



Public Health

This guideline expands on what is expected by the criteria statements in the Hydropower Sustainability Tools (HST) for the Public Health topic, relating to assessment, management, conformance/compliance, stakeholder engagement and outcomes. The good practice criteria are expressed for different life cycle stages.

In the Hydropower Sustainability Assessment Protocol (HSAP), this topic is addressed in P-18 for the preparation stage, I-14 for the implementation stage and O-14 for the operation stage. In the Hydropower Sustainability ESG Gap Analysis Tool (HESG), this topic is addressed in Section 4.

This guideline addresses public health issues associated with the hydropower project. A broad view is taken on public health to incorporate anything for which one would seek medical attention, such as sickness, disease, mental health, injuries and fatalities. Guidance on occupational health and safety, i.e. the health of the labour force, is provided separately in

the Labour and Working Conditions guideline. Hydropower projects also have the potential to provide improvements in public health facilities and health services, which is closely linked with project benefits (see the Project Benefits guideline).

The intent for public health in relation to the hydropower project or operating facility is that:

- the project or operating hydropower facility does not create or exacerbate any public health issues;
- any ongoing or emerging public health issues associated with the hydropower facility are identified and addressed as required;
- improvements in public health are achieved through the project in project affected areas where there are significant pre-existing public health issues; and
- commitments made by the project to implement public health measures are fulfilled.

Assessment

Assessment criterion – Preparation Stage: A public health issues assessment has been undertaken with no significant gaps; the assessment includes public health system capacities and access to health services, and has considered health needs, issues and risks for different community groups.

The Environmental and Social Impact Assessment (ESIA) should include a section on public health. While this may not be a national requirement, it is an expectation for international good practice. The scope of the public health assessment should include all communities potentially affected at all stages of the hydropower project life cycle by exposure to:

- project-related activities and infrastructure at worksites, camps, storage areas, access roads, transmission lines, quarries, revegetation and catchment treatment areas, etc.;
- changes to water flows, including creation of reservoirs, downstream river flow changes below any project infrastructure, spills, emergency releases, and dam break;
- interactions of the public with workers and with security personnel;
- changes in amenity, livelihood and lifestyles due to environmental and social changes caused by the project, which may include economic and physical displacement; and
- population migration into the project area.

The assessment should establish a clear pre-project baseline with regards to the existing public health resources and statistics that includes those communities potentially subject to direct and indirect impacts. The baseline data should include health profiles of potentially project affected communities using all available sources of secondary data. Sources to consider include previous studies, national and regional statistics, and police and road authority data. Local knowledge and administrative health data from the local government, communities, and local health care providers should be included. Community data should be disaggregated as far as possible by cultural, ethnic, socio-economic, gender, age, education, location and other characteristics. Data analyses should seek to understand the different health and safety issues and risks for the various segments of those communities, which could result in different impacts and could make certain individuals, households and communities more vulnerable to impacts. The baseline should describe existing modalities and resources for public health services and disaster management.

The assessment should include a detailed analysis of potential risks and opportunities of the project

development with regards to public health. These should be distinctly evaluated for both the construction and operations stages due to the differing nature of risks that can prevail. Public health risks at the construction stage that should be considered include disease, injuries or fatalities from:

- dam failure and natural disasters caused by project-external factors (e.g. major landslides, floods);
- air, water, and noise pollution, vibrations, and exposure to dust and to hazardous materials;
- accidents from traffic, landslides and rock falls, fires, drowning, blasting or inadvertent detonation of explosives, and misunderstandings with project security personnel;
- communicable diseases, non-communicable diseases, unhealthy behaviour (e.g. drugs, alcohol, sexual behaviour), or violent conflict around work camps;
- declines in livelihoods and nutrition due to loss of access to land and resources;
- temporary pressure on the existing health infrastructure, equipment, human resources, essential drugs, etc. due to the influx of migrants, workers and others;
- loss of public access to health facilities and other essential services, for example in the case of road closures or transport blockages; and
- mental health issues, which may arise due to community anxiety and stress.

At the operation stage, besides the risks mentioned above, additional public health risks that should be considered include disease, injuries or fatalities from:

- drowning in the reservoir(s) or downstream river(s);
- electrical safety;
- health risks related to the reservoir, including waterborne and vector-borne diseases (e.g. malaria) as well as unhealthy water quality for human contact or consumption as it affects fish consumption (e.g. bioaccumulation of mercury); and
- permanent changes to livelihoods and health-related behaviour, including nutrition, exercise, and access to medicinal plants and traditional health services.

Public health opportunities should also be assessed. These may include:

- project ambulances and health facilities that can be used by local communities;
- investments in public health facilities including equipment and staffing;
- improved access to health facilities, health knowledge and health education;
- population health monitoring;
- improved road safety through better design and maintenance, signage, enforcement of traffic regulations;
- flood prediction and early warning systems in close cooperation with disaster management authorities;
- contribution of project reservoirs, inter-basin diversions and other infrastructure to flood retention and management;
- emergency preparedness training and infrastructure; and
- improved local waste management, sanitation and water treatment.

Assessment

Assessment criterion - Implementation Stage: Public health issues relevant to project implementation and operation have been identified through an assessment process utilising appropriate expertise; and monitoring is being undertaken during the project implementation stage appropriate to the identified issues.

Monitoring should be included in the public health issue management plans for both construction and operation so that monitoring activities are directly linked to the identified public health issues, risks and planned responses to findings. Monitoring should be designed to detect if the issue or risk is evident, and to verify that management measures are being implemented and are effective. Locations and techniques used for baseline information in the ESIA should be continued as far as practical. Monitoring locations, timing, and methodologies should have a logical design with meaningful indicators relating to both influences on health (environmental and social) and health outcomes. Where possible, monitoring should seek to link project environmental impacts and public health

factors (e.g. poor water quality and gastro-intestinal issues), and project social impacts and public health factors (e.g. negative livelihood impacts and increased malnutrition).

The exact nature and duration of monitoring will be specific to the issue and management measure. For example, an identified risk could be increased malaria. Planned management measures might include community education and awareness-raising, provision of anti-malarial medications and mosquito netting, measures to avoid pooling of stagnant water, and regular community health checks. Associated monitoring might include: the number of education and awareness-raising sessions; the number of attendees; the amount of anti-malarial medications and mosquito netting dispensed; the number of incidents involving pools of stagnant water; the frequency of health checks; and the number of incidences of malaria among the community.

Assessment

Assessment criterion - Operation Stage: Ongoing or emerging public health issues associated with the operating hydropower facility have been identified, and if management measures are required then monitoring is being undertaken to assess if management measures are effective.

During the operation stage, mechanisms should be in place by which emerging public health issues can be detected and acted on in a timely manner. Depending on the age of the operating facility and the prevalence of public health issues during its development or in the region, the degree of attention on public health by an operating hydropower facility can vary considerably. If the operating hydropower facility was commissioned relatively recently, identification of ongoing or emerging public health issues may take place through follow-up monitoring programmes that were committed to during project development. The duration of these programmes would be as agreed with the project regulatory authorities. For hydropower facilities that have been operating for decades, there may not be direct public health monitoring programmes delivered by the owner/operator. If not directly undertaking the monitoring, it is important for the owner/operator to ensure that

there are services in place in the area affected by the operating hydropower facility that will be able to detect any ongoing or emerging public health issues relating to operations.

Throughout the operations stage, the owner/operator should be monitoring for causative factors relating to operations that could, if not responded to, eventually lead to public health issues (e.g. algal blooms or changed road usage patterns leading to increased hazards). If ongoing management measures are taken by the owner/operator to minimise public health risks, monitoring should be associated with these measures to detect if risks are being fully addressed.

Management

Management criterion - Preparation Stage: Plans and processes to address identified public health issues have been developed for project implementation and operation with no significant gaps.

Management criterion - Implementation Stage: Processes are in place to ensure management of identified public health issues and to meet commitments relevant to the project implementation stage; plans are in place for the operation stage for ongoing public health issues management including handover to local authorities as appropriate.

Management criterion - Operation Stage: Measures are in place to manage identified public health issues.

Plans should be included in the Environmental and Social Management Plan (ESMP) in relation to public health measures to be taken during project development and operation. The public health management plans should be separately specified for both the construction and operation stages and include the following:

- All sources and types of potential public health risks and opportunities are outlined.
- Mitigation measures for public health impacts are listed and the objectives are clearly explained.
- Measures to be implemented have a clear timeline, budget, and responsible parties.
- Measures are culturally-sensitive, e.g. with respect to traditional medicines and local beliefs.

- Measures take into account longer-term considerations, e.g. community growth, maintenance needs of public health facilities, maintenance of project measures to reduce risks such as road signage, handover arrangements from the developer or owner/operator to the government, and capacities of local authorities for ongoing management.
- ESMP content is developed in a manner for which contractor responsibilities can be easily incorporated into tender and contracting documents in a manner that shows the contractors must also convey these responsibilities to their sub-contractors and suppliers.
- A programme for surveillance, monitoring and auditing for all commitments is provided.

Adaptive management measures for unpredicted public health impacts are also ideally included. These would focus on issues that might be identified through the monitoring and surveillance, as well as what the response would be (including responsible parties and contingency budget set aside).

Global experience in managing public health risks in relation to hydropower projects and operating facilities has shown a wide range of potential approaches. In many cases, avoidance and minimisation of public health risks can be achieved through public safety measures (see the Infrastructure Safety guideline), various environmental impact areas (e.g. see the Water Quality guideline and the Waste, Noise and Air Quality guideline), and social impact areas (see the Project Affected Communities and Livelihoods guideline). In addition, measures to address public health risks could include some of the following:

- Measures to mitigate risks from dam failure and natural disasters caused by project-external factors, e.g. major landslides or floods: health infrastructure, equipment and trained human resources to deal with victims of disasters; and hospital contingency plans.
- Measures to mitigate risks from air, water, and noise pollution, vibrations, and exposure to dust and to hazardous materials: provision of personal protective equipment for vulnerable community members, such as face masks, ear plugs, or water filters; and temporary relief to vulnerable households if necessary, including temporary relocation, to avoid health risks from more intensive construction-related impacts.

- Measures to mitigate risks from accidents from traffic, landslides and rock falls, fires, drowning, blasting or inadvertent detonation of explosives: removal and treatment of public safety hazards; appropriate design speeds and enforcement of traffic regulations (e.g. related to speed, seat belts, alcohol, drugs, mobile phone use, etc.); project driver training; project vehicle maintenance; community road safety awareness training; fire management plans; drowning risk management (e.g. through signage, warning systems and access restrictions, rescue equipment and staff, community water safety awareness training); flood prediction and early warning systems; reductions in flooding risks; support to ambulances and health centres (including appropriate staff, equipment and medicines); provision of firefighting equipment, boats, excavators and other equipment to local authorities for accident response.
- Measures to mitigate risks from communicable diseases, unhealthy behaviour (e.g. drugs, alcohol, sexual behaviour), or violent conflict around work camps:
 - medical check-ups and screening for immigrant workers at points of entry;
 - ensuring capacity of local health centres for prevention, screening and response to outbreaks of communicable diseases;
 - healthy conditions and appropriate medical services (annual screening) provided within camps, and workers accommodated outside work camps provided with equivalent conditions and services to prevent the spread of communicable diseases;
 - workers trained in appropriate preventive measures and conduct towards local communities;
 - public access to work camps is controlled; and
 - community-worker interaction is monitored and, where necessary, restricted.
- Measures to mitigate risks arising from declines in livelihoods and nutritional standard due to loss of access to land and resources: those described in the guideline on Project Affected Communities and Livelihoods. Special attention should be paid to vulnerable households and individuals, such as malnourished and stunted children, pregnant women, and the elderly.
- Measures to mitigate risks arising from mental health issues: ensuring appropriate engagement and inclusion of those who would be affected by project decisions; specialised mental health prevention and treatment capacity; spiritual ceremonies performed as appropriate to mitigate community concerns.
- Measures to mitigate risks arising from temporary pressure on the existing health infrastructure, equipment, human resources, essential drugs, etc. due to influx of migrant workers, or loss of access to health facilities: avoidance and minimisation of closures of roads and other infrastructure through appropriate construction management; where necessary, bypass and replacement facilities or provision of alternative transport; timely increase in capacity of all health facilities or additional facilities during construction and operation; sharing of project health facilities with local communities.
- Measures to mitigate risks arising from electrical safety incidents: community awareness training; guidance, signage, exclusion zones and other rules to minimise electrical hazards for community members; electrical equipment and infrastructure undergo regular inspections, maintenance, upgrades and replacements; transmission lines rights-of-way maintained in safe conditions; ensuring project capacity to respond rapidly to electrical malfunctions.
- Measures to mitigate health risks related to the reservoir, including waterborne and vector-borne diseases and unhealthy water quality for human contact or consumption as it affects fish consumption (e.g. bioaccumulation of mercury): monitoring of water quality, fish quality, pathogens, disease vectors, and disease outbreaks; community awareness training, signage, restrictions on public use as needed; clinical treatment of disease cases as needed; control of floating aquatic weeds and vectors, especially in shallow reservoir areas near settlements, by mechanical or chemical treatment.
- Measures to mitigate risks arising from permanent changes to livelihoods and health-related behaviour, including nutrition, exercise, and access to medicinal plants and traditional health services: strengthening of preventative, promotive and curative health care services and community awareness programmes; provision of exercise and recreational facilities for prevention of non-communicable diseases; community screening for non-communicable diseases.

At the same time as managing risks, management plans should seek to incorporate measures that can improve existing public health issues for local communities. With careful attention to public health issues, risks can be managed and opportunities put in place as additional benefits. New health clinics, improved access to health services, provision of improved access to fresh water, supply of reliable electricity for health clinics and refrigeration needs can all make a difference in public health and welfare. Any planned measures for public health opportunities should also have clearly allocated responsibilities, appropriate funding and resources, objectives and targets, and monitoring and evaluation provisions. Handover arrangements with responsibilities to different agencies transferring over time should be clearly identified, along with risks, monitoring and adaptive management responses.

Stakeholder Engagement

Stakeholder Engagement criterion - Preparation Stage: The assessment and planning for public health has involved appropriately timed, and often two-way, engagement with directly affected stakeholders, including health officials and project affected communities; ongoing processes are in place for stakeholders to raise issues and get feedback.

Good practice requires that a process of stakeholder engagement has been followed in the assessment and planning for public health issues in relation to the hydropower project. Directly affected stakeholders for public health should be clearly identified in any project stakeholder mapping. They might be stakeholders only for this issue or stakeholders in relation to many issues relating to the project. Directly affected stakeholders for public health should include those with public health responsibilities in the government and for the developer, public health professionals in the project area, and representatives of the project affected communities. Different health issues may have different affected groups within the communities and these should be taken into account in the engagement process. Representation should be carefully considered and include those in the community who may have alternative approaches for health such as traditional medicines.

Appropriate timing, culturally appropriate, and two-way processes are important components of good practice. 'Appropriately timed' means that engagement is early enough so that the project can respond to issues raised, public health stakeholders can provide inputs before the project takes decisions on these issues, and engagement take place at times suitable for these stakeholders to participate. Public health stakeholders should be supportive of the timing of engagement activities. 'Culturally appropriate' means that methods of engagement respect the cultures of the public health stakeholders and allow adequate provisions to fit with the discussion and decision-making processes typical for them. Stakeholder engagement processes that are culturally sensitive consider, for example, meeting styles, venues, facilitators, language, information provision, the community's decision-making processes, time allocation, recording, and follow-up. Engagement processes for public health stakeholders should consider gender and the inclusion of vulnerable social groups. 'Two-way' means that public health stakeholders can give their views on the plans that will affect them rather than just being given information without any opportunity to respond. Examples of two-way processes include focus groups, community meetings, and public hearings.

Conformance/Compliance

Conformance/Compliance criterion - Implementation and Operation Stages: Processes and objectives in place to manage public health issues have been and are on track to be met with no significant non-compliances or non-conformances, and public health related commitments have been or are on track to be met.

Assessment processes and management measures relating to public health need to be compliant with relevant government requirements. These may be expressed in licence or permit conditions (such as requiring a health centre to be provided with the project, health checks for project affected communities, or sanitation standards to be met in the labour camps) or captured in legislation (such as a requirement for a health impact assessment to be undertaken for proposed major developments). Implemented measures should be consistent with what is in the plans to demonstrate conformance

with the plans. Public health commitments may be expressed in policies of the developer or owner/operator, or in company statements made publicly or within management plans. Evidence of adherence to commitments could be provided through, for example, internal monitoring and reports, government inspections, or independent review. Variations to commitments should be well-justified and approved by relevant authorities, with appropriate stakeholder liaison.

The significance of not meeting a commitment is based on the magnitude and consequence of that omission and will be context-specific. For example, a failure to demonstrate delivery of a major public health mitigation measure expressed in the project approval is likely to be a significant non-conformance, whereas a slight delay in delivery of a monitoring report could be a non-significant non-conformance.

Public health issues rely on very good cooperation between the hydropower developers and the government health agencies. Depending on the particular arrangements and the time period post-project commissioning, responsibilities for public health may have been fully handed over from the operator to government agencies. Conformance with handover plans, and adaptations as needed, should be well-documented, as should longer-term agreements if there are expectations of continued project support.

Outcomes

Outcomes criterion - Preparation Stage: Plans avoid, minimise and mitigate negative public health impacts arising from project activities with no significant gaps.

Outcomes criterion - Implementation Stage: Negative public health impacts arising from project activities are avoided, minimised and mitigated with no significant gaps.

Outcomes criterion - Operation Stage: Negative public health impacts arising from activities of the operating hydropower facility are avoided, minimised and mitigated with no significant gaps.

To show that plans avoid, minimise and mitigate public health impacts from project activities, mitigation measures in the plans should be able to be directly linked to all identified public health issues and risks. The assessment, planning and implementation should have been carried out by appropriately qualified experts. The assignment of responsibilities and resource allocation for implementation, monitoring and evaluation should be appropriate to the planned actions.

An evidence-based approach should demonstrate that negative public health impacts arising from project implementation and operation activities are avoided, minimised and mitigated with no significant gaps. The developer, owner and operator should demonstrate that responsibilities and budgets have been allocated to implement public health plans and commitments. Monitoring reports and data in the implementation and operation stages should clearly track performance against commitments and objectives and capture public health impacts. It should be possible to provide examples to show how identified risks from the assessment have been avoided or minimised. It should also be possible to table evidence to show that mitigation plans have been implemented and are being monitored. Implementation of measures for public health, such as new or enhanced facilities, resources and services, should be evident, and monitoring should show how they are achieving their stated objectives.