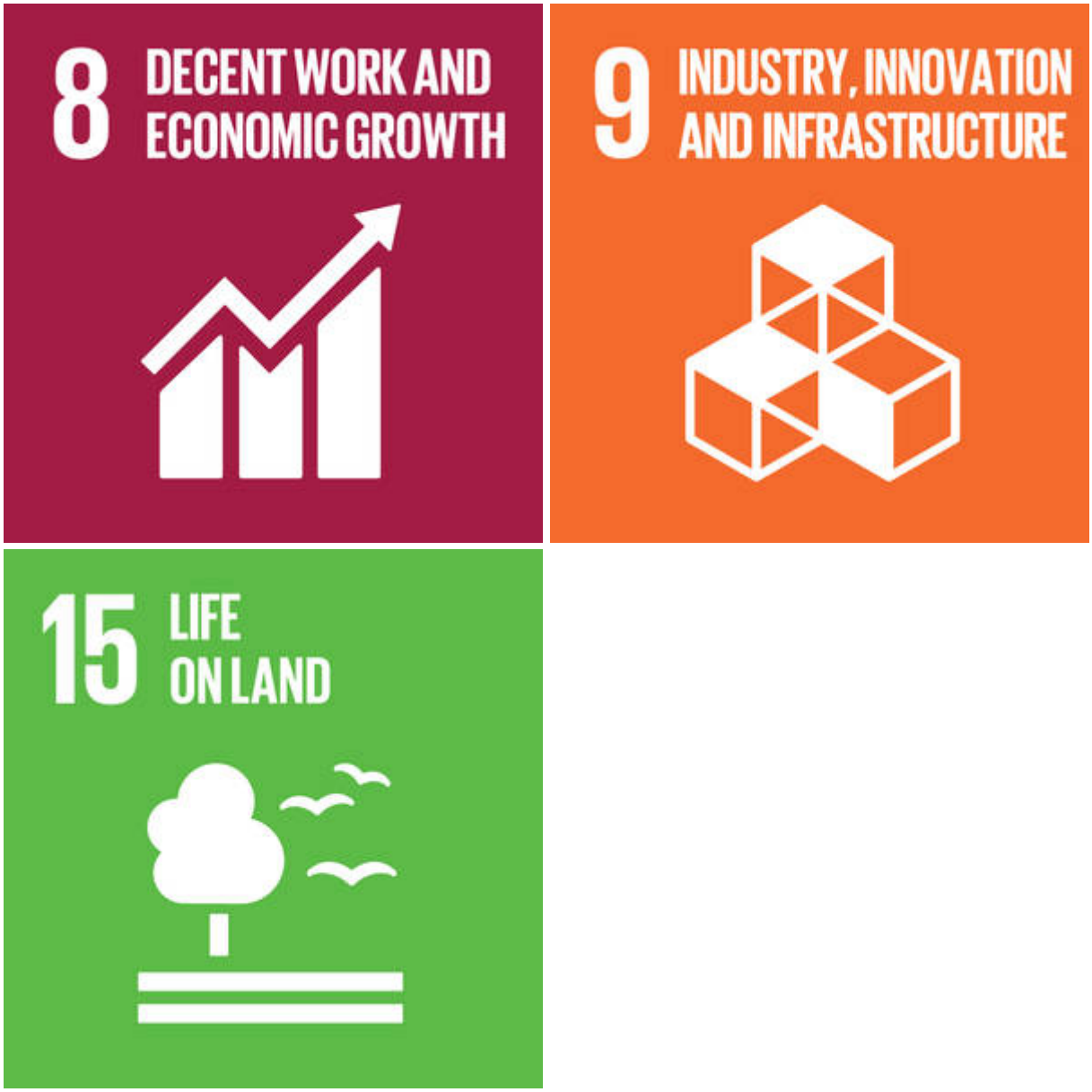
Occupational Health and Safety in Forestry

Basic knowledge

Occupational health and safety in forestry contributes to SDGs:



The Occupational Health and Safety in Forestry Module is aimed at all forest workers, particularly forest managers and supervisors. It provides basic and more detailed information on the dangers to human health and safety posed by some forest activities and identifies measures that can be taken to mitigate these.

The module also provides links to relevant tools and cases.

Forestry is one of the most dangerous of all occupations; it is sometimes called a “3D” job – dirty, difficult and dangerous. Occupational health and safety in forestry can be greatly improved, however, through adequate worker training and supervision and the use of safety equipment, among other things. This module examines major health and safety issues in forestry – especially in the harvesting, extraction, loading and transport of logs – and effective ways of addressing them. Healthy and safe working conditions are prerequisites for SFM.

Workers may be subject to **extreme heat and cold**. High temperatures reduce work capacity and may lead to heat stress and dehydration. The risk can be reduced by, for example, the provision of sun shelters, the regular intake of water and the judicious use of rest periods, and by undertaking the heaviest work in the coolest work hours. Cold weather can reduce dexterity, blood flow, muscle strength and balance. Regular food intake, adequate clothing and sufficient facilities for drying clothes can reduce the risk to human health posed by cold weather.

Terrain and site factors, such as slope and soil type, influence work safety. Forestry activities often occur on steep slopes, with a consequent high risk of machinery accidents and rock falls. Finely textured soils (e.g. clays) are slippery when wet, increasing the risk of accidents involving heavy machinery.

Falling trees and branches, chainsaw “kickbacks” and tree hang-ups pose serious risks to workers. Training in safe practices and the use of adequate safety equipment can reduce such risks.

Noise from chainsaws and brushcutters can lead to hearing loss if hearing protection is not used. The use of hand-held power tools such as chainsaws and brushcutters can also cause **hand–arm vibration**, which can affect blood circulation in the hands and forearms and damage nerves, tendons, muscles, bones and joints. The vibration dampers used in most modern chainsaws can reduce this problem.

Operators of machines such as skidders and loaders may be subject to **whole-body vibrations**, which can cause lower back pain as well as repetitive strain injuries. Whole-body vibrations can be reduced by the use of vibration-damping seats in machinery and decreased exposure through job rotation.

Loading and unloading wood is a hazardous operation in forestry. Risks can be reduced through the use of safe working routines and adequate personal protective equipment. The transport of wood on narrow roads, possibly in poor weather conditions, is another hazardous activity, the safety of which can be improved through good practices.

The forest sector has a range of **chemical hazards**, including the potential for exposure to fumes associated with chainsaw use and to pesticides, and **biological hazards** such as the potential for allergic reactions to plants, pollen and insect bites.

Many rural people collect forest products alone in remote locations and may be exposed to a range of biological hazards as well as to extreme weather, accidents, and – especially for women, children and the elderly – assault.

Forested areas are often considered more unsafe for women than for men. In fact, women and children may be exposed to sexual violence and rape. Such dangers create a barrier for women, who may be forced to shorten the time they spend in forests and, consequently, be limited to more traditionally female jobs. It is not uncommon for women to sell foods and/or provide services like laundry for workers at logging camps; this often involves heavy transport and long trips where they run the risk of being robbed.

Since forest work is usually viewed as a male-dominated field, women are rarely considered when it comes to safety precautions. For instance, tools and equipment tend to be made to fit male workers, creating ergonomic problems for female workers, and making it more difficult for them to find clothes and protective gear to fit them. Additionally, women in the developing world work mostly in the informal sector or in their own households so they don't have any insurance against risks. Women collecting firewood often have to stay away from home for a long time in remote areas. They have to carry heavy loads for long distances, and they usually have little or no help in the event of an accident. In nurseries, which tend to employ women, workers are often given inadequate protection and are exposed to chemicals.

The risks to pregnant and lactating women in forestry are even more alarming because of the potential for bites from insects or pests. The unhealthy surroundings can be very dangerous both for women and for their children.

Related modules

- Management of planted forests
- Silviculture in natural forests
- Wood harvesting

In more depth

The forest sector employs almost 14 million people worldwide, comprising four million in formal employment and about ten million employed informally.

Women comprise an estimated 10 percent of the formal forestry workforce globally, and they tend to be employed in low-paid tasks. Contractors perform a growing share of formal forestry work, reducing employment security for workers, who increasingly are employed on short-term contracts. Accident rates are higher and health problems more common among workers on short-term contracts than among permanent staff. The increase in contract labour has also increased workforce turnover, aggravating skill shortages.

Wages in the forest sector are well below the industrial average in most countries. Piece-rate payment is the dominant wage system, and labour and trade unions are absent or weak in many countries. Many forest workers lack a voice to ensure their rights are respected, including their right to safety and health at work.

Codes of practice

Many countries have codes of practice – sets of rules, prescriptions and recommendations – for health and safety in the forest sector, although they vary greatly in scope and coverage. Such codes can be a useful complement to safety laws and regulations that are not necessarily forestry-specific.

At least two international codes of practice relevant to health and safety in the forest sector have been developed: the FAO Model Code of Forest Harvesting (1996), and the International Labour Organization's Safety and Health in Forestry Work (first published in 1969, revised in 1998). National codes of practice vary in their legal status; for example, they may be legally binding or voluntary. Forest management certification schemes also normally have components that are relevant to worker health and safety.

Harvesting

Protective equipment. A wide range of personal protective equipment is available to help minimize the risk of injury to forest workers. Protective clothing can reduce the risk of chainsaw injury: for example, the padding in "chaps" (worn over trousers) and chainsaw trousers comprise hundreds of polyester, polypropylene or nylon fibres that work by clogging the chainsaw chain and thereby preventing it from cutting through to the worker's skin. Protective clothing are also available that resists cutting such that the chain "glides" over the surface.

Protective rubber footwear with a cut-resistant lining on the upper part of the boot, and metallic toe caps, can protect against chainsaw cuts and other hazards. Rubber boots are uncomfortable in hot climates, however, and leather boots or ankle-high shoes with cut-resistant linings and toe caps can be used. Boots and shoes should also be designed to reduce the risk of slipping and falling, and chemical-resistant soles may also be necessary, especially for forest operations involving the application of pesticides.

Helmets protect against falling objects and chainsaw kickbacks. They should be comfortable and as light as possible without compromising their strength and durability. The strength of both plastic and alloy helmets decreases as they age, and therefore they should be replaced regularly. Headbands must be correctly adjusted. Helmets should have in-built devices for attaching visors and earmuffs.

The face and eye protectors fitted to helmets are normally made of aluminium or fibreglass mesh. Although the mesh reduces incoming light, most operators prefer it to Perspex shields and goggles, which fog easily. Hearing protectors should be certified and fitted tightly against the head (see suggested videos in Tools).

Felling. The chainsaw is the most dangerous tool in forestry, its operator the most exposed worker, and treefelling and crosscutting the activities in which serious and fatal accidents are most likely to occur. Work involving hung-up trees and wind-thrown stands is particularly risky.

Another hazard is chainsaw kickback, which occurs when the upper quarter of the bar nose comes in contact with an object, resulting in an instantaneous "kicking" of the chainsaw, potentially towards the operator. The risk of kickback can be minimized by avoiding contact between the bar nose and the tree, and by always operating the chainsaw with two hands on the saw handles, not using it above the shoulders, and always keeping it in front of the body.

Tree bole crosscutting is often done close to the ground, placing a strain on the operator's back, but the ideal work height is hip level, and this can be achieved by using other fallen trees as "benches". The chainsaw should be partly rested on the tree bole during delimbing. Repetitive work patterns over extended periods can lead to repetitive strain injuries and should be avoided (see videos on the safe operation of chainsaws in Tools).

Noise and vibration from chainsaws are potentially serious hazards. Hearing loss is common among chainsaw operators, but operators can reduce the risk by wearing adequate ear protection at all times. The risk of injury due to chainsaw vibration has been reduced by the introduction of vibration-damping chainsaws; although still available in some countries, chainsaws not equipped with this feature should be avoided.

Machinery. The advent of air-conditioned and noise-protected cabins on ride-on machinery such as skidders and loaders have greatly reduced health and safety hazards related to temperature extremes, noise and dust. Whole-body vibrations and repetitive strain injuries still exist, even when modern machinery is used, but their incidence has been reduced, including through the use of ergonomic checklists (see below). Job rotation is another practice that can reduce exposure to whole-body vibrations and therefore to the risk of associated injuries.

All ride-on forest machinery carries the risk of overturning, being hit or penetrated by objects such as trees and tree limbs, whole-body vibration, noise and fumes. These hazards are particularly high for machines not built specifically for forestry or which lack modern health and safety features such as enclosed, air-conditioned cabins and operator protective structures. Stress poses another hazard for machine operators, who must make many rapid decisions during the course of a working day. Owner-operators and operators working at piece-rates must also deal with the additional stress of needing to continually achieve high productivity.

Repetitive and static work can be a problem for operators. Many machine operators complain of neck and shoulder problems, which can be reduced through job rotation or job enlargement.

Skidders that use cables need choker setters in the forest and on landings. Good communication between machine operators and choker setters is extremely important to ensure safe operations.

Cable systems. Potential hazards associated with cable log-extraction systems include mechanical impacts; the breakage of cables, anchors, spars and supports; and the inadvertent or uncontrollable movement of cables, carriages, chokers and loads. Particular risks are associated with hooking and unhooking loads. Other health hazards include noise, vibration and awkward working postures.

Transport

Log landings and reloading terminals are among the most dangerous working environments in forestry. They are busy places, and many different operations – such as loading and unloading, debarking, trimming and chipping – are often conducted simultaneously. Logs may be stored in unsecured piles, and rain and snow can make the ground slippery. Manoeuvring vehicles are the main hazard. Risks can be reduced by the use of protective equipment by operators, the adequate maintenance of tools and machines, adequately trained operators and supervisors, and the physical separation of manual and machine-based tasks. Loader operators may work for a different organization than truck drivers, and there should be easily understood, pre-arranged ways of communicating hazards and safe systems of work between them on log landings and at reloading terminals.

Log trucks suitable for the job should be well maintained and operated by trained and properly licensed drivers. Overloading should be avoided, and binders should be used to secure loads.

Chainsaw milling

Freehand chainsaw milling is associated with a high risk of injury and fatigue. Removing chain depth gauges to increase cutting speed is a common practice that also increases the risk of kickbacks. Other health hazards are associated with poor posture and high noise and vibration levels. Most of the risk factors associated with chainsaw milling can be greatly reduced by the use of chainsaw milling attachments, which unfortunately are still rare in many countries.

Non-wood forest products

Non-wood forest products (NWFPs) are often harvested by individuals in remote locations, and help may be far away if accidents occur. Tree-climbing, cutting, digging, gathering, picking and manually transporting products are all common NWFP-harvesting activities, and all have associated risks. Other hazards include heavy repetitive or static work, the use of inappropriate tools, difficult terrain, and contact with poisonous plants and venomous animals. Accidents associated with cutting are the most common hazard. Training and proper tool selection and maintenance can help reduce risks. Training should include basic ergonomics, planning, risk assessments and precautionary measures.

Forest fire management and control

The main activities involved in fire management are controlled burning and fire prevention, detection and suppression (see Vegetation Fire Management). Risks include exposure to excessive heat from the fire, the inhalation of toxic fumes (e.g. carbon monoxide), eye irritation

from particulates, and burning. Factors that can increase the risks posed by fire include poor visibility, difficult terrain, difficult logistics, night work, changes in wind direction, stress and fatigue. An effective organizational structure for fire suppression can help avoid fatalities and the loss of property.

Chemical hazards

Chainsaws and brushcutters are sources of **exhaust emissions,** which include the suspected carcinogens benzene and formaldehyde. **Aerosols** from the oils used in chainsaws and brushcutters can cause irritation to skin, eyes and the respiratory system, which can be reduced by the use of goggles and gloves and by regular washing.

Exposure to **herbicides and pesticides** in forestry can lead to a variety of health problems. Personal protective equipment, such as overalls, boots, gloves, and, for toxic agents, respiratory devices, should be used. Smoking and eating should be avoided when working with chemicals.

Biological hazards

Biological hazards include allergic reactions to plants, pollen, wood products and insect bites, as well as snakebite and diseases that can be contracted from, for example, mosquitos and ticks. The risks posed by many biological hazards can be reduced through adequate training, effective management (e.g. by reducing mosquito breeding grounds in the vicinity of camps and the use of mosquito nets), and an adequate level of personal hygiene.

Living conditions

Forest workers often live in camps in remote areas, which should meet certain minimum standards of sanitation, comfort and services consistent with the maintenance of human dignity. A well-balanced diet should be available, and an adequate supply of safe drinking water and other non-alcoholic drinks is also essential.

Ergonomic checklists

Ergonomic checklists are valuable tools for evaluating and improving workplace arrangements. They are particularly useful when:

- assessing new tools, machines, other equipment and techniques, and workplace reorganizations;
- purchasing new tools, machines and equipment; and
- conducting safety inspections.

See Tools for model checklists generated by FAO and the International Labour Organization.

Skills and training

Many forestry workers receive their training “on the job”, and often such training does not involve much more than imitation or trial and error. Even in industrialized countries, many forest owners, self-employed workers and contractors do not receive proper training. For some jobs, mobile training – in which trained instructors travel to workplaces – is an efficient and effective alternative to schools and training centres. Certification schemes for chainsaw operators have also shown promising results.

Further detailed guidance and support on occupational health and safety in forestry can be found in the tools and case studies of this module.

Further learning

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Credits

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This module was revised in 2018 to strengthen gender considerations.

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