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Mainstreaming in the manufacturing and processing sectors

Manufacturing is at the heart of modern economies. Technological and organizational innovations have allowed the sector to diversify, and it now includes industries such as manufacture of food products, beverages, textiles, wood and paper products, chemical products, pharmaceutical products, plastic products, fabricated metal products, computer, electronic and optical products, electrical equipment, machinery, motor vehicles and furniture, among many others.

Manufacturing includes the physical or chemical transformation of materials, substances, or components into new products. This involves facilities (plants, factories or mills) that typically use power-driven machines and materials-handling equipment, small scale/artisanal transformation of materials or substances into new products, and businesses that sell directly to the general public products made on the same premises from which they are sold (e.g., bakeries and custom tailors). The output of a manufacturing process may be ready for utilization or consumption or be inputs for further manufacturing.

Manufacturing accounts for approximately 15% of global GDP and 23% of employment worldwide.

The manufacturing sector relies directly and indirectly on various ecosystem services. Some industries rely primarily on renewable and non-renewable resources (provisioning ecosystem services), typically on raw material inputs into various manufacturing processes, and some regulating ecosystem services, such as water flow regulation and purification services. Some manufacturers rely on the supply of renewable, biological raw/transformed materials (e.g., fibres, foods). Others use genetic resources and associated traditional knowledge. These dependencies on ecosystems can be diverse and complex, contingent on the type of raw material extracted or produced for manufacturing transformation.

Impacts on biodiversity and ecosystems

Impacts on biodiversity vary across manufacturing industries and are driven by the specifics of their production inputs (e.g., renewable and non-renewable resource use) and non-product outputs (e.g., air and water emissions, solid waste). Manufacturing companies generate both direct (e.g., factory location and its direct pollution) and indirect (e.g., through the supply chain) biodiversity impacts and dependencies, across globalized value chains from raw material extraction or production to manufactured goods consumption.

Most manufacturing processes cause, to varying degrees, air, water and soil pollution, which all can have significant impacts on ecosystems and human health. Manufacturing is responsible for around 35% of global electricity use, over 20% of CO₂ emissions, and up to 17% of air pollution-related health impacts, with estimates of gross air pollution damage ranging from 1% to 5% of global GDP. Key indirect biodiversity impact drivers of manufacturing industries include habitat loss/degradation, overexploitation of biological resources, land conversion and deforestation, and remain a challenge in many countries.

In the foreseeable future, major risks for biodiversity linked to the activities and growth of manufacturing industries include:

- (a) The siting and design of factories, as well as source-point pollution from manufacturing processes;
- (b) Land-use changes linked to the supply of various manufacturing inputs (e.g., foods, beverages, textiles, rubber);
- (c) The over-harvesting of biological resources (e.g., fish, wood, natural and genetic materials).

Approaches to mainstreaming biodiversity in the manufacturing and processing sector

Mainstreaming related to biodiversity and other environmental concerns involving the manufacturing sector has taken many forms. Typical policy interventions and measures include:

- (a) Direct regulation (command and control) where a standard, procedure or process is specified, such as hazardous waste or air emissions regulations;
- (b) Market-based instruments such as taxes/subsidies and trading schemes which help internalize negative environmental externalities;
- (c) Removal, phase-out or reform of incentives, including subsidies, harmful to the environment;
- (d) Various positive incentives encouraging more environment-friendly practices;
- (e) Public procurement supporting or discouraging specific behaviours or products with significant environmental impacts;
- (f) Disclosure requirements requiring companies above certain thresholds to report annually on their environmental risks, impacts and performance;
- (g) Trade agreements with environmental safeguards, among others.

Moreover, several key environmental approaches and/or tools are progressively integrating biodiversity considerations, such as environmental management systems, environmental and social impact assessments, life-cycle impact assessments, environmental management accounting and reporting/disclosure, or externality valuation and disclosure.

Countries may wish to consider designing, adopting and implementing enabling policy and legislative environments and incentive measures, or providing guidance with a view to supporting manufacturing companies in recognizing, measuring, valuing, managing sustainably, and making disclosures concerning their performance related to their direct and indirect dependencies and impacts on biodiversity, including across their value chains.

There are a number of international initiatives that are related to mainstreaming in the manufacturing sector, such as the 2030 Agenda for Sustainable Development and its Goal 9, which calls for sustainable industrialization, and Goal 12 on sustainable consumption and production. The 10-year framework of programmes on sustainable consumption and production is another important global initiative, adopted at the United Nations Conference on Sustainable Development, in 2012.

Questions to guide the discussions

- What are the main actions for an enabling environment to mainstream biodiversity in this sector?
- What are some specific positive examples of biodiversity mainstreaming in the manufacturing and processing sectors?
- What are the biggest challenges and barriers to mainstreaming biodiversity into the manufacturing and processing sectors? What are the biggest opportunities we have now?
- What additional actions are needed to enable and support biodiversity mainstreaming in these sectors? Budgetary measures, institutional frameworks and processes, legislation and policy actions?
- Who are the main actors that have a key role to play in achieving biodiversity mainstreaming in these sectors?