Environmental Protection and Microenterprise Development in the Developing World

A Model Based on the Latin American Experience

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Abstract: Microenterprises constitute the vast majority of business firms in low- and middle-income developing countries. In Latin America, the sector contributes significantly to employment and gross domestic product. Recently, the expansion of microlending programs has been viewed as an effective means of developing the microenterprise sector and alleviating poverty. However, the nexus between microenterprise development and environmental degradation has remained largely unexplored. It is suspected that the pervasive informality of the microenterprise sector, its sheer size, and the high incidence of poverty in the sector contribute to cumulative environmental degradation and low standards of occupational safety. This paper highlights commonly observed patterns of pollution and occupational safety risks in the sector and examines feasible ways of promoting improved environmental management and occupational safety. The main recommendations are that microfinance institutions should not be excessively regulated and that environmental and occupational safety issues in the sector should be confronted directly through a combination of private and public actions. In addition, microfinance institutions can and should begin to take steps to promote environmental awareness and eco-efficiency among clients and limit their own exposure to lending risks due to environmental and occupational safety problems.

Protecting the environment and reducing poverty have emerged as key policy goals in the developing world. Nonetheless, there are challenges inherent in the simultaneous pursuit of the two goals. Dating back to the Brundtland Report of 1987, the conventional wisdom has viewed poverty as one of the primary causes of environmental degradation.[1] Succeeding studies and reports have substantiated the basic correlation between poverty and the deterioration of the environment (Falconer & Arnold, 1989; Falconer, 1990; Dasgupta & Goran Maler, 1994). In short, the poor, motivated by the need for immediate survival, are often likely to resort to occupational activities that degrade the environment. In the case of the microenterprise sector, the question is, does a trade-off exist between helping low-income microentrepreneurs and safeguarding the environment? The majority of owner-operators and workers in the microenterprise sector rank among the poor or the near poor (Remenyi, 1998; Ledgerwood, 1999; Orlando & Pollack, 2000). Do microentrepreneurs represent a new environmental threat? If some, or many common microenterprise activities impact the environment adversely, what should be done?

The Importance of the Microenterprise Sector and the Policy Dilemma

Microenterprise, a sector consisting of firms employing less than 10 employees, is estimated to constitute the majority of business firms in low-income, developing countries and to contribute significantly to employment and share of gross domestic product. For example, in Latin America and the Caribbean, microenterprise

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Special thanks also go to Michael Bautista, Joan Hall, and Elizabeth Israel for their assistance.

constitutes 80–90% of all businesses, accounts for more than 50% of employment, and generates upward of 30% of GDP in some countries (Poyo, Parker, & Golden-Vasquez, 1996; International Labour Organization, 1999; Economic Commission for Latin America and the Caribbean, 2000). The Economic Commission for Latin America and the Caribbean (ECLAC) further estimates that there are 65 million urban microenterprises providing employment to 110 million people in the region. When this number is combined with small-scale farmers and rural, nonfarm entrepreneurs, the total size of the sector is massive relative to a 2000 estimate of economically active workforce of 219 million. In sub–Saharan Africa and South and Southeast Asia, the extrapolated estimates are equal or greater.

In addition to the sheer size of the sector, most microenterprises are informal, meaning that they are, at best, in partial compliance with existing government regulations governing business registration, taxes, zoning, minimum wage and social security provisions, and environmental protection. This informality combined with the marked weaknesses of environmental protection agencies in developing countries to effectively enforce environmental statutes and regulations creates the possibility for environmental harm. Furthermore, while each individual microentrepreneur may not be very detrimental to the environment, cumulatively the potential damage can be significant. Due to the informality of microenterprise, microfinance can provide a valuable interface to address environmental concerns. This could be an important strategy since it can potentially help address environmental issues in the largest segment of the developing world's economy.

Since the 1970s public awareness about environmental pollution and degradation has increased and, consequently, raised the demand for more environmental regulations and stricter enforcement of them. Environmental activism started in the richer, more industrialized countries but has spread to middle- and low-income countries. There are three main areas of concern in environmental protection: unsustainable use of natural resources,

emission of effluents (air, water, and solid waste), and occupational health and safety risks. However, effective environmental protection is difficult to achieve in developing countries for a number of reasons. In developing countries legal and legislative frameworks are inadequate and environmental enforcement authorities are weak. Because poverty is more prevalent, citizens are forced to discount environmental amenities vis-à-vis immediate priories of sustenance and income growth. Citizens in these countries are also relatively uneducated about environmental safety, including remedial techniques, alternative clean technologies, and cost-effective occupational safety standards.

In recent years, national policy makers and international donor organizations have seen the promotion of microfinance programs as an efficacious anti-poverty instrument. In 1997, the organizers of the Microcredit Summit called upon world governments, businesses, and multilateral lending institutions to raise U. S. $21.6 billion to provide microcredit to 100 million of the world's poorest families by 2005. However, the active promotion of microcredit and business development services targeting microentrepreneurs raises questions about environmental impact and appropriate remedial measures due to the sheer size of the microenterprise sector. It may be best to prevent large-scale environmental degradation and avoid major health risks now than to remediate after damage has occurred. Thus, policy makers face a difficult dilemma. On the one hand, avoiding environmental regulation may maximize short-term income and employment growth, but at an expensive long-term cost to the natural environment and future economic sustainability. On the other hand, overly strict environmental regulation may have a positive effect on the environment but also hamper the formalization and growth of the microenterprise sector and its ability to reduce poverty. In short, policymakers must either ignore the environmental consequences of microenterprise activities in an effort to promote short-term growth or craft cost-effective and practical mitigation strategies.

Clearly, those strategies that move people out of economic deprivation while maintaining their environmental quality are preferred. Crafting such strategies, however, requires an understanding of the economic and environmental impact of microenterprise in developing countries as well as the institutional context in which regulation and enforcement occur.

The Environmental Footprint of the Microenterprise Sector: A Survey of Latin America

While the economic impact of microenterprise in developing countries is substantial, what is less clear is how to deal with their environmental impact. Examining these issues in the Latin American context provides insights useful to other developing regions.

Most urban microentrepreneurs in Latin America are concentrated in commerce and service sectors and do not leave a heavy environmental footprint (see Table 1). They are food and produce vendors, seamstresses, hairdressers, tailors, shoe repairers, tire repairers, auto mechanics, and trash recyclers. The commerce

Table 1. Sectoral Concentration of Microenterprises in Selected Latin American Countries

Country	Agriculture	Industry	Commerce	Services
Chile	13.5%	6.2%	41.5%	38.8%
Argentina		8.8%	57.9%	33.3%
Columbia		12.3%	81.7%	6.0%
Costa Rica		17.6%	55.5%	26.9%
El Salvador		24.8%	42.2%	33.0%
Guatemala		24.0%	45.0%	31.0%
Honduras		32.5%	43.5%	24.0%
Nicaragua		20.0%	47.0%	33.0%
Panama		23.1%	33.5%	43.4%

Note. Data on agriculture, forestry, and fishery sector unavailable for countries other than Chile .Lloréns, van der Host, and Isusi (1999).

and service activities that the majority of urban micro-entrepreneurs engage in may produce noise, congestion, and litter, but not heavy pollution. However, in areas where there is poor waste management infrastructure, refuse and litter from small businesses can be a significant environmental concern. Some urban businesses also encroach on and convert urban greenspaces (e.g., parks) and bodies of water for their own use. This impact is of concern due to the already very limited amount of urban greenspaes and other such amneities indeveloping country cities. The sector that is most pollution intensive—industry—is a distant third in concentration in most countries where data are available.

Furthermore, most environmental degradation caused by industrial activities operated by microentrepreneurs comes from the clustering of small-scale, pollution intensive industries near population centers. These industries include brick making, electroplating, and leather tanning, among others. These types of firms can have adverse effects on sewage systems, bodies of water, and the health of workers and inhabitants through the release of smoke, dust, and harmful chemicals.

In rural areas, empirical information on the intensity of industrial pollution is scarce. However, many small-scale farmers, fishermen, and miners do engage in unsustainable resource use patterns. In Latin America, a sizeable proportion of small-scale agriculture occurs on steeply sloped hillsides or fragile flat lands without appropriate soil and water conservation investments. The result is a loss of soil fertility on the farm plot and the elevated sedimentation of nearby streams, rivers, lakes, reefs, and dams due to high rates of water runoff and attendant soil erosion. There are also concerns about inappropriate use, storage, and disposal of chemicals and fertilizers by small-scale farmers. One common pollution problem associated with fertilizer use is excessive nutrient runoff into water bodies. That nutrient runoff degrades water quality for downstream users and negatively affects some forms of aquatic life. Another common problem is the improper use of agricultural pesticides, which leads to the contamination of drinking water.

Cattle grazing can also impact the environment negatively. Cattle grazing affects soil quality by compacting the soil and reducing vegetation cover, which leaves soil exposed to wind and water erosion. It also impacts biodiversity by altering the species composition and vegetation quality on grazing lands and in other natural areas (Taddese, Mohamed Saleem, Abyie, & Wagnew, 2002).

Lastly, in areas where an agricultural frontier exists, farmer colonization of previously untouched rainforest ecosystems often leads to deforestation, loss of biodiversity, and soil erosion. For the last several decades, some Latin American countries have recorded some of the highest annual rates of deforestation in the world.

The rural poor, and to a lesser extent, urban traders, tend to rely heavily on collection and trade in natural products (medicinal plants, wild game, building materials, fuel wood, fodder, and inputs for basket-weaving and other artisan products) to meet consumption and income needs. In some cases exploitation of those natural products has adverse environmental consequences (Tictin, Nantel, Ramirez, & Johns, 2002). Trade in wild game, or bushmeat, has become a central environmental concern in many developing regions, particularly in central and west Africa. Much of the trade is informal, and occurs in both urban and rural areas (Rosser & Mainka, 2002; Rao & McGowan, 2002).

Thus, small-scale rural producers may pose a greater environmental threat than urban microentrepreneurs do. However, the total value of damage caused to the natural resource base by urban and rural small-scale entrepreneurs is largely unavailable at national and regional levels.

What Microenterprise Activities Are Pollution Intensive?

Notwithstanding the generally low levels of pollution caused by small- and microentrepreneurs, there are several particular industries where clear evidence of high levels of pollution per unit of output exists. The industries are considered to have

pronounced adverse environmental impacts (Bartone & Benavides, 1993; Kent, 1991; Pallen, 1997).

Pollution Intensive Activities and Related Impact

Leather tanning

Tanning is a large sector in most developing countries. The major effluents consist of heavy metals, organic compounds, and liquid detergents, which are typically discharged into sewer systems, streams, and rivers.

Brick and tile manufacturing

Brick, tile, and ceramic manufacturing can be a major source of air and water pollution (particulates and sediments) as well as land degradation. The extent of pollution in this industry is largely a function of population density; the closer the kilns are to cities and crowded neighborhoods, the worse the pollution is. Often, the situation is aggravated by the burning of "dirty fuels" (scrap wood with varnish on it, tires, plastics, used motor oil, and solvents) as a low-cost alternative to clean wood or propane gas. Depending on where the materials used to make bricks are extracted, soil erosion and subsidence can also occur.

Chemical-intensive agriculture and aquaculture

In the quest to increase yields and incomes, many small-scale farmers with little understanding of associated environmental and health consequences use large amounts of pesticide, herbicide, and fertilizer without safeguards. In the case of aquaculture, the main environmental problems are the loss of biodiversity due to high conversion rates of wetlands and mangroves to fish ponds; water pollution caused by the improper disposal of blood and offal; the escape of water, soil erosion, and salinization because of poor pond construction practices; and the elimination of other species in the ecosystem due to the increasing use of extremely toxic chemicals such as aldrin and dieldrin to control predator and competitor fish species.

Metalworking and electroplating

Many metalworking enterprises are cottage industries discharge heavy metals in sewer systems and result in biological magnification in aquatic life, which in turn poses threats to humans who consume contaminated fish.

Small-scale mining

Small-scale mining tends to be associated with a number of serious environmental impacts, including land degradation and chemical pollution (Gavin, 2002). Mining operations move significant amounts of rock and soil that change the surrounding landscape significantly. Alluvial mining operations result in erosion, riverbank destruction, and dam siltation. The processing of ore, especially gold, results in the release of significant quantities of mercury and cyanide. When these chemicals enter water streams they affect aquatic life.

Painting and printing

Painting and printing involve a number of toxic substances. The improper disposal of pigments, inks, paper waste, and solvents can contaminate soil and water with heavy metals.

Automobile and motor repair

Auto repair firms contaminate the environment through the inappropriate disposal of oil, battery acid, and engine sludge into sewer systems and bodies of water.

Wood processing and metal finishing

The processing and finishing of wood and metal products involves the use of glues, paints, and solvents, the improper disposal of which can degrade soil and water resources. In addition, depending on location and market conditions, the increased demand for wood, coupled with outdated technology and inadequate regulation, may lead to high waste rates and contribute to unsustainable logging practices.

Charcoal making

The production of charcoal can contribute to deforestation and air pollution.

Textile dyeing

The dyeing of textiles can lead to large discharges of particulates, such as alkaline, into local water sources.

Food processing

Food processing plants can discharge significant amounts of untreated wastewater and offal into rivers and streams. This leads to degraded water quality with negative consequences for aquatic life and downstream communities. Also, when the wastewater is trapped in stagnant pools, it can be highly odorous and serves as a breeding area for mosquitoes.

What Are the Patterns of Occupational Health and Safety Risk?

A related form of environmental risk focuses on health and safety risks in the microenterprise industry. Again, data is quite limited on occupational health and safety issues in the microenterprise sector, but existing data and anecdotal evidence seem to suggest that the majority of small-scale entrepreneurs do not engage in practices to safeguard the well-being of workers and family members.[2] Less than full compliance with established safety norms is due to low income, fear of not being able to compete with others who do not adopt safe practices, and lack of education about safe environmental practice (Pallen, 1997; Hiba, 2000). Many entrepreneurs believe that appropriate safety equipment is too expensive and unaffordable. For example, safety glasses and fire retardant work overalls cost more than regular clothing and no goggles. Due to low levels of income, many prefer to allocate income to higher priorities, such as food or schooling expenses. Also many do not know the long-term health consequences of unsafe practices or practical remedies for these consequences. Health problems

Table 2. Occupational Health and Safety Issues for Selected Industries That Microentrepreneurs Are Active In

Economic Activity/Sector	Unsafe Work Conditions	Associate HealthRisks
Agriculture	Exposure to pesticides, herbicides, fungicides and moving parts and blades in machinery.	Chemical poisoning due to unsafe handling. Cuts and loss of limbs due to improper operation of machinery or failure to use safeguards.
Brick making	Exposure to particulates (smoke, dust, fumes), oxides of sulfur, nitric oxide, hydrocarbons, and carbon monoxide.	Skin irritation, allergic reactions, and chronic lung disease.
Ceramics, pottery, and glazing	Exposure to glazes containing lead, cadmium, chrome, zinc, asbestos, silica, uranium oxides, and deadly gases and metal fumes released during kiln firing.	Skin irritation, allergic reactions, chronic lung disease, and metal poisoning.
Enameling	Exposure to corrosive acids and silver solder containing cadmium.	Acid burns, chronic lung disease, and metal poisoning.
Food processing	Exposure to noise, humidity, machinery with sharp blades or grinders, and bones.	Repetitive use injuries, cuts, skin irritation, and bacterial disease.
Glass manufacture and glass blowing	Exposure to highly toxic gases and corrosive acids.	Heat stress, eye damage, acid burns, and carbon monoxide and metal poisoning.

Economic Activity/Sector	Unsafe Work Conditions	Associate HealthRisks
Leather tanning	Exposure to toxic dyes and gases and chromium.	Skin irritation, intoxication, and damage to vital organs and allergic reactions.
Metal soldering, casting, welding, and forging	Exposure to toxic gases, silica, and asbestos.	Damage to the nervous system, heat stress, burns cuts, electrical shock, and chronic lung disease.
Mining	Exposure to mercury (in the case of gold mining).	Damage to organs.
Painting	Exposure to pigments containing heavy metals, toxic solvents, asbestos, and possibly carcinogens.	Skin irritation, intoxication, metal poisoning, and chronic lung disease.
Print making	Exposure to pigments containing cadmium, cobalt, zinc, asbestos, toxic and flammable solvents, and possibly carcinogens.	Skin irritation, intoxication, metal poisoning and chronic lung disease.
Textiles, dyes, batik	Exposure to poisonous solvents, corrosive vat and acid dyes, poisonous wax dyes, and possibly carcinogens.	Allergic reactions and chronic lung disease.
Wood processing	Exposure to toxic glues, paints, strippers, finishers, solvents and noise.	Skin irritation, intoxication, damage to vital organs, allergic reactions, and possibly hearing impairment.

Ontario Crafts Council, 1980; Shaver and Tong, 1991.

due to exposure to smoke and solvents and injury due to repetitive tasks done without proper protective and ergonomic equipment may not become a problem for years, creating a sense of complacency in entrepreneurs (Hogstedt, 2000).

Table 2 lists some of the health and occupational hazards for a selected number of economic activities that small-scale entrepreneurs are involved in. According to the International Labour Organization (ILO), two-thirds of the workers in less developed countries do not meet minimum safety standards. In low-income countries a major part of the workforce is involved in agriculture, services, and cottage industries, characterized by heavy workloads and multiple tasks for each worker. Family members of the entrepreneurs are also exposed to health risks because the home and work environment are often one and the same. Furthermore, occupational risks are magnified by poor hygiene, sanitation, and nutrition, and parasitic and infectious diseases (Hogstedt, 2000).

What Should Be Done: Institutional Context and Potential Approaches

To improve environmental protection and occupational safety in the microenterprise sector, a careful and differentiated approach is needed in Latin America as well as other developing regions. To review, the threat of urban pollution exists from a few "dirty industries," and with waste management in some commerce and services, but not for the majority of microenterprise activities. In rural areas the situation is more heterogeneous and does not permit generalizations. Depending on agricultural production conditions, management practices, and the ecosystems in question, natural resource degradation may or may not be a threat. Context specific information is needed before a judgment can be made for rural activities. In the area of occupational health and safety, the most serious life-threatening health risks arise from exposure to chemical agents, which seem to be concentrated in a few activities. However, work capacity risks such as workplace injuries and

repetitive use problems seem to be widespread and warrant some attention (Hogstedt, 2000).

The challenge becomes how to craft a response in this complex setting marked with such varied ecological and economic considerations. In general, there are three main approaches to mitigating impacts: command-and-control, economic incentives, and increased lender liability. Each approach has its strengths and weaknesses, and in the context of developing countries with limited scientific knowledge, low human capital, and weak enforcement capabilities, each must be used carefully to be effective.

Traditional command-and-control approaches to environmental protection and occupational safety are largely ineffective due to lack of enforcement capability, inadequate legislative frameworks, pervasive informality, high rates of poverty, and limited human capital in most developing countries. They tend to place a heavy burden on governmental enforcement agencies that have limited human and financial resources. In such a context, the best remedy would be to focus limited resources on the most egregious and threatening sources of pollution, degradation, and occupational risk (World Bank, 2000). Following this principle would entail environmental protection authorities focusing on pollution intensive manufacturing industries and largely ignoring small- and micro-scale entrepreneurial activities.

The newer economic incentive approach that has started to take hold in United States and the European Union, using tools such as "tradable emissions permits" and subsidies for the adoption of "clean technologies," is not currently transferable to developing countries. This approach requires a preexisting base of extensive scientific field data, the ability to model financial and pollution interactions fairly accurately in order to design the permit and subsidy programs, the availability of affordable technological solutions, and the resources to bear the fiscal costs of the subsidies. In the context of developing countries, subsidies for cleaner technologies and training appear to be necessary and unavoidable. The question is how

to allocate limited resources judiciously to achieve the greatest results with a limited budget.

A third and, as yet, incipient approach is to use financial intermediaries to support environmental protection agencies and occupational health and safety authorities in enforcing relevant regulations. This approach appears to be an inviting solution, since financial institutions interact closely with the small businesses and provide opportunities to positively influence their clients' environmental performance. However, one concern is that this shifts the administrative and enforcement burden from governments to financial institutions. Careful analysis shows that without adequate government support, this approach can have undesirable side effects when applied in a developing country context, particularly with microfinance. Principal among these side effects is an expensive administrative function requiring either additional dedicated personnel or an expansion of current team members' training and duties. Great attention must be paid to the issue of raising costs in an industry where garnering sufficiently high returns to achieve sustainability is a concern.

This approach has, however, shown clear efficacy in the industrialized nations where a growing number of financial intermediaries are engaging in active environmental screening (Smith, 1995; UNEP 1998). Commercial banks review environmental impact assessments (EIAs), conduct environmental audits, and explicitly consider environmental risks in loan decisions (Vaughan, 1994). In developing countries, private commercial banks frequently have less incentive to be concerned about the environment, and therefore do not engage in the same degree of environmental screening as their counterparts in industrialized countries. The exceptions are with larger projects, or projects with obvious risks, such as dams, pipelines, or petrochemical factories (Smith, 1995; UNEP 1998).

Why is this the case? Because most banks in industrialized countries are being pushed to adopt more rigorous environmental standards out of fear of economic losses in projects with catastrophic environmental risks due to private lawsuits

or government mandates. For example, in the case of the United States a series of laws, court cases, and regulations have established and defined the extent of lender liability for environmental damage.[3] Essentially, lenders are responsible for environmental standards if they participate in management of a company and have the ability to influence treatment of hazardous waste. This makes banks that foreclose on pollution intensive clients extremely vulnerable.

In addition to facing liability for environmental disasters, a lender is also at risk of decreased cash flows due to unforeseen environmental costs faced by the borrower. These costs might include compliance with costly environmental regulations, fines for noncompliance, clean up costs, lost revenue from damaged reputation, production limitation or termination, and so on. These penalties damage a borrower's profitability and thus hamper their ability to repay loans (Beanlands, 1999; Padden, 1996; Coulson & Dixon, 1995).

Further, banks in more developed countries are sensitive to community group criticism that can result in tarnished institutional reputations and lower profits (Smith, 1995). A handful of European banks, such as Triodos, view the environment as a "bankable" concept and are actively looking for and financing projects that involve clean technologies and sustainable resource uses, such as the production of building materials made with a high percentage of recycled materials, wind and solar power generation, and organic agriculture.

However, in many developing regions this is not the case. Countries in these regions have unclear environmental laws and less strident environmental advocacy from civil groups. Environmental legislation does not clearly address lender liability. No single provision squarely imposes liability on lenders and no provision clearly exempts or defines safe harbors (Gracer, 2000). This ambiguity in the law opens the door to private suits for environmental damage against parties with deep pockets, including banks.[4]

In the financial services sector in Latin America, increased corporate responsibility tends to come not from environmental

regulation or advocacy but from contractual requirements in line of credit, guarantee, and grant operations funded by international donor organizations. For example, in the case of the Inter-American Development Bank there is a clear mandate to protect the environment in all project financing as described in the "Report on the Eighth General Increase in the Resources of the Inter-American Development Bank" (1994).[5] The Inter-American Development Bank recently approved a formal statement mandating environmental protection called Guidelines for Environmental and Social Due Diligence for IDB Microenterprise Operations. Similar mandates exist for the World Bank, the International Finance Corporation, and some bilateral donor agencies. Furthermore, some organizations, such as Conservation International, have dedicated funds to be used for creating ventures that showcase and protect the natural environment, such as the Eco Maya project in Guatemala.

While such policies exist among many donor agencies, most of the environmental strictures created to protect the environment through sub-loans in Latin America are largely "unoperationalized," and if applied, have been cumbersome and have met with some resistance (Taborga & Wenner, 1997; COFIDE/OACA/Ecolab, 1998; Zuccetti & Alegre, 1999). However, this may soon change as more tailored, sectorally targeted, and flexible operational guidelines are developed.

In addition to donor pressure, which is of critical importance, the other incentive for microfinance institutions to adopt environmental management policies is to avoid the risk of not getting repaid because of environmental problems with borrowers. For example, Beanlands (1999) relates a story of how the majority of a village in Vietnam rose up against a brickmaker who had located his factory in a densely populated area. He was forced to move the factory to a remote site at great cost. Such clients have a higher risk of defaulting on their loans. While brickmakers tend to be larger enterprises, this example demonstrates the financial risks associated with environmental damage in rural areas.

Many of the constraining factors listed previously—weak government, poverty, informality, lack of education, and lack of alternative technology—make implementing these mandates via financial institutions more challenging. For example, the traditional use of very rigorous environmental audits and environmental impact assessments (EIA) to screen and rank loan applicants is not applicable to most microenterprise projects in developing countries. The small size of loans demanded essentially negates the applicability of traditional EIAs. The cost of the EIA is likely to be more than the typical $50–$1,000 microloan granted in Latin America. Likewise, an exhaustive environmental audit may identify a number of glaring problem areas, but in the absence of effective infrastructure (e.g., regular waste collection) and readily accessible alternative technologies, appropriate training in new management, and production techniques, it has limited operational value. The audit may help in establishing a baseline, but by itself does not solve the problem of environmental degradation or unsafe working conditions. Moreover, the additional transaction costs entailed in using traditional instruments would increase the break-even interest rate to be charged, making microcredit even more expensive than it is already.

Possible Solutions

Given the dual objectives of poverty reduction and environmentally sound operations, two alternative courses of action exist. The first option is to increase the environmental awareness of microcredit clients and promote voluntary compliance rather than enforcement. The main incentives for clients of microfinance institutions to adhere to sound environmental management are perceived profit, health benefits, and sustainability of their resource inputs. A voluntary approach would build upon these incentives. For example, educating microcredit clients that well aligned and sharpened saws can minimize wood wastage and result in better selling products is one way to increase both profits and environmental soundness. Another

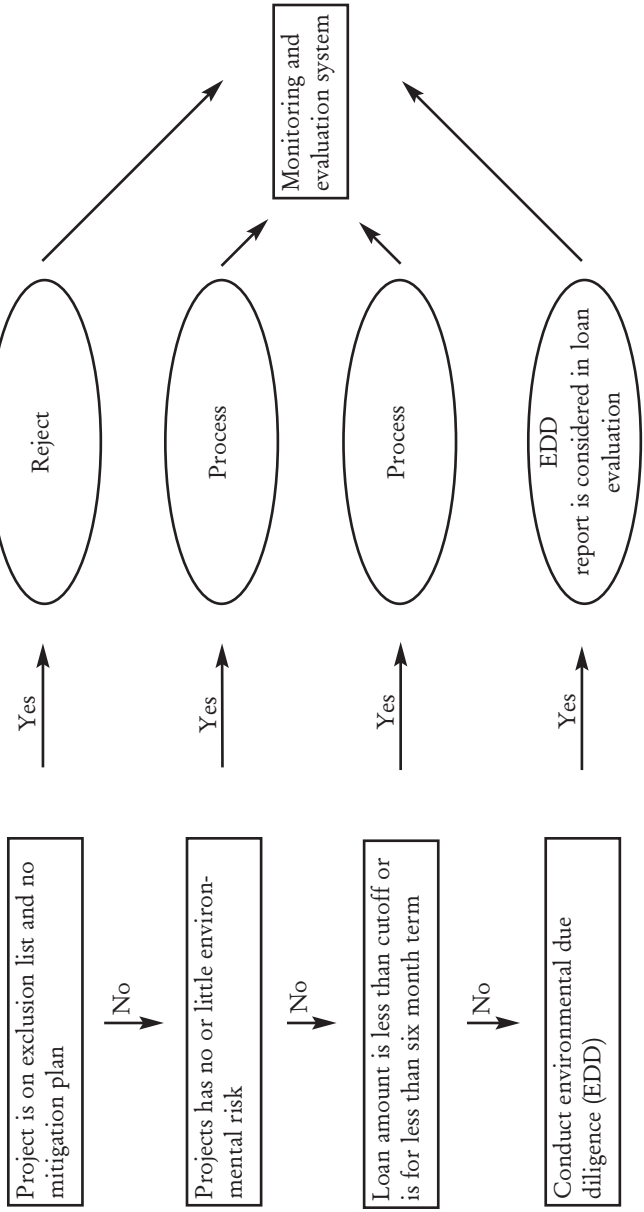
example would be for a microfinance institution to link one client whose waste byproduct (e.g., sawdust) could be the input of another client (e.g., packing filler or combustible fuel). Similarly, in rural agricultural settings improved environmental practices such as soil and water conservation create a win-win situation from both an ecological and a business standpoint (Barbier, 2000). In such cases, the objectives of poverty reduction and environmentally sound business are compatible.

The second option is for microfinance institutions to use simplified environmental assessment tools to identify a businesses' environmental impact, eliminate or require mitigation from the riskiest businesses, and, depending on the scope of the impacts, choose a mitigation strategy. In the short run, an effective and feasible means of environmental screening would be to develop a list of entrepreneurial activities that are known unequivocally to pose serious environmental and occupational safety risks without the presence of mitigation plans. This would essentially eliminate the problem providing incentive for an entrepreneur to adopt cleaner technology that may not be readily affordable, as well as eliminate the transaction costs burden on the microfinance institution of having to train and monitor potential offenders. Interestingly, from an environmental perspective the "dirty industries" also tend to be the ones with the gravest occupational safety risks, so a list would be the simplest tool to use. Both approaches have unique advantages and can even be used in tandem.

Figure 1 contains a scheme that could be used for microfinance institutions. It is important to underscore the point that the cutoff loan amount for triggering more detailed environmental due diligence must be high enough not to generate excessive transaction costs. Furthermore, the measures of environmental due diligence would probably have to be more commonsensical and less scientifically rigorous than the traditional instruments used in developed countries.

In Figure 1, a proposed microloan screening procedure is diagramed. The microfinance lender would have a preestablished

Figure 1. Proposed schema to introduce environmental considerations in microfinance operations



list of the most environmentally damaging economic activities, which would not be financed. If a project were not on the exclusion list and had little environmental or occupational safety risk, such as commerce, the loan could be processed according to standard credit-worthiness criteria. To economize on transaction costs if a project had some environmental risk, a cutoff loan amount or term should be set based on typical loan demand patterns and the level of economic development in the given country. Obviously, the higher the income and cost of living in the particular country, the higher the cutoff will be set.

For example, pig raising has some environmental risk, such as the runoff of pig manure into streams. However, if the amount lent for a pig-raising operation were small, only a few animals could be financed at a given time and thus the impact of manure runoff would be negligible. If the environmental risk level were medium to high and the loan amount requested passed a cutoff amount implying larger scale of operations, then some environmental due diligence or assessment is proposed (see Appendix). The due diligence would entail a site visit and an assessment of the amount of pollution or occupational safety risk proposed, the adequacy of existing mitigation systems, or likely effectiveness of proposed ones. The due diligence report supplements other credit risk assessments. To close the system and to help improve future screening procedures and financial product development, all the loans should be minimally monitored for environmental impact. Field officers should enter information on a selected number of environmental and occupational health and safety variables. This system implies that credit officers be given some minimal training in environmental risk assessment and management.

Conclusions and Recommendations

Microenterprise constitutes the majority of business firms in the developing world. While many microenterprise firms do not threaten the environment, some particular activities create pollution, impact biodiversity and other natural resources, and

generate occupational health and safety concerns. Despite the data problems and some uncertainty surrounding economic and ecological relationships, some pragmatic steps can be taken in this sector to mitigate existing damage and to protect the environment for both current and future generations.

The temptation to completely outsource environmental protection to financial intermediaries should be avoided. The main approach should be to directly help microentrepreneurs educate themselves about the environment, adapt more environmentally sound production technologies, and improve occupational safety standards. Instead of hectoring, the approach should be to convince microentrepreneurs of the private economic and health benefits of environmentally friendly practices (eco-efficiency). Focus should be on interventions that result in increased profits and productivity. Specific assistance could consist of loans and grants to increase environmental and occupational safety awareness, develop and diffuse environmentally friendly technology, improve environmental and occupational safety health data collection, processing, and analysis, and strengthen the public sector's and community's capacity to enforce standards. Partnerships will have to be forged between government, community, trade associations, and financial intermediaries to work jointly toward the goal of improved environmental protection and improved occupational safety and health. This latter area is the most fertile for quick, short-term solutions to problems as additional profits are developed that counteract program costs. The example of how brickmakers, environmental activists, and local government coordinated efforts and worked constructively to handle the pollution caused by traditional kilns in northern Mexico can be instructive (Blackman, 2000).

Pressuring microfinance intermediaries to better protect the environment by conditioning loans, however, should be done cautiously and carefully. Commercially oriented microfinance institutions are profit-oriented and dedicated to attaining financial self-sufficiency (Otero & Rhyne, 1994; Christen

et. al, 1995).[6] The microcredit technologies that these successful institutions developed minimize transaction costs. Therefore, the incorporation of environmental concerns should be consistent with the dictates of financial viability and avoid reducing the competitiveness of such institutions if they are to meet the dual goals of poverty reduction and sustainable development. Clearly, initiatives should be streamlined and cost effective. Such interventions should serve to minimize repayment risks caused by unsound environmental and occupational health and safety practices (Beanlands, 1999). Further, financial intermediaries should actively adopt a forward-looking approach that views sustainable production processes as viable investment opportunities and begin to engage in "green financing" (e.g., micro drip irrigation, small-scale solar, organic agriculture, agroforestry, catalytic converters, etc.) where feasible.[7]

In the shortrun, the primary focus of microfinance institutions should be to increase the level of awareness of both their staff and clients and recommend clients to qualified third parties for assistance in environmental management. With the exception of certain high-pollution activities lacking mitigation plans, microfinance institutions should be permitted to lend to all types of enterprises. Excessive environmental regulation runs the risk of introducing distortions and inefficiencies, namely, raising transaction costs without corresponding environmental benefits, reducing access to credit by poor microentrepreneurs, and encouraging more environmental degradation by severely credit constrained entrepreneurs who may be excluded from loans. The model should continually improve over time. Because environmental management in microfinance institutions is a relatively new topic, interventions should be closely monitored and evaluated.

Appendix

Environmental Assessments (EA) are used by a wide range of institutions to systematically identify environmental concerns, examine alternatives for impact mitigation, and report on expected

impacts of projects activities. Applying EA to microenterprise requires making adjustments due to the scale and nature of microenterprise and the needs of MFIs.

In 2002, World Vision (WV) Canada began using EA and conducted staff trainings on environmental impacts of microenterprise at a regional workshop in Serbia. The EA tool was designed to be streamlined for quick analysis and ranking of the environmental impact of various types of business activities. An EA allowed for ranking sectoral impacts on the following: soils, land use, vegetation, wildlife, water quality, air quality, energy, health, and safety. Given the demands placed on microfinance staff, this rapid approach was appropriate for evaluating the level of environmental risk posed by each type of business activity.

Once the risks and impacts were identified WV staff were able to screen out certain high-risk businesses. WV trained staff on mitigation strategies involving proper waste and byproduct disposal. The trainers also encouraged MFI staff to identify and support environmentally friendly sectors such as recycling and waste management.

Similarly in Tanzania and Romania in 2002, MEDA provided environmental management training to its loan officers. Loan officers were trained to integrate environmental risk analysis into their loan review process. MEDA's program also identified high-risk loans and devised strategies specifically for those loans. Other forms of environmental management were applied on a case-by-case basis. Source: Green Microfinance, 2003

Notes

The opinions expressed herein do not necessarily represent the official views of the Inter-American Development Bank, Brigham Young University Hawaii, the American University of Sharjah, and Green Microfinance. All errors and omissions are the sole responsibility of the authors.

1. The World Commission on Environment and Development, chaired by Gro Harlem Brundtland, published Our Common Future, commonly referred to as the Brundtland Report, in 1987.

2. An estimated 250 million accidental injuries with more than 300,000 fatal-

ities and 160 million new cases of occupational disease occur among the global work force each year. Poor occupational health and reduced working capacity may cause economic loss of between 10–20% of GNP. In developing countries the situation is worse. Only 5–10% of workers have access to adequate occupational health services in developing countries compared to 20–50% of workers in industrial countries. Source: Hogstedt, 2000.

3. Examples of flaws, court cases, and regulations enforcing rigorous environmental standards include U.S. v. Mirabile (1985), U.S. v. Maryland Bank & Trust Co. (1986), U.S. v. Exxon Valdez (1989), U.S. v. Fleet Factors (1990), Resource Conservation and Recovery Act (1976), Comprehensive Environmental Response, Compensation, and Liability Act (1980), and Asset Conservation and Lender Liability Protection Act (1996).

4. For example, in Brazil, Law No 9.605 (February 1998) establishes broad civil and criminal liability for environmental violations. In Chile, La Ley de Bases (Framework Law) states in article 52 that "every person that intentionally or negligently causes environmental harm shall be responsible for such harm." In Argentina, Federal hazardous waste law includes broad liability provisions, including the "owner and guardian of hazardous waste" (article 47). Under Law 24.051, a bank that forecloses on property and takes action to cause pollution could be deemed to have "utilized" the hazardous wastes in violation of the law.

5. In the case of the Inter-American Development Bank, there is a clear mandate to protect the environment in all financing projects in the "Report on the Eighth General Increase in the Resources of the Inter-American Bank," (AB-1163) p. 42, paragraph 2.42. Similar mandates exist for the World Bank, the International Finance Corporation, and bilateral donor agencies. Recently, the Inter-American Bank approved Guidelines for Environmental and Social Due Diligence for IDB Microenterprise Operations (July 2003).

6. Other microfinance institutions can be poverty-oriented and place more emphasis on serving very poor and marginal clients. These types of institutions tend to be more subsidy dependent and long-term permanence and stability may be less certain; stability is largely a function of marketing and maintaining access to donor or social investor funds. The paper takes the perspective of commercially oriented microfinance institutions.

7. The risks, levels of investments needed, and the payoff streams of "green projects" are typically quite different from traditional microfinance activities aimed at commerce. Many "green projects" require large and lumpy investments at the start, face more marketing risks, involve higher cost of production, and may have lagged benefit streams (i.e., waste minimization, energy savings, increased soil fertility). Nonetheless, there seems to be very profitable niches to be explored in garbage recycling, organic agriculture, energy conservation, eco-tourism, etc.

References

Barbier, E. B. (2000). The economic linkages between rural poverty and land degradation: Some evidence from Africa. *Agriculture, Ecosystems & Environment*, *82*(1/3): 355–370.

Barotone, C., & Benavides, L. (1995). *Local management of hazardous wastes from small-scale and cottage industries.* Washington, D.C.: World Bank.

Beanlands, G. (1999). *Environmental Protection and Microfinance in Vietnam.* Paper presented to the International Finance Corporation by Jacques Whitford Engineering Consulting Firm. Washington, D.C.

Blackman, A. (2000). Small is not necessarily beautiful: Coping with dirty micro-enterprises in developing countries. *Resources*. Issue 141. Washington, D.C.: Resources for the Future.

Christen, R. et. al. (1995). *Maximizing the outreach of microenterprise finance: An analysis of successful microfinance programs*. (Program and Operations Assessment Report No. 10). Washington, D.C.: U.S. Agency for International Development.

Coulson, A. B., & Dixon, R. (1995). Environmental risk and management strategy: The implications for financial institutions, *International Journal of Bank Marketing, 13*(2): 22–29.

COFIDE/OACA/Ecolab. (1998). *Concientización Ambiental en la Banca y La Pequeña y Microempresa.* Lima, Perú.

Economic Commission for Latin America and the Caribbean (ECLAC). (2000). *Proyección de la Población Económica de América Latina para el 2000.* Santiago, Chile: Informe Técnico.

Dasgupta, P., & Goran Maler, K. (1994). Poverty, Institutions, and the Environmental Resource Base. (World Bank Environment Paper Number 9). Washington, D.C.: World Bank.

Environment and Economics Department. (1995). *Global survey: Environmental policies and practices for the financial services sector*. Nariobi, Kenya: Environment and Economics Department.

Falconer, J. (1990). *The major significance of minor forest products*. Rome, Italy: FAO.

Falconer, J., & Arnold, J. E. M. (1989). *Household food security and forestry: An analysis of socio-economic issues*. Rome, Italy: FAO.

Gavin, H. (2002). Small-scale mining in Africa: Tackling pressing environmental problems with improved strategy. *Journal of Environment and Development, 11*(2): 149–174.

Gracer, J. (2000, November). *Environmental risk management and lender liability in Latin America*. Paper presented to the Inter-American Investment Corporation. Washington, D.C.

Hiba, J. C. (2000, June). *¿Cómo Lograr que las Pequeñas y Medianas Empresas Mejoren sus Condiciones y Medio Ambiente de Trabajo?* Paper presented at International Conference on Occupational Safety and Worker Health. Washington, D.C.: Inter-American Development Bank.

Hogstedt, C. (2000, June). *Review of worldwide occupational safety and health policies and approaches, solutions, and options*. Paper presented at International Conference on Occupational Safety and Worker Health. Washington, D.C.: Inter-American Development Bank.

Inter-American Development Bank. (1994). *Report on the eighth general increase in the resources of the Inter-American Development Bank*. (Document No. AB 1683). Washington, D.C.: Inter-American Development Bank.

International Labour Organization. (1999). *La Estructura del Empleo Urbano 1990–1998 Nuevos Datos*. Geneva, Switzerland.

Kent, L. (1991). *The relationship between small enterprise and environmental degradation in the developing world with emphasis on Asia*. Prepared for Office of Small, Micro, and Informal Enterprises, U.S. Agency for International Development. Bethesda, MD: Development Alternatives Incorporated.

Ledgerwood, J. (1999). *Sustainable banking with the poor: Microfinance handbook*. Washington, D.C.: The World Bank.

Lloréns, J. L., van der Host, R., & Isusi, I. (1999). *Compilación de Estadísticas de Pymes en 18 Países de Amércia Latina y el Caribe*. Report prepared for Advisory Unit on Small and Medium Enterprise. Washington, D.C.: Inter-American Development Bank.

Microcredit Summit. (1997). Various presentations. Washington, D.C.

Ontario Crafts Council. (1980). *Crafts and hazards to health*. Toronto, Canada: Mimeo.

Orlando, M. B., & Pollack, M. (2000). *Microenterprises and poverty: Evidence from Latin America*. Microenterprise Unit. Washington, D.C.: Inter-American Development Bank.

Otero, M., & Rhyne, E. (Eds.). (1994). *The new world of microenterprise finance: Building healthy financial institutions for the poor*. West Hartford, CT: Kumarian Press Inc.

Padden, J. D. (1996). *The impact of environmental liability on access to capital for small business*. (PB96195870.) Washington, D.C.: U.S. Small Business Administration.

Pallen, D. (1997). *Environmental sourcebook for microfinance institutions*. Ottawa, Canada: Canadian International Development Agency Asia Branch.

Poyo, J., Parker, J., & Golden-Vasquez, A. (1996). Trends in microenterprise development in Latin America and the Caribbean: Implications for the Inter-American Development Bank. Report prepared for Microenterprise Unit, Inter-American Development Bank. Bethesda, MD: Development Alternatives Inc.

Rao, M., & McGowan, P. (2002). *Bushmeat and international development. Conservation Biology, 16*(3): 587–589.

Remenyi, J. (1998). Microfinance: A panacea for poverty. *Microfinance and Development, 14*(1): 2–11.

Rosser, A., & Mainka, S. (2002). Wild-Meat use, food security, livelihoods, and conservation. *Conservation Biology, 16*(3): 580–583.

Shaver, C., & Tong, T. (1991). Chemical hazards to agricultural workers. *Occupational Medicine: State of the Art Reviews, 6*(3): 391–411.

Smith, D. R. (1995). *Environment risk: Credit approaches and opportunities: Interim report*. Report prepared for United Nations Environment Program. Nariobi, Kenya.

Taborga, M., & Wenner, M. 1997. *An evaluation of the Inter-American Development Bank loan for micro and small enterprise development in Costa Rica*. Microenterprise Unit, Sustainable Development Department, Washington, D.C.: Inter-American Development Bank.

Taddese, G., Mohamed Saleem, M.A., Abyie, A., & Wagnew, A. (2002). Impact of grazing on plant species richness, plant biomass, plant attribute, and soil physical and hydrological properties of vertisol in East African Highlands. *Environmental Management, 29*(2): 279–289.

Tictin, T., Nantel, P., Ramirez, F., & Johns, T. (2002). Effects of variation on harvest limits for nontimber forest species in Mexico. *Conservation Biology, 16*(3): 691–705.

United Nations. (1998). *Report of the UNEP Financial Institutions Initiative 1998 survey*. Environment and Economics Department. Nariobi, Kenya.

Vaughan, S. (1994). *Environmental risk and commercial banks*. Discussion paper prepared for United Nations Environment Program's Roundtable on Commercial Banks and the Environment, September 26–27, Geneva, Switzerland.

Wenner, M. (2002). Microenterprise growth and environmental protection. *Microenterprise Development Review, 4*(2): 1–8.

World Bank. (2000). *Greening Industry*: *New Roles for Communities, Markets, and Governments*. New York: Oxford.

World Commission on Environment and Development. (1987). *Our Common Future*. New York: Oxford.

Zucchetti, A., & Alegre, M. (1999). *Microempresa y Ambiente*. Paper presented at the Second Interamerican Forum on Microenterprise, June 24–26. Buenos Aires, Argentina.