

Trend analysis

For conducting many SEAs, trend analysis is likely to be one of the most useful approaches. Trend analysis can be defined as **an interpretation of changes over time without and with the proposed/revised PPP** (policy, plan, or program). It has several advantages:

- It can help to describe the past trends and current situation by tracing any trends or patterns in the relevant territories in time periods covered by the SEA.
- It can also help in predicting future 'baseline' trends without the proposed PPP being implemented (the so-called 'zero alternative'), since some trends can be safely extrapolated based on information about their future drivers. However, it is important to note that oversimplified extrapolation, which does not consider how the trend will evolve once it reaches a key breaking point (e.g., when the carrying capacity of the surrounding environment has been reached or exceeded) or once the counter-trend becomes stronger, may be misleading. Such analyses can open many new insights and can be useful not just for the SEA process but also for the development of the PPP as such.
- Lastly, the trend analysis can facilitate the assessment of cumulative impacts of proposed developments (including downstream projects) in the PPP on the identified future "baseline" trends.

Trend analysis can combine many different tools, and it has the capacity of analyzing cause-and-effect relationships even in situations constrained by significant data gaps. The presentation of trends can be fairly simple, e.g.,

- Storylines that describe the overall trends, their main drivers, their territorial dimensions, and key concerns and opportunities arising from these trends;
- Maps showing spatial development patterns;
- Graphs: these can be (a) simple graphs that use available data sets to illustrate the evolution of key issues and/or their drivers over time, or (b) complex graphs that provide a comprehensive overview of the correlation between the evolution of drivers over time and the corresponding (sometime delayed) changes in the issues addressed by the analysis.

Proper understanding of the current situation and trends and their likely evolution if the PPP is not implemented provides the basis for predicting environmental and social effects within the SEA. These trends may be influenced in various ways by, e.g.,

- Market forces—e.g., higher prices for minerals can stimulate mining,
- Major development projects that have been already approved but not implemented yet,
- PPPs other than one being directly assessed by the SEA; and
- Changed climatic conditions

The impacts of these developments may not yet be visible or fully evident. The forward-looking analyses undertaken by an SEA should outline the expected future environmental and social trends since it is important to understand impacts of the PPP on the "future environment" in which the PPP will operate. Many environmental and social issues may improve and many may get worse in the future irrespective of the proposed PPP (e.g., some ecosystems will be lost anyway; many environmental features will become even more important; the population will grow anyway and place increased demand on land and natural resources). It is also important to consider that, in the near future, some environmental and social trends may be affected by climate changes, e.g., increasing temperatures, flash floods, landslides, forest fires, glacial retreat and glacial lake outburst floods (GLOF), water shortages, declining yields of some crops (e.g., maize and rice) and increases for others (e.g., potato), changes in pests and plant diseases as well as rainfall patterns, shifts of forest types to higher elevations, changes in the ranges of species, increased risk of water-borne diseases, and spread of vector-borne diseases (e.g., malaria, dengue).

SEA requires consideration of long-term trends, and the SEA team needs to present sound judgments on the ongoing environmental and social changes (which may be linked) that are relevant to the PPP. In this regard, it should be noted that the most common deficiencies in analyzing current situations and trends do not usually arise from the lack of data but rather from poorly targeted analyses that focus on irrelevant issues. This task therefore demands, especially in the case of large-scale PPP, focused analytical thinking, a strategic approach to data collection, and qualified expert judgments.

In order to ensure that the assessment of the current situation stays focused, it is recommended to concentrate on the main environmental and social issues, objectives, and guiding questions that have been identified in the preceding SEA scoping step. The SEA experts need to gather just enough information to answer the following questions:

- How good or bad is the current situation? How far is the current situation from any established thresholds or targets?
- Are particularly sensitive or important elements of the receiving environment affected, e.g., vulnerable social groups, non-renewable resources, protected areas, endangered species, rare habitats? Are the problems reversible or irreversible, permanent or temporary?
- What is driving these trends?
- What is the expected future continuation of these trends, if one considers impacts of other already agreed projects or PPPs and considering impacts of climate change?

Both qualitative and quantitative information can be used for this purpose. The description of the past and current trends can be made on the basis of data available from existing information sources (e.g., State of the Environment reports, data from other available PPPs, research projects, donor analyses), or through expert judgments (in cases where data are lacking). SEA experts should not embark on collecting raw data at this stage, unless very clear key issues are identified for which no data are available. They are required to accomplish this task while taking into account available studies and considering the key driving forces behind these trends. When maps are easily available, these analyses may be supplemented by maps showing spatial dimensions and linkages between the key environmental, social, and economic issues in the study area.

The data on the current and future environmental and social trends serve not just to inform future SEA steps but may also strengthen the analysis of the overall development context during the elaboration of the PPP. In cases where the SEA process is carried out during the elaboration of the PPP, information gathered or generated during this step can be provided to the PPP planning team and may strengthen the analysis of the overall development context.

Analysis of environmental and social trends without the PPP can significantly benefit from inputs from key authorities, academia, business groups, or NGOs that have the relevant information. Workshops, roundtables, and formal meetings, etc. can be used for this purpose.

Tables A11.1 and A11.2 provide fictional examples of a trends analysis for past trends and future trends, respectively.

TIPS FOR PRACTICE

Keep the focus when collecting information. Do not collect excessive details or use information just because it is there. Concentrate on environmental and social issues, objectives, and guiding questions identified in the scoping phase, and do not overburden the evaluation of the situation with irrelevant information.

Set a time limit for information collection. Do not expect to be able to obtain all relevant information in the first SEA of a PPP, but make arrangements to fill any major gaps for future replacements or reviews of PPP.

Use the expertise within environmental and social authorities and key stakeholders to identify and interpret relevant data and predict trends.

When describing the past trends, try to **determine the main economic or social factors that drive these trends**. This information may later help you to analyze whether the PPP positively or negatively influences these driving forces.

Consider the impacts of other relevant PPPs and outline the likely expected evolution of environmental trends, if the proposed PPP were not to be implemented.

Consider the impacts of the expected climate changes on future environmental and social trends, as increased risk of hazards may increase vulnerability.

Where possible, **supplement these analyses by maps** showing spatial dimensions and linkages between the key environmental, social, and economic issues.

Share and double-check this information with the planning team.

Table A11.1: Fictional example of past trends analysis for terrestrial biodiversity

Analysis of past trends and current situation	
Theme:	Terrestrial biodiversity
Issues:	Condition and extent of natural areas and connectivity of important ecosystems
Please describe: • An overall context of the theme addressed (i.e., original/natural potentials and constraints, etc.—basic facts such as volumes, acreage, etc.—accompanied by a short commentary on their importance—international, national, provincial, local) • List issues that you have chosen to focus on within this theme and justify in 1-5 sentences for each issue why it is important—wherever possible, relate it to official documents that also recognize these issues as important • For each issue, analyze its past trend (e.g., how has the situation evolved so far, whether the trend is improving or worsening, whether it reaches any critical bottom-lines or turning points, etc.). • Factors (drivers) that positively or negatively affect this trend or that limit the trend (counter-trends). When doing so, you may wish to cross-refer to any relevant national/provincial/local SPPs or major projects. • The key problems and/or the key geographic areas of specific concern (of national, provincial, and local importance) • Always quote sources of data (e.g., full references in footnotes) and, when necessary, provide commentary on their quality and uncertainties—if you find that some critical pieces of information are missing or may be doubtful (contradictory, incomplete, etc.), state it clearly.	
E.g. • In 1990, the province had an extensive population of XX critically endangered species (out of which XX species are endemic) and of XX endangered species (out of which XX species are endemic). Further to this, the province hosts a small population of XX species, which are not protected, but they play a significant role in the lifestyles of the local ethnic groups. • Valuable natural ecosystems in areas (see attached map) accounted for ZZ ha (25% of the territory of the province) in 1995. They were connected by bio-corridors KVD and HWD, which played an important role in the migration of XX critically endangered or endangered species. The Biodiversity Conservation Action SPP of the province (elaborated in 1994 by SWA but not yet awaiting formal approval by the Provincial People's Committee) has suggested ensuring that at least 15% of the territory becomes protected to halt biodiversity decline. • Until 2006, 9% of the territory of the province has received various degrees of protection. ZZZ ha in location XYZ that hosts species SSS has been declared a national park which is also classified as a habitat of international importance (see ministerial meeting XSW and resolution by KWC). ZZZ ha in location UBF serves as a breeding ground for species GDE has been declared protected area, etc. Areas GBH 1-3 have been proposed as special use forests. • At the same time, ZZ ha (5% of valuable important ecosystems found in the province) have been irreversibly damaged by the conversion of these natural ecosystems to mining and agriculture. The remaining valuable ecosystems that are endangered by forestry practices FFF. As overall degradation of the ecosystems regards, it should be noted that the status of existing protected areas does not entirely prevent degradation of already protected ecosystems (e.g., forestry practices GHJ cause impacts YUZ in locations DRT). • A study by FAO found out that the most important driving force for deforestation in rural areas is the development of paved roads in rural areas. The pavement of new roads contributes to 85% of forest loss. Corridors along the newly paved roads (5–10 km on each side of the road) quickly become deforested due to illegal logging and subsequent small-scale illegal agricultural activities and informal settlements. So far, all government measures to tackle this problem have been ineffective due to a lack of enforcement. • The bio-corridor KVD has been irreversibly damaged by road developments in AA1. Migration of critically endangered species XX has stopped with the fragmentation of this bio-corridor; however, some migration reportedly takes place through the bio-corridor HDW. The bio-corridor HDW thus serves as the only migration route for species XX and plays the key role in the viability of these populations of these migratory species in the province, and in the country generally. + Supplemented by any graphic aids to illustrate the trend—graphs, maps, pictures, or boxes with local stories that provide representative examples of the trend.	

Future trends without the proposed SPP	
Theme:	Terrestrial biodiversity
Issues:	Condition and extent of natural areas and connectivity of important ecosystems
Key factors that will influence these trends:	Likely expected positive or negative impacts of these factors on the given trend:
Outline key factors that may positively or negatively influence the future trend in this issue without the SPP. These may include: - market drivers; - new policies, laws, and regulations and economic incentives, - other agreed SPPs; - major projects; and - climate change!	Explain in detail: - Character of impact (what exactly causes this impact or assumptions that form the basis for your prediction) - Probability and key uncertainties - Geographic scale—directly and indirectly affected territories - The key concerns associated with this impact All these statements need to be substantiated (calculations, examples, references to international and national literature, maps, graphs), which can be annexed to illustrate the impact.
Spatially-focused plans (Ps) for Development of Tourism for 2007-2013 (Ministry of Tourism, 2006)	10 ha of coastal ecosystems that are part of the planned protected area ZDT may be lost in the next 6 years because of planned tourism projects in LKT, HWT, and CZD. The scale of impact depends on the outcomes of the detailed design of these planned projects that will also be subject to EIAs.
Forestry Ps (MARD, 2005)	Natural ecosystems that could be declared protected areas are likely to decrease by approximately 5% in the next 6 years, mainly because of recently adopted changes in the forest classification and approval of logging projects at QSW and GRF.
Aquaculture projects in XYZ and ZSY (approved by the District People's Committee in 2006)	Both projects have damaged bio-corridor GJY. No plans for rehabilitation of these bio-corridors exist.
Summary of key trends in the relevant environmental issue without the implementation of the SPP	
Please use the above information to outline: - How good or bad is the current situation? Do trends show that it is getting better or worse? - How far is the current situation from any established thresholds or targets? - Are particularly sensitive or important elements of the receiving environment affected, e.g., vulnerable social groups, non-renewable resources, endangered species, rare habitats? - Are these problems reversible or irreversible, permanent or temporary? - How difficult would it be to offset or remedy any damage?	
E.g. - Valuable natural ecosystems that could be declared as protected amount to 25% of the territory. Until now, 9% of these ecosystems have been declared protected areas, but the most important bio-corridors that connect them have been damaged. - Valuable natural areas are likely to decrease by approximately 5% in the next 6 years, mainly because of the recently adopted Transport Development SPP and approved future projects for aquaculture and tourism. No plan for rehabilitation of bio-corridors exists.	

Table A11.2: A fictional example of assessment of impacts of future environmental and social trends as influenced by the actions proposed in a PPP for terrestrial biodiversity

Analysis of future trends with the SPP		
Theme:	Terrestrial biodiversity	
Issues:	Condition and extent of natural areas and connectivity of important ecosystems	
Summary of the past and future trends without the SPP		
Summarize the past and future trends without the SPP, e.g., through 5-10 sentences that remind the reader of the past trends, current situation, and future trends without the SPP.		
E.g., - Valuable natural ecosystems that could be declared as protected cover 25% of the territory. Until now, 9% of these ecosystems have been declared protected areas, but the most important bio-corridors that connect them have been damaged. - These areas will decrease by approximately 5% in the next 6 years, mainly because of the recently adopted Forestry Policy and approved future projects for windfarming, aquaculture, and tourism. No SPPs for rehabilitation of biocorridors exist.		
Expected direct effects of the proposed SPP on the future trend in these issues		
Components of the SPP	Expected environmental risks (negative impacts) and environmental opportunities (positive impacts)	Proposed mitigation and enhancement measures
Feature or component of the SPP that cause these impacts (these may be the overall development direction pursued by the SPP, clusters of projects or individual projects proposed in the SPP).	Explain in detail: - Character of risk/impact (what exactly causes this risk/impact or assumptions for this prediction) - Probability and key uncertainties - Geographic scale: directly and indirectly affected geographic areas that will become of specific concern - Duration and reversibility - Key concerns associated with this impact When doing so, make sure that you judge these impacts on the basis of future trends without SPP (e.g., some important ecosystems or development opportunities may be lost as a result of development trends without the SPP, or some ecosystems or development opportunities may become even more important since they will provide the only remaining assets in the study area). All these statements can be substantiated by detailed calculations, examples, and references to international and national literature and supplemented by graphic aids (maps, graphs) to illustrate the impact.	Provide your recommendations for possible changes in this proposed strategic orientation of the RDP. You may also suggest additional “flanking” measures for future management of environmental issues that you’ve identified.
Project 1.1.1.	The construction will most probably lead to fragmentation of ecosystem AXT that will form an integral part of the only remaining regional bio-corridor. This impact can be either short-term or permanent, depending on the effectiveness of mitigation.	This loss of bio-corridor can be compensated by the restoration of damaged ecosystems AXT after the construction.
Project 1.2.3.		

Expected future cumulative effects of the SPP on the trends for the issue
Summarize the worst-case scenario and the best-case scenario for the future evolution of this trend if all direct and indirect impacts of relevant components of the SPP on the trend happen.
E.g., <u>Worst-case scenario:</u> If SPP proceeds as planned, 250 ha of natural ecosystems in location CDR, etc. will be lost and 4 bio-corridors DWS, etc. of international importance will be permanently damaged. This trend will most likely lead to the extinction of species FRD, GWS, etc. <u>Best-case scenario:</u> If all recommended changes to SPP are adopted, only 50 ha of natural ecosystems in location DRT, etc. will be lost and only 2 important bio-corridors will be temporarily damaged. This damage, which will occur in any case, can be compensated by the establishment of new protected areas in XXX. Species FRD and GWS will remain critically endangered, and greater attention needs to be given to their protection.