

ENVIRONMENTAL ISSUES AND BEST PRACTICES FOR MICROFINANCE INSTITUTIONS AND MICRO AND SMALL-SCALE ENTERPRISES



Brief Description of the Sector

USAID has funded microenterprise development for more than two decades. Over the past 10 years, USAID provided more than \$280 million in assistance for microenterprise development in Latin America and the Caribbean. The programs USAID supports now reach nearly one million clients in the region with more than half a billion dollars in active loans.¹ Micro and small enterprises (MSEs) employ 50 employees or less and are particularly important contributors to the Latin American economy.² They contribute significantly to gross domestic product and create jobs for low-income populations, including substantial numbers of women, indigenous groups, and minorities. In many cases, MSEs are the sole source of income for entrepreneurs and their workers.

MSE activities range from informal commerce, such as street sales of food or crafts, to the production of export-quality goods, such as garments or processed foods. The organization of production ranges from single entrepreneurs working out of a household with their families to larger, independently sited facilities with dozens of permanent workers.

In most cases, negative environmental impacts associated with MSEs are a result of legal, political, economic, and social factors over which MSEs have little control. MSEs generally use outdated technologies and lack knowledge about and are unable to invest in newer cleaner technologies. Improper use of chemicals, inadequate treatment or disposal of waste, uncontrolled emissions, and production techniques that make intensive use of non-renewable resources further add to potential environmental impacts. Urban MSEs tend to have little access

¹ See <http://www.usaid.gov/about/monterrey/microent.html>.

² MSEs are also commonly known as small and medium-sized enterprises (SMEs).

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to infrastructure such as sewage or waste collection. In rural areas, excessive use of pesticides and other chemicals in farming and aquaculture, lack of adequate land, inappropriate livestock management, and risks to wildlife can be of major environmental concern.

These guidelines on environmental issues and best practices have been developed for activities that support 1) technical services agencies that provide business or technology services to MSEs or 2) intermediary financial institutions and direct lenders that provide credit to MSEs. They provide tools to quickly identify critical environmental impacts and consider cost-effective mitigation options.

Potential Environmental Impacts

Do such small entities really have environmental impacts worth worrying about—particularly next to large, high-polluting enterprises? Absolutely. Although there is a lack of quantitative information on the extent of environmental impacts of microenterprises, there is sufficient evidence that there are impacts associated with certain microenterprise sectors, such as agrochemical intense production, metal plating, textiles, brick making, automobile repair shops, tanneries and small-scale mining. The key environmental problems associated with these microenterprise sectors are:³

- The negative environmental impacts of microenterprises often pose a direct threat to human health. This includes, above all, the improper disposal and unsafe use of hazardous substances such as pesticides and chemicals.
- The growing use of pesticides, chemicals, and other polluting technologies.
- Pollution and waste through the inefficient use of resources and outdated technologies.
- An ever-increasing number of microenterprises competing for diminishing resources and space.
- In urban areas, the inappropriate location of microenterprises and their subsequent contribution to overcrowding and pressure on infrastructure such as water and sanitation services.

³ See Pallen 1996.

⁴ For example, while small enterprises account for 40 percent of all industrial production in India, they contribute nearly 60 percent of all industrial pollution.

Table 4.1 Environmental Impacts Associated with MSEs

Sector	Environmental issues
Tanneries	♦ Release of and exposure to toxic effluents (particularly chromium VI)
Textile dyeing and crafts	♦ Release of and exposure to toxic effluents; use of toxic products in production
Agriculture and aquaculture	♦ Misuse of agro-chemicals; land degradation, non-point source pollution
Brickmaking	♦ Depletion of forest resources; exposure to particulate and fumes; release of ashes into waterways
Metalworking and electroplating	♦ Toxic effluents
Ceramics	♦ Use of glazes based on heavy metals and corrosive acids
Mining	♦ Toxic effluents (particularly cyanide and mercury) in gold processing
Automobile and motor repair shops	♦ Inappropriate disposal of used oils, batteries, sludge, and other toxic wastes
Foundries	♦ Air pollution from gases, metal fumes, organic solvents and dust; solid wastes
Paint and print shops	♦ Toxic effluents and wastes
Food processing (grains, sugar milling, edible oils, milk processing, coffee)	♦ Potentially dangerous wastewater and organic wastes; air pollution (particulate matter); odors
Wood processing (furniture, construction materials)	♦ Use of toxic materials (glues and paints) in production process
Livestock operations	♦ Biochemical effluents; human exposure to diseases
Household chemical products (soaps, detergents)	♦ Toxic effluents
Small-scale transportation	♦ Air pollution from old and poorly maintained vehicles
Leather works (shoes, leather goods)	♦ Solid wastes; chemical handling; toxic effluents (dyes, chemicals)
Mattress industry	♦ Solid wastes
Lime kilns	♦ Air pollution; solid wastes; indirect deforestation
Clothing confections (small scale)	♦ Wastewater; solid wastes

Source: Pallen 1996 and Acevado and Beasley 2001.

unit of production, small enterprises can often pollute more than larger enterprises, and their prominence in particular economies or industrial sectors can create environmental impacts of significant proportions. Table 4.1 presents potential environmental effects associated with common microenterprise activities.⁴

The study identified three principal areas of concern regarding potential environmental impacts in microfinance: depletion of natural resources; disposal of liquid, solid, and gaseous wastes; and occupational and safety issues.

Program Design—Some Specific Guidance

Many Latin American and Caribbean countries are only beginning to establish environmental standards, regulations, and enforcement institutions for particular sectors, such as brickmaking, mining, and textile dyeing. Even where environmental standards and strong regulatory institutions exist, many MSEs go unregulated and uninspected because of their sheer numbers and dispersion, as well as competing political and economic pressures or fear of detrimental effects on income and employment.

Given that regulation and enforcement are nascent in many countries, other steps must be taken to prevent or mitigate environmental impacts associated with MSEs. Thus, integrating environmental concerns into MSE credit and technical assistance operations is vital. Credit institutions have a particularly important role in this transition since they serve as intermediaries in the economy, making contact with most economic actors.

Training can be provided to intermediary service organizations and credit agencies to incorporate environmental review processes and assistance for mitigating environmental impacts as part of the lending process and technical assistance provided to the entrepreneur. Incorporating incentive mechanisms (low interest financing to upgrade equipment, or reformulate production) into the design of microfinance programs is one way to help ensure that environmental concerns will be addressed as part of the technical or financial assistance being provided.

A recent study conducted for USAID/Bolivia addresses ways to quantify and mitigate potential environmental impacts of microenterprises, supported indirectly by USAID's program to develop microfinance institutions in Bolivia. The proposed mitigation measures also take into consideration the current economic and social context in which Bolivian microenterprises and microfinance institutions operate. The study identified three principal areas of concern regarding potential environmental impacts in microfinance: depletion of natural resources; disposal of liquid, solid, and gaseous wastes; and occupational and safety issues. The study made a number of recommendations to USAID/Bolivia

for future efforts to support environmental assessment and mitigation in microenterprises. The principal recommendations are issues that should be considered in the design of any microfinance program. They include the following:

- Microfinance institutions should be encouraged to track portfolios by the number of clients in specific activities. Tracking this information by number of clients is important for institutions that wish to finance complete packages (credit for businesses as well as technical assistance) and for gauging risk, whether environmental or financial.
- USAID must build collaboration and coordination among bilateral and multilateral donors, since presently there is no consistent and coordinated approach to address environmental issues in microlending portfolios in Bolivia. Not only would a coordinated approach lead to more efficient use of donor dollars, but it would also ensure consistency in the application of environmental criteria.
- Only the most polluting sectors within the range of microenterprise activities should be the target of any assessment and mitigation programs.
- USAID should create an environmental assessment and mitigation pilot project to test the effectiveness of internal assessment and mitigation (where the microfinance institution works directly with clients) versus externally supported assessment and mitigation (where the microfinance institution works in cooperation with other institutions that provide technical assistance to the clients). Elements of the pilot would be:
 - Monitoring cost and time required
 - Developing technical guidelines and training materials
 - Building the capacity of support organizations and loan officers.
 - Monitoring outcomes of the pilot
- Development of an environmental assessment tool for microfinance should be accompanied by lending program for purchase of clean production technology for microenterprises. This financial support must be accessible to microenterprises on longer terms and for larger amounts than normally available.

WHAT IS CLEANER PRODUCTION?

- 1 A problem-solving strategy that emphasizes examination of the processes that create waste and pollution to develop more efficient practices, such as:
 - ♦ Good housekeeping
 - ♦ Input material change
 - ♦ Better process control
 - ♦ Equipment modification
 - ♦ Technology change
 - ♦ On-site recycling
 - ♦ Useful byproducts
 - ♦ Product reformulation
- 2 A concept that may boost creativity and innovation in processes, products, and technologies
- 3 An economical approach—the rationalization of the production normally improves material, water, and energy efficiency, which, in turn, creates attractive financial benefits
- 4 An environmental strategy that reduces waste and pollution at the source, as well as down the supply chain

Source: Adapted from Pallen 1996.

Environmentally Sound MSE Development

There are many opportunities available for USAID and its development partners to encourage MSEs to prevent or minimize adverse environmental effects.⁵ In most USAID-funded programs, individual loans and technical assistance activities are too diverse to enable advance, program-level environmental planning. The following guidelines can be used, however, to improve the effectiveness of reviewing and mitigating the adverse environmental impacts of MSEs:⁶

- There are limits to the extent and type of activity that a particular environment or locality can support over the medium to long term. Understand resource factors—such as the availability of land and forest resources, water and sanitation services, quality of infrastructure, living space, and population density—and the limits they place on economic activity.
- To avoid the overuse of a resource or an unacceptable level of pollution in a locality, promote diverse, and, if possible, complementary microenterprise activities that require different types of resources or can reuse each others' waste.
- In rural areas, where the collective environmental impact of microenterprises may be significant, regenerative activities such as reforestation can be promoted to refurbish a resource.
- Encourage activity that are best suited to the resource base.
- At the sector level, work with microentrepreneurs and their associations to ensure that environmental health and safety standards are proactively addressed and that more environmentally benign technologies and production processes are promoted. As more is learned about environmentally sound procedures, promote their collective use and implementation. A simple idea—promoting vegetable- or flower-based dyes, instead of chemical ones, among artisans—can have a very positive impact.

⁵ At the program level, USAID is required to review all proposed programs to ensure that they comply with federal environmental regulations. However, the regulations do not explicitly require an environmental review or mitigation measures when intermediaries will be designing specific activities or making specific loans. Credit components qualify for a categorical exclusion under Regulation 216, when (1) the purpose of the activity is equivalent to capitalizing an intermediary financial institutions (capitalizing a guarantee facility, rather than making each guarantee); (2) USAID does not retain the right to review and approve each loan (or equivalent) by the intermediary; and (3) USAID does not know what kinds of activities will be funded. This is the case regardless of whether USAID's funds are used for loan guarantees or direct loans.

⁶ Adapted from Pallen 1996.

- To the greatest extent possible, anticipate dilemmas that may arise from promoting certain types of economic activity. This may include conflicts over land and resource use, overcrowding, a decline in incomes due to overproduction of a product, or negative environmental impacts from downstream investments. For example, a successful livestock initiative can lead to the creation of secondary industries such as tanneries and meat processing operations that are far more polluting than the original enterprise and can accelerate environmental problems.
- In rural areas, ensure that microfinance institutions are not contributing to environmental impacts from activities such as the unsustainable intensification of agriculture or the clearing of forests, wetlands, or critical wildlife habitat.
- Collaborate with local land, housing, health, and public service authorities to improve standards in support of microenterprise activity.

Addressing Environmental Concerns Is Compatible with Poverty Alleviation and Economic Growth

The primary mission of economic development organizations is to ensure the economic success of enterprises that they support, as measured by profitability, productivity, employment, income generation, and long-term sustainability. Success not only achieves public policy objectives (poverty alleviation, economic growth, and so on), but it also ensures that credit institutions remain solvent through healthy loan repayment rates. Incorporating environmental concerns fits with this traditional mission, giving credit institutions a better sense of their risk and the enterprises' potential for success.

Compliance with in-country environmental standards and business best practices can assist in formalizing the status of MSEs, giving them access to a greater array of credit and public and private resources. Banks and other service providers increasingly recognize that “good environmental performance is often linked to good financial performance,” and several private European banks—UBS, BOA, Deutsche Bank, ING Group—have integrated environmental risk into their credit assessments. Similarly, many credit institutions now recognize that giving credit to women isn't just socially beneficial, it makes better business sense, since women have a better repayment rate than men.

Why does better environmental management equal better overall management? When environmental management, also known as cleaner production, is adopted, the entire production process is assessed to identify ways to reduce, reuse, and recycle raw material, energy, and other inputs—the start-to-finish approach.

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This can result in benefits both for the enterprise, by reducing production costs, and for the environment.

Cleaner production methods may include material substitution, process modifications, equipment upgrades, and product redesign. For example, businesses may benefit by using renewable energy even when its initial cost is higher than

MICROENTERPRISES AND THE ENVIRONMENT IN PERU

Since 1998, the Inter-American Development Bank has been financing a microlending operation with the Peruvian Development Finance Corporation (COFIDE). From 1999 to 2001, the Micro-global Credit Program provided nearly 35,000 loans to MSEs and disbursed more than \$35 million.

As part of the loan review process, COFIDE developed an environmental evaluation process for loan applications, as well as a series of tools and procedures to ensure that environmental issues are incorporated into the projects approved for credit. Commitment to environmental measures is voluntary for the entrepreneur, but to be considered for credit under this program, enterprises had to be in full compliance with national environmental legislation.

COFIDE and the intermediary financing institutions implementing the program provided the environmental qualification analysis for credit applications, conduct periodic environmental inspections of credit projects, and provide

technical assistance for environmental issues and cleaner production.

An evaluation identified the following lessons learned for incorporating environmental aspects into microenterprise financing:

- ♦ Intermediary financing institutions (credit institutions) can play a decisive role in incorporating environmental issues into productive activities with simple environmental procedures applied during the loan review process.
- ♦ Intermediary financing institutions should be prepared to respond to the increasing requirements of international agencies to incorporate environmental aspects into microfinance programs and adhere to emerging national environmental regulations.
- ♦ Intermediary financing institution staff and credit analysts should receive environmental training.
- ♦ Effective implementation of an environmental system for microfinance requires the

development and dissemination of appropriate and informative educational materials that can provide basic information to MSEs on how to improve the health and safety of the workplace and how to optimize production processes reducing the use of inputs, energy, and raw materials.

- ♦ Motivational messages should emphasize the economic advantages of implementing sound environmental practices, reducing the use of inputs, and recycling and reusing materials where possible.
- ♦ Examples of cleaner production success stories should be a key element of awareness raising programs for MSEs.
- ♦ Environmental aspects should be incorporated into existing credit technology in intermediary financing institutions before additional cumbersome procedures to review loans and supervision processes are required.

Source: Zucchetti and Alegre, no date.

non-renewable energy sources. Many renewables can lessen the impact of electrical brownouts and logistical problems associated with the delivery of conventional energy to the end user. MSEs can mitigate their primary health and safety problems at a low cost, while improving productivity. Furthermore, resource-extractive enterprises can implement cleaner production techniques to reduce resource use and pollution. Sawmills can sell scraps to MSE furniture makers to reduce the need for new cuts. Brickmakers can employ different baking techniques that require less wood-based charcoal. Charcoalers can cut back trees to spur regrowth and minimize erosion.

As such, cleaner production, together with health and safety procedures, actually enhances traditional loan criteria in three distinct ways:

- ***Provides an indicator of management competence.*** Similar to total quality management, it focuses on building quality into products, rather than repairing defects.
- ***Generates direct and indirect cost savings, enhancing cash flow.*** Direct gains are achieved through decreases in health and safety problems, increases in productivity, and savings in materials, labor, regulatory compliance costs, waste disposal, and transport.
- ***Enhances profitability and long-term competitiveness.*** Improved management and cost savings lay a solid foundation for economic sustainability of the enterprise and repayment of the loan.

Even when pursuing cleaner production techniques, some businesses may need to install costly pollution control solutions to comply with standards. This, however, does not mean that the MSEs will become financially unviable. Micro and small enterprises that implement environmental measures can survive and flourish, though the establishment of environmental standards and uniform incentives or disincentives creates a more uniform playing field for all.

Nevertheless, the ability to adapt to environmental costs varies according to several factors (including managerial skills, business profitability, attitude toward risk, business size, access to capital, and market signals) and can often only be understood on a case-by-case basis. Understanding constraints—both real and

MSE ACTIVITIES CAN BENEFIT THE ENVIRONMENT

- ◆ Reforestation using native species
- ◆ Micro-watershed management
- ◆ Monitoring of national parks, protected areas, water sources, and pollution
- ◆ Guides and assistants for ecological education and recreation services
- ◆ Researchers and taxonomists to identify and evaluate plant and wildlife diversity
- ◆ Nurturing of endangered species
- ◆ Breeding of fish to repopulate watercourses
- ◆ Urban sanitation
- ◆ Maintenance of urban parks and trees
- ◆ Recovery, reuse, and recycling of trash and waste
- ◆ Protection of historical monuments
- ◆ Protection of public spaces
- ◆ Collection and distribution of genetic material for sale in nurseries and botanical gardens
- ◆ Medical and paramedical services
- ◆ Industrial safety and hygiene services

Source: IADB 1997.

Business development and credit institutions can successfully foster and support green business.

perceived—on MSEs can be helpful in judging how well they will incorporate environmental concerns into their production, distribution, and sales processes. This understanding is also useful in determining how business support service providers and credit institutions may be able to help MSEs, and how they are constrained.

Green Enterprises

While this manual focuses on enterprises that have an adverse impact on the environment, they also apply to “green” enterprises oriented toward environmental betterment. These businesses—ranging from ecotourism to waste collection—can be economically successful. As with any MSE, to qualify for credit they must focus on creating a viable business with a sound business plan, well-defined markets, and attractive, competitively priced products.

Many green enterprises—such as bioprospecting, commercial production of unique flora and fauna (“wild products”), and ecotourism—concentrate on keeping nature pristine or rely on a price premium for being “ecofriendly.” External support may be limited by three constraints:

- Significant organizational resources and marketing efforts may be needed to develop and sell the products.
- Significant technical and scientific resources may be required for monitoring to ensure that the activities are not unintentionally damaging.
- Narrow market niches and excess supply may be created by businesses targeting similar niches, thereby threatening the long-term economic viability and sustainability of green businesses.

Despite these difficulties, business development and credit institutions can successfully foster and support green business. They may wish to collaborate with NGOs, community groups, producer associations, and consultants who have technical knowledge and practical experience with such enterprises.

Service providers are likely to be more comfortable supporting more traditional and tested green service or production enterprises, such as building and operating latrines, collecting solid waste, manufacturing bicycle carts, or manufacturing high-return cleaner production safety equipment for other enterprises.⁷ They need to be aware, however, that even green enterprises may have adverse impacts on the environment that need to be mitigated. For instance, ecotourism

⁷ See, for example, Lardinois 1996, which presents research on micro and small enterprises that collect solid waste in Latin America.

operations must guard against the human and solid waste issues typically associated with traditional tourism worldwide.

Environmental Mitigation and Monitoring Issues

In its *Guide for Improving the Environmental Quality of Lending Operations for Microenterprises*, the Inter-American Development Bank has a comprehensive list of mitigation measures for Category II Microenterprises (activities with potentially negative environmental impact). When addressing mitigation measures

Table 4.2 Environmental Impact and Mitigation for Category II Microenterprises

Activity	Environmental Impact	Mitigation Measures
Food Processing, except dairy products, oils, and sugar	<ul style="list-style-type: none"> ◆ Less water availability ◆ Risk of food poisoning ◆ Increase in solid wastes 	<ul style="list-style-type: none"> ◆ Conserve water ◆ Enforce strict hygiene practices; use raw materials free from chemical residues; minimize use of preservatives and coloring agents; manage organic waste ◆ Recycle, reuse
Textiles, leather, footwear	<ul style="list-style-type: none"> ◆ Noise ◆ Suspended particles ◆ Inhalation of toxic substances in glue ◆ Overloading of trash collection systems 	<ul style="list-style-type: none"> ◆ Require use of masks and ear plugs by exposed operators ◆ Follow special timetables to reduce impact on neighbors ◆ Follow strict maintenance and lubrication practices for the moving parts of equipment
Paper articles, printing, and photography	<ul style="list-style-type: none"> ◆ Chemical and lead contamination ◆ Plastic and chemical waste ◆ Indirect impacts on forests 	<ul style="list-style-type: none"> ◆ Use suitable ventilation systems in workshops, including fans and extractors ◆ Carefully manage containers ◆ Establish contingency plans for work accidents ◆ Employ economic design practices; reuse scrap materials; sell waste to recycling companies
Manufacture of jewelry and glass	<ul style="list-style-type: none"> ◆ Chemical contamination ◆ Health risks for operators and surrounding community 	<ul style="list-style-type: none"> ◆ Require use of protective equipment, such as masks and gloves ◆ Install suitable ventilation systems ◆ Establish contingency plans for work accidents ◆ Employ suitable storage methods ◆ Adequately dispose of toxic materials ◆ Reuse waste from photographic processes ◆ Promote microenterprises that specialize in recycling ◆ Use recycled paper

Activity	Environmental Impact	Mitigation Measures
Manufacture and repair of household appliances, musical instruments, and agricultural implements, except batteries	<ul style="list-style-type: none"> ◆ Noise ◆ Contamination from metal particles and substances, such as solder, glue, oils, solvents, and coolants ◆ Waste dumped into sewers 	<ul style="list-style-type: none"> ◆ Suitably manage substances, including safe storage and use of masks, gloves, and protective clothing ◆ Keep workshops clean ◆ Warn operators about toxic effects and instruct them on how to store raw materials in accordance to safety standards ◆ Establish contingency plans for work accidents
Restaurant	<ul style="list-style-type: none"> ◆ Biological and chemical contamination from food handling ◆ Increase in solid and liquid wastes ◆ Increase in demand for potable water and power ◆ Accidents from improper use of electric devices 	<ul style="list-style-type: none"> ◆ Suitable maintenance and lubrication of equipment ◆ Insulate the noisiest equipment ◆ Establish special hours of work that do not disturb the neighbors ◆ Minimize the use of toxic substances ◆ Require that operators use protective gear, such as earplugs ◆ Establish contingency plans for work accidents ◆ Reuse and recycle raw materials ◆ Bolster trash collection and disposal services in localities where microenterprises are installed
Inshore fishery	<ul style="list-style-type: none"> ◆ Contamination of beaches and ports from fuel and oil spills and organic waste ◆ Deterioration of habitats and species 	<ul style="list-style-type: none"> ◆ Require use of masks and gloves, continuous cleaning of old containers, and hygienic practices ◆ Wash products thoroughly; do not use foods that fail to comply with health authority requirements ◆ Recycle; dispose of trash in authorized dumps; minimize use of packaging ◆ Employ basic water and energy conservation practices ◆ Train staff in basic industrial safety practices ◆ Establish contingency plans for work accidents ◆ Establish order and cleanliness in operations; carefully maintain motors ◆ Observe fisheries regulations, such as closed seasons
Livestock farming and slaughter	<ul style="list-style-type: none"> ◆ Deforestation and erosion caused by livestock farming ◆ Chemical contamination from ingestion of fodder, water, or other contaminated food ◆ Odors and biological contamination by insects and rodents ◆ Waste and contaminated water in slaughterhouses 	<ul style="list-style-type: none"> ◆ Establish suitable grazing and soil management practices that favor pasture growth; grow fodder for harvest; use stables ◆ Observe strict regulations governing location ◆ Employ comprehensive pasture management with minimum use of agricultural chemicals ◆ Require use of protective equipment, such as gloves and masks, and follow strict hygiene standards ◆ Recycle

Activity	Environmental Impact	Mitigation Measures
Dairy product manufacturing	<ul style="list-style-type: none"> ◆ Biological contamination from pathogens, chemical residues, or heavy metals ◆ Organic, solid, and liquid waste ◆ Odors 	<ul style="list-style-type: none"> ◆ Practice good hygiene in milking and bottling; pasteurize milk ◆ Recycle whey for agricultural operations or barnyard animals; recycle water used in cooling and cleaning; treat liquid waste to neutralize it and reduce the organic load ◆ Require adequate supervision during disposal of whey and washing equipment
Tanning and dyeing leather	<ul style="list-style-type: none"> ◆ Chemical contamination from heavy metals such as chrome, mercury, and sulfides ◆ Biological contamination ◆ Strong odors 	<ul style="list-style-type: none"> ◆ Minimize the use of chemicals; recycle liquid waste; minimize the amount of water used in processes; install small treatment plants ◆ Carefully manage organic sludge
Manufacture of carpets and rugs, textile dyeing, and printing	<ul style="list-style-type: none"> ◆ Chemical contamination from organic and synthetic waste ◆ Increase in waste 	<ul style="list-style-type: none"> ◆ Require use of protective equipment in the shop; minimize the use of toxic substances; manage volatile gases ◆ Recirculate and manage waste; recycle
Battery manufacture and repair	<ul style="list-style-type: none"> ◆ Contamination from acids and heavy metals ◆ Risk of explosions and fires 	<ul style="list-style-type: none"> ◆ Require use of safety equipment ◆ Install efficient ventilation systems that do not pose risks to surrounding neighborhoods ◆ Establish contingency plans and adequate training for operators. ◆ Carefully manage gases produced ◆ Promote safe recycling systems; bolster public trash collection and disposal services
Night clubs and similar establishments	<ul style="list-style-type: none"> ◆ Noise ◆ Pollution ◆ Increased waste 	<ul style="list-style-type: none"> ◆ Be mindful of hours of operation, insulation, volume control, and legislation governing location in urban areas (zoning) ◆ Establish hygienic practices ◆ Employ adequate waste management; recycle
Sawmills, manufacture of furniture and other wood products	<ul style="list-style-type: none"> ◆ Deforestation ◆ Noise ◆ Contamination from wood, dust, glues, solvents, sealants, lacquers, or toxic substances used in wood treatment, such as arsenic ◆ Increased waste 	<ul style="list-style-type: none"> ◆ Reforest cleared areas; require sustainable forest management and certification ◆ Maintain equipment ◆ Insulate ◆ Require use of protective equipment, such as masks, gloves, and ear plugs ◆ Recycle; minimize waste production
Manufacture of straw hats	<ul style="list-style-type: none"> ◆ Contamination from sulfur gases used in bleaching and strengthening straw ◆ Injuries and incorrect work posture 	<ul style="list-style-type: none"> ◆ Employ safety practices, including requiring the use of protective equipment, such as masks, gloves and protective clothing ◆ Install adequate ventilation systems ◆ Design suitable areas for work

Activity	Environmental Impact	Mitigation Measures
Gas storage and distribution	<ul style="list-style-type: none"> ◆ Poisoning or asphyxia of operators, clients, and neighbors from gas leaks ◆ Risk of fire and explosions 	<ul style="list-style-type: none"> ◆ Strictly monitor tank conditions with continuous inspections ◆ Install adequate ventilation around tanks ◆ Use care in handling cylinders ◆ Establish contingency plans for fires, explosions, and work accidents ◆ Regularly check function of fire extinguishers
Manufacture and sale of chemicals, including medicines	<ul style="list-style-type: none"> ◆ Contamination of operators, neighbors, and clients from residues, waste, and gases produced in mixing, bottling, and packing processes ◆ Risk of fires and explosions ◆ Residues including toxic substances 	<ul style="list-style-type: none"> ◆ Require use of protective equipment, such as masks, gloves, and protective clothing; post warning signs in work and sales areas ◆ Install suitable ventilation equipment ◆ Establish contingency plans for fires, explosions, and work accidents, and regularly check function of fire extinguishers ◆ Install independent waste minimization system; reuse and recycle scrap
Manufacture of ceramics, porcelain, plaster, and tiles	<ul style="list-style-type: none"> ◆ Contamination from the use of lacquers, paints, dyes, glues, and finishes containing toxic materials, particularly lead ◆ Increased waste ◆ Risk of fires and explosion in the firing process 	<ul style="list-style-type: none"> ◆ Require use of protective equipment, such as masks and gloves ◆ Avoid using lead in manufacturing products; use vegetable dyes when possible; use labels to identify each substance; establish contingency plans for work accidents, fire, and explosions ◆ Minimize waste; reuse and recycle; seal industrial waste in proper containers ◆ Employ strict industrial safety practices; regularly check function of fire extinguishers
Manufacture of clay, brick, and tile for the construction industry	<ul style="list-style-type: none"> ◆ Erosion caused by extraction of clay soils ◆ Deterioration of the rural landscape ◆ Flow reduction and pollution of public watercourses ◆ Chemical contamination from firing gases 	<ul style="list-style-type: none"> ◆ Manage land and water carefully to avoid spills and gullyng; use land reclamation techniques, including conservation of plant cover, landfilling, remodeling topography, water storage, and recycling ◆ Plant foliage to mask the excavations ◆ Employ water management techniques, such as canals and sedimentation ponds; establish agreements with potential users of public watercourses ◆ Require use of protective equipment, such as masks, gloves and protective clothing ◆ Use filters and electric kilns to reduce impact on nearby residents

Activity	Environmental Impact	Mitigation Measures
Manufacture of cement, plaster, concrete, and lime construction components	<ul style="list-style-type: none"> ♦ Air pollution from dust from grinding and milling operations ♦ Solid and liquid waste 	<ul style="list-style-type: none"> ♦ Keep materials moist, require use of gloves and masks; install filters ♦ Use drainage and recirculation systems for processing water; separate solid and liquid waste; install settling tanks in the facility to protect the sewer system
Manufacture of rubber products	<ul style="list-style-type: none"> ♦ Contamination from combustion processes ♦ Increased waste production ♦ Risk of fires 	<ul style="list-style-type: none"> ♦ Install air extractors and filters ♦ Require use of protective equipment, including masks, hard hats, and gloves ♦ Introduce practices for reuse, recycling, or sale to other manufacturers ♦ Establish contingency plans for fires and regularly check function of fire extinguishers
Manufacture of metal products, except for electroplating	<ul style="list-style-type: none"> ♦ Air pollution from smelting, welding, and painting processes ♦ Pollution of water, soil, sewer systems from spills of solvents, paints, or metals ♦ Noise from cutting, lathing, and polishing processes ♦ Risk of fires and explosions ♦ Increased energy consumption 	<ul style="list-style-type: none"> ♦ Employ industrial safety measures, and require use of protective equipment, such as hard hats, masks, gloves, and earplugs ♦ Reduce noise by regularly adjusting and lubricating machinery; establish suitable working hours ♦ Install filters and extractors. ♦ Ensure cleanliness and order in shops and suitable handling of materials ♦ Recycle waste ♦ Establish contingency plans for fires, explosions, and work accidents; regularly check function of fire extinguishers ♦ Employ energy-saving measures
Automobile and motorcycle repair	<ul style="list-style-type: none"> ♦ Contamination from toxic substances, oil, fuel, and lubricants ♦ Noise from operating vehicles, hammering, and polishing ♦ Traffic congestion due to obstruction of public space by improperly parked vehicles 	<ul style="list-style-type: none"> ♦ Employ industrial safety procedures, and require use of protective equipment, such as earplugs ♦ Practice waste management techniques that minimize water use; sell scrap ♦ Work in closed installations and follow strict work hours to reduce impact on neighbors ♦ Observe regulations governing urban zoning and protection of public spaces

for these activities it is important to consider the nature of the proposed activity, its scale, and the environmental context.

Included in this chapter are two attachments that can be of use in classifying and evaluating environmental impacts associated with small and microenterprises. Attachment 1 lists enterprises that commonly receive development assistance, and divides them into two categories: those that are expected to have positive effects or minimal adverse environmental impacts; and those that are expected to have significant adverse environmental impacts. Attachment 2 is a sample enterprise-specific questionnaire for preparing a more detailed review of a loan candidate enterprise that has been classified as having potentially adverse environmental impacts.

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<http://www.gdrc.org/icm/environ/environ.html>.

Zucchetti, Anna, and Marcos Alegre. No date. *Microempresa y ambiente*. ECOLAB SRL/OACA for the Inter-American Development Bank.

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Web Sites

Environmental Enterprises Assistance Fund.

A non-profit organization that operates as a venture capital fund, providing long-term risk capital to environmental businesses in developing countries. EEAF has made over 20 direct investments and manages for-profit funds for Latin America. Online: <http://www.eeaf.org>.

Global Pollution Prevention/Cleaner Production Network.

Organized by the U.S. National Pollution Prevention Roundtable, this is a global network of pollution prevention and cleaner production professionals. Online: <http://www.p2.org/intl/activities/new/main.html>.

North Carolina Department of Environment and Natural Resources, Division of Pollution Prevention and Environmental Assistance Service.

This joint effort with U.S. Environmental Protection Agency Waste Reduction Resource Center offers a Web library of links on pollution prevention practices and case studies in more than 20 sectors, as well as tips for water and energy conservation. Online: <http://www.p2pays.org>.

UNEP-TIE (United Nations Environment Program, Division of Technology, Industry and Economics).

The International Cleaner Production Information Clearinghouse contains an extensive database of case studies, country profiles, and cleaner production strategies for various sectors. Online: <http://www.emcentre.com/unesp-web>.

