a method to estimate a preliminary Tier 2 emission factor for livestock. A preliminary Tier 2 emission factor begins with a Tier 1 approach and incorporates full or partial Tier 2 parameterisation. Limitations to using Tier 1 emission factors for estimating enteric fermentation emissions are noted in Section 7.2.4.

Users may determine the assessment method based on both their assessment objectives and their capacity, resources and time available to carry out the assessment. For planning purposes, it is helpful for the user to identify the desired estimation method prior to beginning an impact assessment.

Figure 4.2: Range of methods for estimating GHG emissions based on data availability



**Note: Tier 1 method is not sufficient to capture improvements in efficiency of livestock production*

4.2.4 Expert judgment

It is likely that expert judgment and assumptions will be needed in order to complete an assessment where information is not available or requires interpretation. Expert judgment is defined by the IPCC as a carefully considered, well-documented qualitative or quantitative judgment made in the absence of unequivocal observational evidence by a person or persons who have a demonstrable expertise in the given field.[1] The goal is to be as representative as possible in order to reduce bias and increase accuracy. The user can apply their own expert judgment or consult experts.

When relying on expert judgment, information can be obtained through methods that help to avoid bias known as expert elicitation. The IPCC 2006 GL provides a procedure for expert elicitation, including a process for helping experts understand the elicitation process, avoiding biases, and producing independent and reliable judgments.

Expert judgment can be associated with a high level of uncertainty. As such, experts can be consulted to provide a range of possible values and the related uncertainty range or they can be consulted to help select suitable values from a range of values. Expert judgment can be informed or supported through broader consultations with stakeholders. It is important to document the reason that no data sources are available and the rationale for the value chosen.

[1] IPCC 2000.

4.2.5 Planning stakeholder participation

Stakeholder participation is recommended in many steps throughout the guidance. It can strengthen the impact assessment and the contribution of policies to GHG mitigation goals in many ways, including by:

- Establishing a mechanism through which people who may be affected by or can influence a policy have an opportunity to raise issues and have these issues considered before, during and after policy implementation
- Raising awareness and enabling better understanding of complex issues for all parties involved, building their capacity to contribute effectively
- Building trust, collaboration, shared ownership and support for policies among stakeholder groups, leading to less conflict and easier implementation
- Addressing stakeholder perceptions of risks and impacts and helping to develop measures to reduce negative impacts and enhance benefits for all stakeholder groups, including the most vulnerable
- Enhancing the credibility, accuracy and comprehensiveness of the assessment, drawing on diverse expert, local and traditional knowledge and practices
- Enhancing transparency, accountability, legitimacy and respect for stakeholders' rights
- Enabling enhanced ambition and financing by strengthening the effectiveness of policies and credibility of reporting

Various sections throughout this guidance explain where stakeholder participation is recommended—for example, in identifying the impacts of the policy (Chapter 6), estimating the baseline scenario and emissions (Chapter 7), estimating GHG impacts ex-ante (Chapter 8) and monitoring performance over time (Chapter 10).

Before beginning the assessment process, consider how stakeholder participation can support identified objectives and include relevant activities and associated resources in assessment plans. It may be helpful to combine stakeholder participation for GHG impacts assessment with other participatory processes involving similar stakeholders for the same or related policies, such as those being conducted for assessment of sustainable development and transformational impacts and for technical review.

It is important to ensure conformity with national legal requirements and norms for stakeholder participation in public policies, as well as the requirements of specific donors and of international treaties, conventions and other instruments to which the country is party. These are likely to include requirements for disclosure, impact assessments and consultations, and may include specific requirements for certain stakeholder groups (e.g., UN Declaration of the Rights of Indigenous Peoples, International Labour Organisation Convention 169) or specific types of policies (e.g., UNFCCC guidance on safeguards for activities reducing emissions from deforestation and degradation in developing countries).

During the planning phase, identify stakeholder groups that may be affected by or may influence the policy. Appropriate approaches should be identified to engage with the identified stakeholder groups, including through their legitimate representatives. To facilitate effective stakeholder participation, consider establishing a multi-stakeholder working group or advisory body consisting of stakeholders and experts with relevant and diverse knowledge and experience. Such a group may advise and potentially contribute to decision making to ensure that stakeholder interests are reflected in design, implementation and assessment of policies, including on stakeholder participation in the assessment of GHG impacts of a

particular policy. It is also important to ensure that stakeholders have access to a grievance redress mechanism to secure adequate protection of stakeholders' rights related to the impacts of the policy.

Refer to the ICAT *Stakeholder Participation Guidance* for more information, such as how to plan effective stakeholder participation (Chapter 4), identify and analyse different stakeholder groups (Chapter 5), establish multi-stakeholder bodies (Chapter 6), provide information (Chapter 7), design and conduct consultations (Chapter 8) and establish grievance redress mechanisms (Chapter 9).

Appendix A summarises the steps in this guidance where stakeholder participation is recommended along with specific references to relevant guidance in the ICAT *Stakeholder Participation Guidance*.

4.2.6 Planning technical review (if relevant)

Before beginning the assessment process, consider whether technical review of the assessment report will be pursued. The technical review process emphasises learning and continual improvement and can help identify areas for improving future impact assessments. Technical review can also provide confidence that the impacts of policies have been estimated and reported according to ICAT key recommendations. Refer to the ICAT *Technical Review Guidance* for more information on the technical review process.

4.3 Assessment principles

Assessment principles are intended to underpin and guide the impact assessment process, especially where the guidance provides flexibility. It is a *key recommendation* to base the assessment on the principles of relevance, completeness, consistency, transparency and accuracy, as follows:[2]

- **Relevance**: Ensure the assessment appropriately reflects the GHG impacts of the policy and serves the decision-making needs of users and stakeholders, both internal and external to the reporting entity. Applying the principle of relevance depends on the objectives of the assessment, broader policy objectives, national circumstances and stakeholder priorities.
- **Completeness**: Include all significant impacts in the GHG assessment boundary, including both positive and negative impacts. Disclose and justify any specific exclusions.
- **Consistency**: Use consistent assessment approaches, data collection methods and calculation methods to allow for meaningful performance tracking over time. Document any changes to the data sources, GHG assessment boundary, methods, or any other relevant factors in the time series.
- **Transparency**: Provide clear and complete information for stakeholders to assess the credibility and reliability of the results. Disclose and document all relevant methods, data sources, calculations, assumptions and uncertainties. Disclose the processes, procedures and limitations of the assessment in a clear, factual, neutral, and understandable manner with clear documentation. The information should be sufficient to enable a party external to the assessment process to derive the same results if provided with the same source data. Chapter 11 provides a list of recommended information to report to ensure transparency.
- **Accuracy**: Ensure that the estimated impacts are systematically neither over nor under actual values, as far as can be judged, and that uncertainties are reduced as far as practicable. Achieve

[2] Adapted from WRI 2014

sufficient accuracy to enable users and stakeholders to make appropriate and informed decisions with reasonable confidence as to the integrity of the reported information. If accurate data for a given impact category is not currently available, users should strive to improve accuracy over time as better data becomes available. Accuracy should be pursued as far as possible, but once uncertainty can no longer be practically reduced, conservative estimates should be used. Box 4.2 provides guidance on conservativeness.

In addition to the principles above, users should follow the principle of comparability if it is relevant to the assessment objectives, for example if the objective is to compare multiple policies based on their GHG impacts or to aggregate the results of multiple impact assessments and compare the collective impacts to national goals (described further in Box 4.3).

- **Comparability**: Ensure common methods, data sources, assumptions and reporting formats such that the estimated impacts of multiple policies can be compared.

Box 4.2: Conservativeness

Conservative values and assumptions are those more likely to overestimate negative impacts or underestimate positive impacts resulting from a policy. Users should consider conservativeness in addition to accuracy when uncertainty can no longer be practically reduced, when a range of possible values or probabilities exists (for example, when developing baseline scenarios), or when uncertainty is high.

Whether to use conservative estimates and how conservative to be depends on the objectives and the intended use of the results. For some objectives, accuracy should be prioritised over conservativeness in order to obtain unbiased results. The principle of relevance can help guide what approach to use and how conservative to be.

Box 4.3: Applying the principle of comparability when comparing or aggregating results

Users may want to compare the estimated impacts of multiple policies, for example to determine which has the greatest positive impacts. Valid comparisons require that assessments have followed a consistent methodology, for example regarding the assessment period, the types of impact categories, impacts, and indicators included in the GHG assessment boundary, baseline assumptions, calculation methods, and data sources. Users should exercise caution when comparing the results of multiple assessments, since differences in reported impacts may be a result of differences in methodology rather than real-world differences. To understand whether comparisons are valid, all methods, assumptions and data sources used should be transparently reported. Comparability can be more easily achieved if a single person or organisation assesses and compares multiple policies using the same methodology.

Users may also want to aggregate the impacts of multiple policies, for example to compare the collective impact of multiple policies in relation to a national goal. Users should likewise exercise caution when aggregating the results if different methods have been used and if there are potential overlaps or interactions between the policies being aggregated. In such a case, the sum would either over or underestimate the impacts resulting from the combination of policies. For example, the combined impact of a local energy efficiency policy and a national energy efficiency policy in the same country is likely less than the sum of the impacts had they been implemented separately, since they affect the same activities. Chapter 4 provides more information on policy interactions.

In practice, users may encounter trade-offs between principles when developing an assessment. For example, a user may find that achieving the most complete assessment requires using less accurate data for a portion of the assessment, which could compromise overall accuracy. Users should balance trade-offs between principles depending on their objectives. Over time, as the accuracy and completeness of data increases, the trade-off between these principles will likely diminish.