

ARIES

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Assistance to
Resource Institutions
for Enterprise Support

THE FORESTRY PRIVATE ENTERPRISE INITIATIVE IN ECUADOR: AN ASSESSMENT OF INFORDE'S FIRST EIGHTEEN MONTHS

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By:

Jennifer Bremer-Fox

Team Leader

W.L. Bender

Forestry Specialist

*The views and interpretations in this publication are those
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Agency for International Development*

ARIES

Assistance to Resource Institutions for Enterprise Support

The ARIES project is designed to strengthen the capabilities of support organizations in developing countries to implement small-scale and micro-enterprise development programs. ARIES builds on the work of the Agency for International Development's former Program for Investment in the Small Capital Enterprise Sector (PISCES) and Small Business Capacity Development projects. It works with intermediary support organizations that provide services to small and micro-businesses and industries, such as private voluntary organizations (PVOs), banks, chambers of commerce, management training centers, business people's organizations, and other developing country government and non-governmental organizations (NGOs).

The contract for this five-year project has been awarded to Robert R. Nathan Associates, Inc. (RRNA) with subcontractors Harvard Institute for International Development (HIID), Control Data Corporation (CDC) and Appropriate Technology International (ATI).

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The ARIES project has three major components -- research, training, and technical assistance -- designed to cross-fertilize each other. The applied research component focuses on economic, social, and organizational issues surrounding intermediary support organizations to inform AID missions and host country actions in this subsector. The training component includes design, testing, conduct and follow-up of training programs in such areas as finance, management and evaluation for PVO and NGO personnel. The technical assistance component provides short-term technical assistance to AID missions and intermediary organizations to assist small and micro-enterprise development.

EXECUTIVE SUMMARY

The Private Enterprise Initiative for Forestry Development (INFORDE)¹ is an experimental program designed to test and demonstrate private sector approaches to development of the wood and forestry sector. The program, financed by the U.S. Agency for International Development (A.I.D.), has two aims: (1) to develop the markets for wood-based industries in the target country in order to mobilize private sector participation in forest development and (2) to encourage the host country government and the donor community to expand their support of private sector activities in the forestry and wood sectors.

Ecuador was chosen as the site for the INFORDE experiment on the basis of the importance of forestry in the national

1. The INFORDE field program in Ecuador is part of the Forestry Private Enterprise Initiative (FPEI), a component of the Forestry Support Program. The Forestry Support Program (FSP, formally titled the Forest Resources Management Project) is a centrally-funded AID project sponsored by the Office of Forestry, Environment, and Natural Resources in the Bureau for Science and Technology (S&T/FENR). The FPEI component of the FSP is implemented by the Southeastern Center for Forest Economics Research (SCFER, a cooperative research center sponsored by the USDA Forestry Service and Duke and North Carolina State Universities) under a contract with the U.S. Department of Agriculture funded by AID.

economy, the presence of strong local private sector institutions, and the excellent potential for growth in forestry and wood-based industries.

INFORDE's strategy is based on promoting private sector forestry by assisting in-country firms and private institutions to (1) increase the value of wood-based products, including lumber and plywood as well as finished products such as furniture; (2) raise the earnings of private forest-based activities through improved technology; and (3) encourage direct private sector participation in reforestation and forest management. INFORDE has focused on six areas: (1) promotion of increased use of wood in construction; (2) support to private sector reforestation activities; (3) improvement of sawmill technology; (4) strengthening of in-country sources of technical information and research support; (5) applied research in support of private forestry; and (6) strengthening of private sector institutions in the forestry sector.

Despite the very limited resources available to INFORDE in time and money (one full-time specialist in market development, with a total annual budget of less than \$300,000), INFORDE has demonstrated the value of targeted technical assistance and market development for the private sector. Working in close cooperation with local institutions such as the Wood Industries Association and non-profit development foundations, INFORDE has made significant progress in a number of areas. For example, INFORDE has produced investment profiles detailing the private costs and benefits of forest plantations and played an instrumental role in the formation

of an export consortium which has already resulted in increased sales by one of its members. The availability of INFORDE support was the deciding factor enabling a private foundation implementing an AID-financed small enterprise project to identify wood-based industries as one of its four priority areas. INFORDE has won high praise from public and private sector organizations in Ecuador and from the donor community for the value and quality of its assistance program. There is no doubt that INFORDE has made a contribution to the forest sector totally out of proportion to its modest size.

INFORDE has been less successful in encouraging donors to incorporate private sector approaches into forest development programs. Despite the demonstrated potential for private sector support to plantation forestry, and the need for immediate attention to preservation of the forest base for key Ecuadorian industries, donor programs in the forest sector have continued to stress public sector institutions almost exclusively. INFORDE has only been in the field for 18 months, however, and several of the project initiatives supported by INFORDE show signs of bearing fruit in the near future.

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I. INFORDE: THE FORESTRY PRIVATE ENTERPRISE
INITIATIVE IN ECUADOR

A. Background

In many developing countries, including Ecuador, the wood sector provides an important share of the nation's employment and income, particularly in rural areas. The natural forests that support this sector are often considered a national resource and, in consequence, placed under the jurisdiction of the public sector. The exploitation of the forest resource, however, and the transformation of the raw material for human use are most commonly the responsibility of the private sector. Private forest resources -- from industrial plantations to individual trees or farms -- also play a large role in Ecuador as elsewhere.

INFORDE¹ is a pilot effort in market development for private sector wood-based enterprises. Its scope is broad: from the harvesting of the timber to its final sale to consumers as furniture, lumber, and other wood products; from local markets, where wood is sold virtually unprocessed, to export markets for highly industrialized products such as furniture

1. INFORDE is the Spanish acronym for the Private Forestry Initiative for Development, the Iniciativa Forestal Privada para el Desarrollo.

and plywood; from small rural enterprises employing four or five people, up to large firms employing a hundred or more.

The underlying principle of INFORDE is the value of information for the development of private wood-based enterprises, information on the costs and returns to private reforestation and plantations, on alternative technologies for wood processing, on the international market for high-quality wood products, and on the support available from public and private institutions.

INFORDE is being implemented as part of the U.S. Agency for International Development's Forest Resources Management Project (the Forestry Support Program), a centrally-funded program of the Science and Technology Bureau's Office of Forestry, Environment, and Natural Resources (S&T/FENR). The program's Forestry Private Enterprise Initiative is being implemented by USDA in cooperation with the Southeastern Center for Forest Economic Research (SCFER). The pilot market development program began implementation in late 1985 and is expected to continue into fiscal year 1989. Activities have been concentrated in Ecuador, which was selected as the site for the demonstration on the basis of its large potential for forest-based development and the AID Mission's strong commitment to private enterprise and forest development. Field activities have been carried out in close cooperation with the Mission.

Natural forests cover an estimated 42 percent of Ecuador's land area and total roughly 12 million hectares, three-quarters of which is primarily in the sparsely-populated Oriente. At the current rate of colonization (200-300,000 ha./year), it would take approximately 60 years to clear the

natural forest completely, but escalating transportation costs and regeneration of abandoned areas are likely to slow the net loss of forestland considerably. While plantations cover less than 100,000 hectares, they currently supply 30 percent of the needs of the formal wood-industry sector and are expected to supply a much larger share in the near future, as the cost of exploiting remote forest resources is rising sharply.

Forestry generates 6 percent of Ecuadorian agricultural production and accounts for less than one percent of total GNP. Wood industries constitute roughly 3 percent of total industrial production and 1 percent of GNP. Furniture manufacture is a major activity, employing roughly 4 percent of those working in the manufacturing sector. Wood products account for 2 percent of total merchandise exports, primarily in the form of balsa and plywood. These figures understate the importance of wood in the Ecuadorian economy, as they do not include informal activities (local construction and firewood), nor do they count the wood-related service sector (construction, transport, and retailing of wood products including furniture). While estimates are not available for the latter activities, firewood consumption totals on the order of 6 million m³, roughly three times the total volume consumed in the formal wood sector (estimated at 2.3 million m³ in 1986). Wood products are also main inputs into a wide range of small and large enterprises.

The wood sector shows a high degree of duality. Large enterprises (by Ecuadorian standards) dominate the production of balsa and plywood, while small firms and artisans account for most of the production of sawn wood, furniture, and other wood products. Nonetheless, there are significant interdependencies between large and small enterprises. Small sawmills

and private loggers supply wood to the large plywood producers, which in turn supply one of the most important inputs into small furniture manufacturing. The small loggers and colonists operating in the coastal area depend on the roads and market outlets supplied by the large plywood firms. This high degree of duality and interdependence is characteristic not only of forest-based industries but also of many other industrial activities in the agricultural sector (coffee, bananas, agricultural inputs), as discussed further in section II.

Forestry and wood-based industries in Ecuador face a range of problems. The increasing scarcity of high-value species and their rising cost affect both the large plywood firms and the small furniture manufacturers, as well as the returns of the logging firms themselves. The poor quality and high costs of the country's estimated 400 small sawmills hamper the development of the market for construction lumber, which is also constrained by the low prestige of wood construction. Poor quality and uncertain supply are also major problems for the furniture industry, which has to date been unable to capitalize on the potential for exports.

B. INFORDE's Objectives and Overall Strategy

The problems cited above provided the basis for defining INFORDE's objective to assist private firms and organizations in the Ecuadorian wood sector in: (1) expansion of private sector reforestation; (2) development of the domestic market for construction materials; (3) promotion of furniture exports; (4) strengthening of private institutions supporting the wood sector; and (5) improvement in the availability of technical and market information to the wood sector. With

only one full-time professional in country, approximately \$150,000 in annual operating expenses, and backstopping support provided by SCFER in North Carolina, INFORDE's effectiveness in contributing to this daunting set of objectives depends on mobilizing resources in the public and private sector.

INFORDE's strategy is based on selective interventions in five areas, each designed to improve public-private sector communication and cooperation:

1. Expanding the supply of information by drawing on local and U.S.-based resources to conduct applied research to improve the understanding of the wood sector, its problems, and the solutions available
2. Improving the flow of information by conducting workshops and seminars and facilitating contacts between the Ecuadorian and U.S. private sectors through buyers' and sellers' missions, contact between industrial associations, and technical assistance
3. Identifying and promoting investments by conducting feasibility studies and investment profiles, assisting potential investors, and mobilizing donor resources for the wood sector
4. Supporting private sector associations and other organizations in the wood sector through consultancies, training, and other assistance
5. Promoting market development by designing and building wood prototypes, broadening the discussion of policy issues constraining market operations, carrying out market studies, and promoting grades and standards.

The overall strategy guiding selection and implementation of INFORDE activities is the need to increase the value of wood products in Ecuador. Whether the problem is poor

acceptance of wood by consumers, the low quality of wood products, lack of information on establishing plantations for profit, or limited knowledge of the international market, the result is that wood products do not realize their potential value or sales volume in the marketplace. In consequence, the value of the forestry resource is depreciated, discouraging proper management, and the cycle of low quality leading to low demand is perpetuated.

This strategy of carefully targeted action in cooperation with local and international institutions has enabled INFORDE to achieve real progress in several areas during its first 18 months.

C. The INFORDE Program: Experience in the First Eighteen Months

1. Summary of Activities and Accomplishments

INFORDE was formally initiated in late 1984, when the market development specialist joined the staff of North Carolina State and the FPEI. After field visits to a number of countries, Ecuador was selected as the site for the pilot program, based on the presence of a strong private wood industry association, AIMA¹, and the country's excellent prospects for private sector forest-based development. The market development specialist began operations in Quito in August 1985, with offices close to those of AIMA, the Chamber

1. The Asociacion de Industriales Maderos (the Wood Industries Association), a private sector organization.

of Small Industries Chambers, and other important organizations in the wood sector. Although the professional staff of INFORDE still consists of a single individual, the effective staff has been increased to six with the addition of a graduate student from North Carolina State and four Ecuadorian trainees.

INFORDE is attached administratively to the AID Mission's Private Sector Office, and coordinates closely with the Forestry Section of the Agriculture Office as well. INFORDE activities are carried out in cooperation with several public and private sector institutions in Ecuador in addition to AIMA, including the Institution for Socio-Economic and Technological Research (INSOTEC, a private foundation supporting small enterprise development), local universities, the Ministry of Agriculture, the Ministry of Industries, and local private sector firms.

In the relatively short period of 18 months, INFORDE has accomplished a great deal, as shown by the following major achievements:

1. Formation of a consortium of furniture exporters within AIMA, which has already succeeded in raising the exports of one firm and is making progress toward introducing several other firms to the export market for the first time
2. Completion of a survey of the home-expansion market to measure the potential demand for wood in this important construction market
3. Development of investment profiles detailing the costs and benefits of private sector plantations for six of the main commercial species, as an aid to private investors and farmers interested in reforestation

4. Design and construction of an all-wood promotional housing prototype, which has been installed in Quito's largest public park as a center for rotating art exhibits, ensuring that it is regularly open for public viewing
5. Support to the formation of a non-profit Corporation for Technical Support to Wood Industries (CORMADERA) by AIMA, the Ministry of Agriculture, and other private sector groups, to provide technical support to wood processing industries and establish a national system of grades and standards for major wood products
6. Completion of the economic analysis for an upcoming Inter-American Bank reforestation project, assisting the Ministry of Agriculture to meet a tight timetable
7. Identification of the wood sector as one of the four areas to be emphasized by INSOTEC in its assistance to small enterprises under the Mission's new Small Enterprise Project

In addition, INFORDE has carried out an active program of applied research, seminars, and training, and has assisted local firms to resolve technical problems that limit their profitability and access to markets. A small parquet producer in the Oriente, for example, received advice on reducing sawing costs, while a veneer producer was aided in improving the proportion of his product accepted by local plywood mills.

The following section discusses two of INFORDE's most important programs in greater detail to provide a better picture of how INFORDE works in practice. A complete listing of INFORDE's activities is included in Appendix A.

2. Furniture Export Promotion and CORMADERA:
Two Examples of INFORDE Action Programs

Furniture production employs approximately one-fourth of all workers in wood industries. Three hundred twenty-five

firms are officially registered with the Ministry of Industry, including 235 classified as artisan and 90 larger firms. The 1980 economic census identified over 4,500 firms, however. With the local market effectively saturated, firms are increasingly looking to the export market to support future growth. But few firms have managed to break into the international market as yet, and potential entrants face serious barriers in the form of design and quality problems, lack of information on the market and how to gain access to it, the uncertain availability of hardwood supplies, and low production volumes.

INFORDE is working with local manufacturers to tackle all of these problems. A workshop was held in cooperation with AIMA in November 1985, a few months after INFORDE began its Ecuador operation, with the support of USAID/Quito's Non-Traditional Agricultural Export Project. As a result of this workshop, six manufacturers agreed to form an export consortium (one large firm and five small firms, following the classification used in Ecuador). The consortium has been the locus for a number of export-promotion activities, carried out with assistance and, in some cases, funding, from INFORDE:

- a. Assistance in design was obtained from a U.S. designer, which was instrumental in helping one of the firms expand its export volume dramatically.
- b. A seminar on lumber drying techniques was conducted jointly with INSOTEC.
- c. Representatives of the consortium attended trade fairs in the United States to acquaint them with market requirements and potential customers.
- d. A marketing agent was identified and a showroom established in the United States, resulting in sales to a new United States market.

- e. A buyers' mission was conducted to interest potential purchasers of Ecuadorian furniture parts.
- f. Consortium participation in AIMA's annual Ecuadorian wood products fair (MADEXPO) was organized and implemented.

The consortium is currently working on overcoming the industry-wide problem with furniture finishes and other technical issues.

These actions are clearly only first steps toward breaking into the export market. It will take several years to build a market based on the quality of Ecuadorian furniture and the performance of local firms in the marketplace.

INFORDE's strategy recognizes that INFORDE alone cannot supply the support needed to reach this objective, that there is a need for ongoing institutional support to the furniture sector and other wood industries. In response, INFORDE has provided substantial support to AIMA's CORMADERA initiative, which was already underway when INFORDE began.

CORMADERA is conceived as an innovative joint venture between the public and private sectors in Ecuador. The core of the institution will be an existing forest products research center established several years ago under the jurisdiction of the Ministry of Agriculture. The facility has an excellent physical plant, but research and testing activities have been sharply constrained in recent years by the lack of operating funds. Under the CORMADERA proposal, these facilities would be turned over to CORMADERA, which would operate a technical support unit for the entire wood-based industrial sector. The Ministry of Agriculture would continue its financial input at

the current level, and additional funds would be added by charging for services provided to the private sector, selling products produced in the facilities, and seeking international donor support. If successful, CORMADERA would represent a significant step forward in public-private cooperation in Ecuador and a model for research and technical support under a wide range of circumstances.

The main elements of the program include:

- a. A demonstration sawmill to promote the market for high-quality, standardized products for construction and furniture-making, to introduce improved techniques, and to generate income for CORMADERA itself
- b. Technical assistance and training in wood drying and preservation
- c. Product quality certification for the local and export markets for furniture, construction lumber, and plywood, and promotion of a uniform system of grades and standards for these products
- d. Promotion of wood construction through development of prototypes, assistance in cost estimation, and training
- e. Testing of the structural characteristics of local wood, including new species
- f. Technical support to furniture firms in finishes, design, equipment utilization, and quality certification for export, as well as a special program of assistance to micro enterprises (artisanal firms)

CORMADERA is widely supported by Ecuadorian wood industry firms. The initial steps to establish CORMADERA have already been taken. The corporation has been formally established. The Ministry of Agriculture has agreed to turn its wood

products research and testing facility over to the corporation and to continue supporting the salaries and operating expenses of the facility, a major show of faith in this innovative institution. The corporation's sponsors are currently looking for donor funding.

INFORDE is providing the support needed to develop the CORMADERA concept to the point where local institutions can carry it forward to fruition. INFORDE funded a consultancy by a Brazilian expert who played a key role in defining the need for CORMADERA and building consensus on its functions. INFORDE personnel developed the funding proposal for CORMADERA, which will be used by AIMA and other institutions in soliciting funding. INFORDE also provided assistance in identifying a United States firm to certify CORMADERA's quality control program for the international market. Finally, a training program was organized by INFORDE for four wood industry professionals who will provide the core of the CORMADERA staff.

It is still too early to say whether CORMADERA will go forward. Nonetheless, it demonstrates the potential value of a program such as INFORDE in helping local institutions to move from the drawing board to the marketplace.

D. Key Issues in Replicating INFORDE

INFORDE offers a prototype for enterprise promotion, not only in the wood sector, but in all areas where public-private cooperation is important to successful stimulation of growth. INFORDE demonstrates that a small infusion of resources can have a very real impact on private development when these resources are targeted at priority technical problems in a

specific sector. INFORDE has also tested and demonstrated a number of specific interventions that have potential applicability for enterprise support programs, whether or not they follow the INFORDE model.

Four issues merit consideration in determining whether the INFORDE model as a whole is appropriate to a given situation and in adapting it to meet local needs: (1) the strength of existing private sector counterpart institutions; (2) the selection of priority issues; (3) coordination with the AID Mission strategy; and (4) the mix and level of resources provided.

1. Private Sector Counterpart Institutions

INFORDE's program in Ecuador would not have been possible without AIMA, a private association with strong leadership and 11 years of experience in wood industry development. AIMA provided the entree into the wood industry community that enabled INFORDE to get off to a rapid start. Many of INFORDE's most successful activities have been based on expanding and improving ongoing AIMA programs; the potential for continuing these programs after INFORDE terminates next year depends on AIMA's interest and support.

INFORDE has also worked closely with INSOTEC, a local foundation that provides technical assistance and research to support small enterprise development. The relationship has been mutually beneficial: INFORDE has provided INSOTEC with the technical support needed to move into the wood products industry, a new area for INSOTEC, and has helped INSOTEC to gain experience in feasibility studies and analyses of the wood sector; INSOTEC has provided INFORDE with information on

small enterprise development and has served as a channel for INFORDE assistance to the small enterprise sector.

The INFORDE program would have been very different if neither of these institutions had existed. As a one-person operation with few resources, INFORDE is dependent on being able to mobilize other institutions. In the absence of viable private sector partners, it would be necessary to concentrate more resources on creating or building up such institutions. While the development of local private sector support institutions is extremely important for improvement on both the technical and policy fronts, such an emphasis would inevitably imply less direct impact on local firms in the short run.

INFORDE differs from most AID-sponsored activities in that it is a "free-standing" unit; it is not attached to any particular Ecuadorian institution, public or private, nor is it set up as a unit within the AID Mission. As such, it has no formal call on the support or resources of another institution, but it is also free to pursue any initiatives identified without formal clearance from anyone but AID. This unusual institutional placement (or lack thereof) has been extremely useful in maintaining flexibility and in responding quickly to opportunities, but is an open question whether this independent status would be acceptable to the host government in a Mission-sponsored project.

2. The Selection of Priority Issues

The ability to tie into ongoing programs has encouraged INFORDE to initiate a wide range of activities, stretching from small enterprises to the largest local firms and from tree plantation to furniture refinishing. Individual

activities have been dropped within each program, but no program has been dropped. Overall, INFORDE has tended to increase diversity rather than the contrary, with the number of programs growing from five to seven.

Its broad range has enabled INFORDE to shift resources into areas where progress is being made and out of areas that are temporarily lagging or that prove not to live up to their initial promise. On the other hand, it is possible that more progress might have been made in each area with a more concentrated program. It remains a matter for speculation which approach would yield the greatest progress in the wood sector overall.

3. Coordination with the
AID Mission Strategy

The diversity of INFORDE's program is, in part, a response to the absence of a close fit with other AID activities in Ecuador. Both the forestry and the private sector programs of the Mission are compatible with INFORDE's activities, but their focus is somewhat different. The forestry program emphasizes support to public sector institution-building, agroforestry, and reforestation, not utilization of existing forests by private firms or large-scale plantations. The forestry program is aimed at encouraging small farmers to plant trees as part of their total income-generating strategy, and in this differs sharply from previous projects which focused assistance on public sector planting, but it nonetheless is pursuing a strategy quite different from INFORDE's. Processed wood products do not fit easily into the private sector non-traditional agricultural exports program, as furniture and plywood are not generally considered agricultural products. On the other hand, the small enterprise

program implemented in cooperation with INSOTEC is an area of increasing collaboration.

The divergence has both positive and negative aspects. On the positive side, it has helped INFORDE to establish its own identity and to respond quickly and flexibly to needs expressed by the private sector. On the other hand, the lack of overlap between the two programs has limited INFORDE's ability to mobilize other AID resources in support of initiatives developed with private firms. Although INFORDE has helped the Mission to use funds in existing programs more effectively, it has not succeeded in bringing about a dramatic increase in AID funding for private sector forestry activities. Indeed, one might question whether this was an appropriate objective for INFORDE. Once a project has been designed, as in the case of the Ecuador forestry project, it is very difficult to add new activities. Even when, as in this case, the project is being redesigned, the Mission's aim is to pare down and simplify the project, not add new complications. But new projects are not good targets for INFORDE lobbying, either, as the two-year time frame from concept to start-up is too long for an initiative such as INFORDE to be in on both the design and the implementation.

A final point worth emphasizing in considering INFORDE's replicability is the value of maintaining an appearance of separation between the support institution and AID. The INFORDE director has consistently downplayed his connection with AID in his dealings with the Ecuadorian private sector. Rightly or wrongly, it was the general perception of those who commented on this separation that association with an American aid agency would not be helpful in winning the confidence and collaboration of private sector entrepreneurs.

4. The Mix and Level of Resources Provided

The resource limitations placed on INFORDE have been both a source of strength and a constraint on the program's progress. Perhaps surprisingly, the lack of funds may have increased INFORDE's success by forcing it to work closely with local institutions in order to accomplish anything at all, which ensured that it would be responsive to local priorities and prevented the all-too-familiar phenomenon of project isolation. INFORDE's funds have been used effectively to top up or supplement the funds of other institutions. On the other hand, the resource limitations are an inevitable source of frustration, as promising initiatives can be carried forward only a few steps before outside funding must be sought or the effort dropped. It remains to be seen whether the many promising initiatives started by INFORDE -- CORMADERA, the export consortium, and others -- will be able to generate the financial support to continue. On balance, it would appear that the chances of sustaining these initiatives are greater than they would have been had they been funded wholly with outside resources.

The focus on technical assistance has not been a problem for INFORDE. In particular, the absence of credit funds in the program has not been a constraint, given the large number of other credit programs available and the limited interest of local enterprises in further expanding their already over-extended credit lines. The situation in another country could clearly be quite different, making technical assistance less productive in the absence of credit, training funds, or other resources.

Two elements of the resource package provided to INFORDE have been key to its achievements:

- a. The marketing specialist fielded to Quito is a dynamic and insightful individual with extensive experience in wood industries. At times, his rapid pace has made those around him uncomfortable, but it is clear that a more relaxed approach would not have yielded an equal measure of progress. Equally important, his thorough technical grasp of the important aspects of wood product processing and marketing have enabled him to gain the confidence of businessmen throughout the sector. Unfortunately, there is very little that can be done to ensure that other individuals placed in similar situations will display this mix of a can-do personality and strong technical skills.
- b. Strong home-office backstopping provided by NCSU as well as AID proved critical to the effectiveness of the marketing specialist. His success in gaining the confidence of his counterparts in Ecuador was traceable in no small measure to his ability to count on the support of the NCSU office to deliver materials needed in a timely fashion, respond to his requests for information or personnel, and provide technical support to his activities. The resource requirements for effective backstopping were underestimated in the FPEI design (a situation familiar to anyone who has ever implemented a project overseas), but this situation was remedied quite rapidly to provide a nearly full-time administrative back-stop person as well as part-time professional support.

It is perhaps somewhat unusual to assign primary responsibility for a market development program to a university-based research center, and it is worth exploring briefly the merits of this institutional location compared to others (a PVO or a for-profit firm, for example). The project has suffered somewhat from the inevitable home office/field

tensions, and these have been exacerbated to a measurable degree by the difference in perspective between the action-oriented field personnel and the research-oriented home office. At times, the home office has felt that the field was running away with the project. At times, the field has felt that the home office was too slow and deliberate.

On balance, however, the relationship has worked well. The university tradition of independent action and the somewhat looser management of funds characteristic of AID-university relations has been reflected in NCSU's management style, which has given the field more freedom than many for-profit firms are willing or able to allow their field staff (but probably not more than is typical in a PVO operation). The field and the home office have also been able to collaborate effectively on a number of research topics, although here the independence of individual actors has worked to the detriment of the activity, as researchers have not always been willing to follow up on leads identified by the field.

In summary, there have been both pluses and minuses to the choice of a university as the institutional home for the project. In replicating the INFORDE model, the selection of an institutional sponsor should be made on the basis of local conditions, with both universities and other institutions given initial consideration.

But the INFORDE model need not be replicated as a single unit. Indeed, many of the most successful aspects of the INFORDE program might well be picked up and incorporated into a wide range of enterprise promotion programs. For example, the profiles of private forest plantations provide a good

example of developing a package of specific information to assist entrants into a new private sector activity. As discussed further below, INFORDE has also provided valuable insights into the relative merits of alternative support institutions for promoting private sector development.

II. AN ASSESSMENT OF INFORDE

Any assessment of INFORDE must take into consideration that INFORDE operates on a number of different levels. First and foremost, it provides technical assistance to private sector firms and associations in the Ecuadorian wood sector with the aim of increasing production, income, and employment in the sector. At the same time, INFORDE was also envisioned by its sponsors as a demonstration of how to approach private sector issues and objectives in the forestry sector and as an attempt to increase the level of donor resources -- particularly AID resources -- directed to the forestry sector.

The following discussion is organized into three sections. The first section discusses the Ecuadorian wood sector in more detail to set the context for an assessment of INFORDE's programs and accomplishments. The second section discusses INFORDE's approach to ten key problems facing the sector, reviews and assesses the program's activities in each area, and suggests future directions for INFORDE and, where appropriate, other AID programs. The final section summarizes the main recommendations for AID and INFORDE programs in the wood sector.

A. The Country Situation:
The Wood Sector in Ecuador

1. The Forestry Resource

Ecuador occupies approximately 275,000 km² of land surface, about the size of the State of Oregon. The country has three principal geographical zones -- the Pacific Coastal Plain (Costa), the Andean Cordillera (Sierra), and the Amazon Basin (Oriente). (Map 1)

a. Indigenous Forests

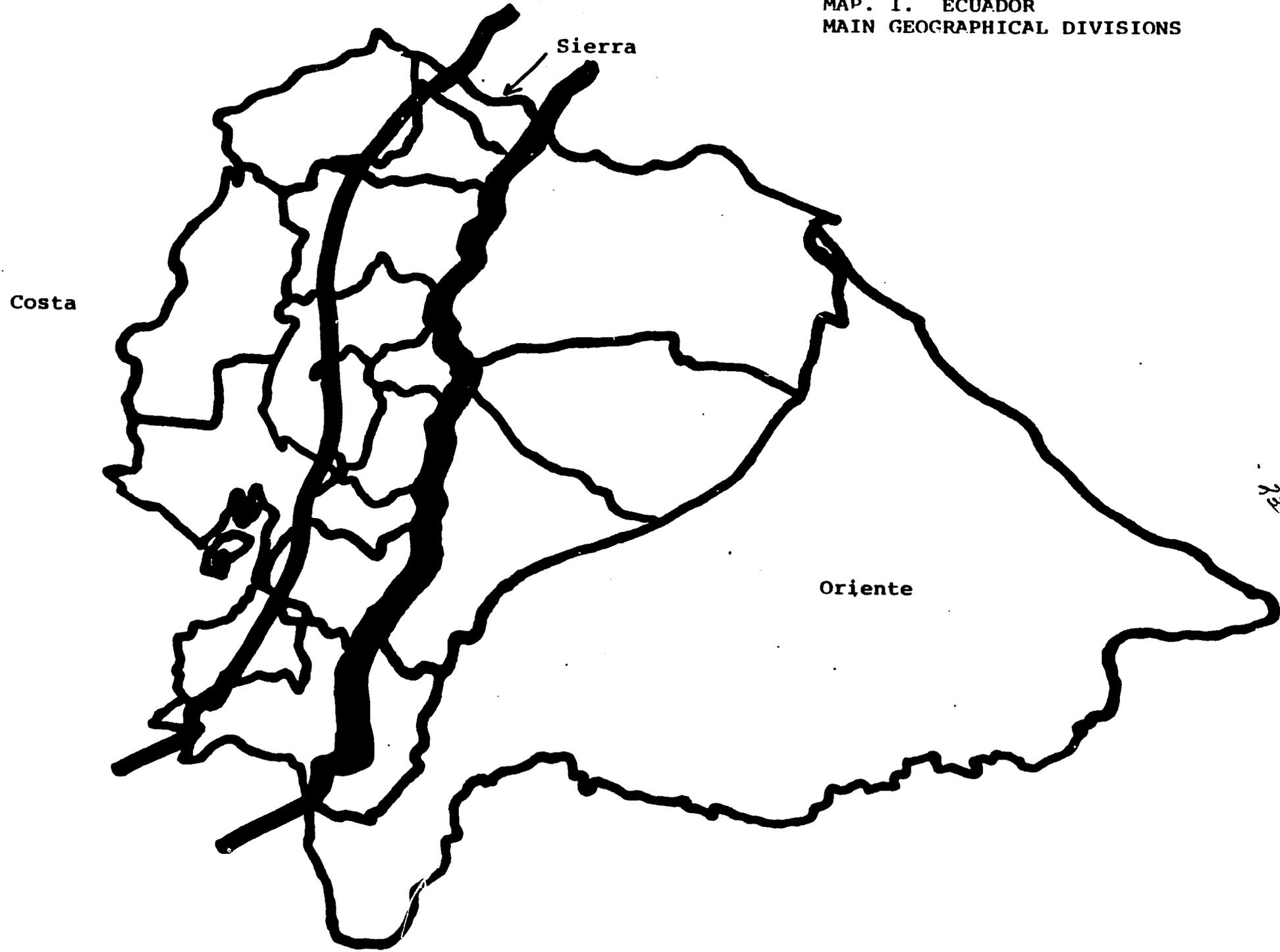
About 42 percent of the land or 120,000 km² is covered with tropical hardwood forests, about 30 percent in the Costa (the province of Esmeraldas, mainly), and 70 percent in the Oriente (Provinces of Napo and Pastaza, mainly). These forests contain about 40 m³ of commercial hardwood per hectare. The Sierra has about 8,000 km² of natural forests, mainly watershed protection forests in the upper elevations.

Colonization takes 200-300,000 ha./year out of the tropical hardwood forest resource. Less than 30 percent of the timber felled in clearing the land constitutes commercial species that find their way into forest industry plants. Most is burned or left to rot.

b. Plantations

The Sierra has an estimated 30,000 ha. of plantations, 70 percent eucalypt, 25 percent pine, and 5 percent other species. The plantations range from 6,000 to 11,000 feet (1,800-3,500 m). Growth rates have been estimated at 13 m³/ha. for pine and 27 m³/ha. for eucalypt. It is estimated

MAP. 1. ECUADOR
MAIN GEOGRAPHICAL DIVISIONS



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by the Ministry of Agriculture that 30 percent of the lumber produced in the country comes from these plantations. Although widely quoted, this estimate is of uncertain origin. In particular, it is unclear whether the source is formal public-sponsored plantations or informal plantings on private land. Informal observations suggest the latter, particularly as public sector plantations are generally believed to have a low percentage of commercially exploitable timber -- perhaps 10 percent.

The tropical areas have about 15,000 ha. of plantations with mean annual growth of 20-30 m³. The major species planted are laurel (Cordia allidora), balsa (Ochroma pyramidale), teca (Tectona grandis), and pachaco (Schizolobium parahyba).

In assessing Ecuador's forest resource situation, it is critical to recognize that a hectare of natural forest is not the equivalent of a hectare of tropical hardwood plantation. From an ecological standpoint, the former may be far superior (as a habitat for endangered species, for example, and a biological diversity "bank"), but from the standpoint of wood production, the reverse is true. A hectare of natural forest may provide only 20 cubic meters of usable hardwood logs in the initial harvest. By contrast, a well-managed plantation of fast-growing species, such as pachaco, should register growth rates of 20 cubic meters per year. Thus, a hectare of managed plantation harvested after 20 years can produce as much wood as 20 hectares of natural forest. The estimated 2.3 million cubic meters of wood used annually by Ecuador's wood industries (excluding firewood) could be provided by 115,000 ha. of well-managed plantations, almost exactly 1 percent of the current tropical forest cover. As discussed further

below, this fact has not escaped the managers of Ecuador's large plywood firms.

2. Availability and Utilization

Specific figures are not available on the use of the forest resources. The estimates in this section are based on the best judgment of professionals in the field, as well as extrapolations from official data. All of these numbers exclude the informal gathering of wood from natural stands and small on-farm planting for firewood, fencing, construction, and other uses in the rural areas, for which no figures are available. As previous estimates are based on other unknown assumptions, it is not possible to describe trends in wood use, but most observers agree it is increasing at around 2 percent annually.

The Pacific coastal forests are the most accessible, with many river basins and a fairly well developed road system resulting from the conversion of much of the forest to agricultural land. The process of road-building and colonization is still continuing in the northwest, however. Crops such as bananas, coffee, cacao, and oil palm occupy large areas of land. In this region, even colonos have begun to participate in plantations of tropical hardwoods on a limited scale. The coastal forests supply about 40 percent of the logs for the forest products industry, 24 percent being used in the Costa, and 16 percent sent to Quito.

The Oriente forests are the least accessible and the most costly to exploit because of greater hauling distances and the absence or poor condition of roads. The Oriente supplies

about 40 percent of the logs, sending 16 percent to the Costa and 24 percent to Quito.

The Sierra supplies 20 percent of the logs at present, sending 8 percent to the Costa and using 12 percent in the Sierra. By the year 2000, the Sierra is projected to supply 45 percent of the logs to the sawmill industry vs. 20 percent now, as the result of continuing plantation in the Sierra and depletion of economically accessible natural forest.

3. Wood-Based Industries

Ecuador has an extensive forest products industry. The primary products are poles and posts, veneer and saw logs, chip logs for particle board, firewood and charcoal. Secondary products include moldings, flooring, furniture, doors, and other small artisan products. The number of plants can be broken down roughly as follows, excluding artisanal operations:

<u>Primary</u>		<u>Secondary</u>	
Pole treating plants	2	Further processors (flooring, molding)	37
Sawmills (including planers)	446	Balsa processors	18
Veneer mills	4	Furniture plants	90
Plywood mills	6		
Particleboard plants	3		

In addition to these plants, there are some 4,500 small shops classified as wood-based small industries. The latter figure may be an underestimate. There is no reliable estimate of the number of small, movable sawmills, much less the number of chainsaw operators. A recent study of small ("mountain")

sawmills found 664 operating in Pichincha Province alone, implying a national total several times the official level.

The wood-based industries accounted for 2 percent of the GNP in 1983 (half agricultural and half industrial) and 4 percent of the industrial production. Furniture ranked as the foremost subsector in 1980, accounting for 52 percent of the total value. The industry employs 25,000 people, 15,000 in the furniture industry alone, about 8 percent of the nation's industrial workers. Similar results were obtained in surveys of small- and medium-scale industries (SMSI) in Ecuador, which found that wood-based industries accounted for around 3 percent of SMSI production, 4 percent of SMSI value-added, 7 percent of SMSI employment, and 8 percent of SMSI establishments. Specific figures are not available for wood-based artisanal firms (not included in small industry in the Ecuadorian classification system), but the overall picture is believed to be similar. It is estimated that total employment in the wood sector, including logging operations, is around 50,000, 2 percent of the economically active population.

These numbers are surprisingly low for a country with Ecuador's extensive forest resources. Surveys of wood-based industries elsewhere have found that they account for a sizeable portion of small-scale industrial (SSI) activity, particularly in the rural areas. Unpublished data provided to the evaluation team by Michigan State University researchers indicate that wood-based industries account for 8 percent of SSI firms (and 5 percent of SSI employment) in Bangladesh, 12 percent of SSI firms (14 percent of employment) in Zambia, and 14 percent of firms (15 percent employment) in Jamaica. These figures do not take into consideration the large number of firms that depend on products produced by wood-based

industries, including shoe-making, fruit-packing, and so on. In most countries, wood-based industries fall into the top four categories for small enterprise activity (together with food processing, cloth and clothing, and metal products).

a. Poles and Posts

In recent years, a formal pole business has developed with the installation of treating plants. Almost all poles are of pine and eucalypt and are bought by the electric power and telephone companies. A smaller number are used on farms, but the majority of farm timber is harvested informally by the farmer himself.

b. Sawmills

The crudest form of sawing lumber is carried out by chainsaw, accounting for at least 40 percent of all logs harvested. Cants and boards are cut from the log where the tree has been felled and bucked. These are normally 8.2 ft. long (2.5 m) and are usually hauled out of the woods by mules and horses. The chainsaw "sawyers" have come into existence because of the lack of alternative rural employment and the low volume per hectare removed, which in most cases would not justify using a skidder or tractor, much less building a road, even if the capacity existed to do so. It is estimated that over 30 percent of the lumber production is cut by chainsaw, with a waste factor said to be 75-80 percent.

The remaining 70 percent of the lumber is produced by sawmill, both fixed and movable. Almost all of these sawmills are circular mills with inserted teeth powered by small gasoline or diesel engines, many ex-automobile engines. Some

of the movable mills are very portable, working in the forest itself and changing locations every week. Other mills are located along roads and highways throughout the country. There are few band or gang mills in the country, and the only large-scale integrated sawmill is that of Artepractico in Cuenca (see Map 2). Waste in the sawmills is estimated at 35-40 percent, but some of this is sold for firewood, rough fencing, and other uses.

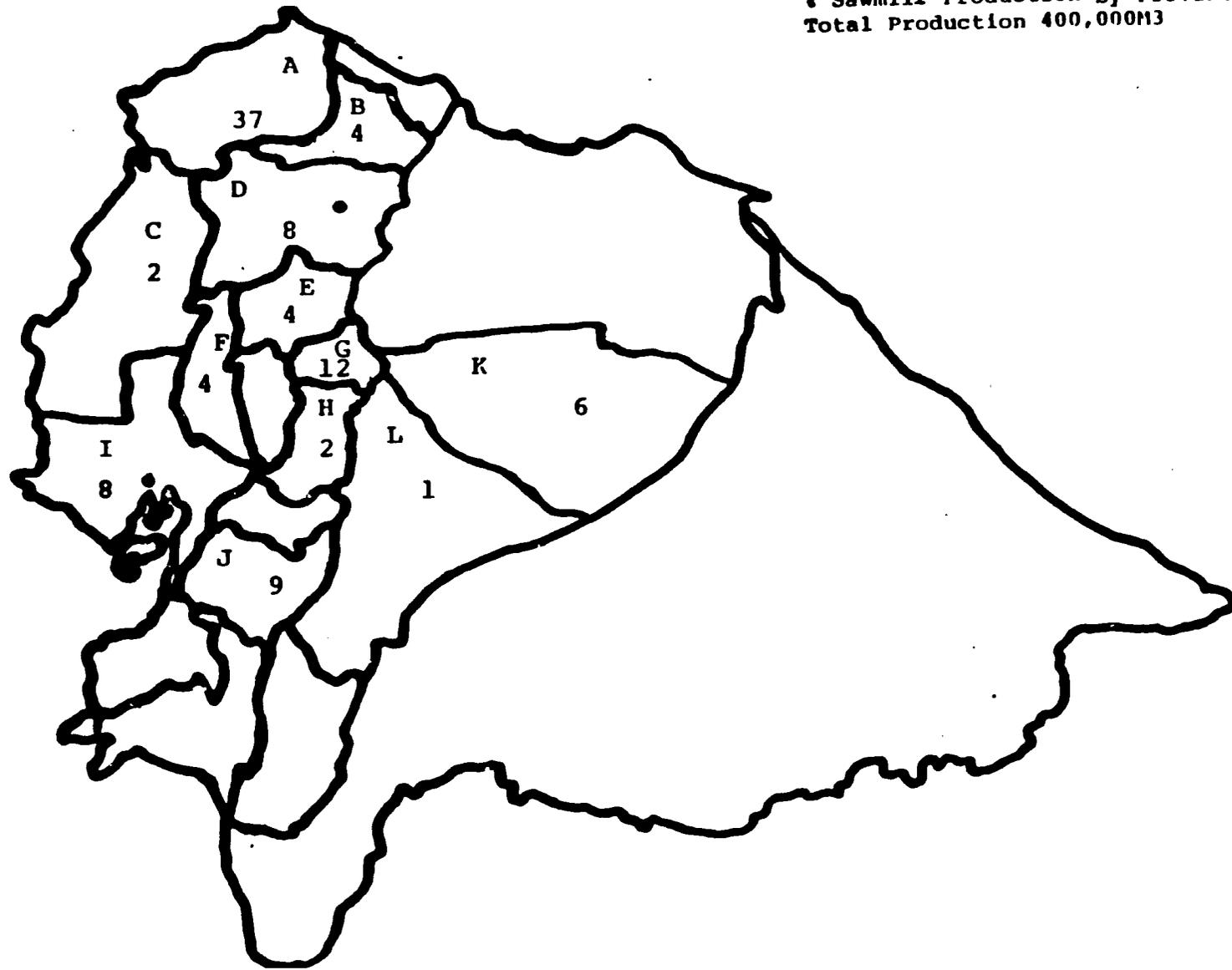
c. Processed Lumber

Much of the lumber moves from small sawmills in the forest by mule and horse or tractor to roadside, where it is transported by truck to the market. It is poorly sawn, rough, and green. Some goes into the construction industry in this form. Some is taken directly to furniture, flooring, molding, drying, and treating plants or lumberyards, where it is resold or processed into various forms of treated, dressed, and dried lumber and other products. Most is air dried, although there are an increasing number of drykilns. It is estimated that the final yield from the round wood is less than 30 percent, as the poor quality of the rough lumber leads to high losses at each further stage in the process.

d. Veneer

One small plywood plant in Puyo has converted to making market veneer for sale to other plywood mills because of financial and technical problems. Several plywood mills have slicers to make decorative veneer (ENDESA, Chapas y Madera, CEMAC) for their high quality plywood or for export as veneer.

MAP 2. ECUADOR
Sawmill Production by Province 1982-83
Total Production 400,000M3



- A. Esmeraldas
- B. Imbabura
- C. Mariabi
- D. Quito/Pichincha
- E. Cotopaxi
- F. Los Rios
- G. Tungurahua
- H. Chimborazo
- I. Guayaquil/Guayas
- J. Cuenca/Azuay
- K. Paztaza
- L. Morona/Santiago

e. Plywood

There are five operating plywood mills in the country, three in the Costa and two in Quito. All of their production is from tropical indigenous hardwood. The larger companies are actively engaged in forest exploitation to provide veneer logs for their mills, with investments in mechanized logging equipment such as skidders, forwarders, and road-building equipment. The smaller mills buy their logs from contract loggers. Only the largest firms are engaged in reforestation, and this is currently on a very limited scale (fewer than 3,000 ha.).

f. Particleboard

There are three particleboard plants in Ecuador, all located in the Sierra. One, ACOSA, has recently added a waferboard line (the first in Latin America). Pine and eucalypt are used for particleboard (the waferboard uses only pine).

(See Tables 1 and 2.)

4. Private Institutions Supporting
Development of the Wood Sector

There are four major private institutions supporting the development of the wood sector, in addition to the forestry parastatal EMDEFOR, technically a noted public-private enterprise, which supports private planting in the central Sierra.

Two of these institutions -- AIMA and the Corporacion Forestal -- specialize in the wood sector, while the other two -- INSOTEC and FENAPI -- are directed to small enterprises in

Table 1. Species used in Primary Forest Products

Poles (posts):	pine, eucalyptus
Lumber:	pine, eucalyptus, tropical hardwoods
Veneer plywood:	tropical hardwoods
Particleboard:	pine and eucalyptus
Waferboard:	pine

List of More Important Ecuadorian Tropical Hardwoods

<u>Common Name</u>	<u>Botanical Name</u>
<u>Heavy Hardwoods</u>	
Colorado	Pouteria spp.
Canelo	Nectandra spp.
Chanul	Humirastrum procerum
Mascarey	Hieronyma chocucensis
Tangare	Carapa guianensis
<u>Medium Hardwoods</u>	
Fernan Sanchez	Triplaris guayaquilensis
Jigua	Nectandra pisi
Laurel	Cordia alliodora
Seique	Cedrelinga catenaeformis
Cuangare	Dialyanthera sp.
Sande	Brosiumem utile
<u>Light Hardwoods</u>	
Cedro	Cedrela rosei
Higueron	Ficus sp.
Ceibo	Ceiba pentandra
Specific gravity (O.D. weight, green volume)	
Heavy hardwoods: 0.52 or more	
Medium hardwoods: 0.52-0.40	
Light hardwoods: under 0.40	

Table 2. Estimated Production of Primary Forest Products in 1986 and Their Roundwood Consumption^a
(000 m³ -- excludes informal sector)

	Production	Export	Roundwood consumed
Poles, posts, and other roundwood	90	0	90
Lumber			
Chain-sawed	195	0	780
Sawmills	478	31 ^b	1,140
Veneer and plywood	41	25	90
Particleboard	50	4	50
Miscellaneous (fuel-wood, charcoal, sold in the formal sector)	<u>150</u>	<u>-</u>	<u>150</u>
Total	1,004	60	2,300

a. La Industria del Aserrio en el Ecuador: Realidad y Perspectivas, Ing. Enrique Laso, 1987.

b. Balsa only.

all sectors, but have recently increased their activities in the wood sector. Other institutions, such as SECAP (a national training program) and local universities provide assistance to the sector as well.

a. AIMA (Asociacion de Industriales Madereros del Ecuador)

AIMA is the strongest organization in the wood sector; it is the driving force gathering the major wood industries together. It was founded 11 years ago and has 51 members, including all of the largest wood products producers and the major furniture manufacturers. Sixty-six percent of the membership is classified as "small industries" (based on their capitalization). AIMA members directly employ 4,000 people, 80 percent of whom are in production, 10 percent administrative, 5 percent management, and 5 percent sales. Over 90 percent of the sales of member firms are domestic. Half of the members have sales of up to US\$290,000 and one-fourth have sales between US\$290,000 and US\$580,000.

The objectives of AIMA are:

1. To promote forestry and the wood resource
2. To promote exports of wood products
3. To establish and conduct annual wood fairs to promote sales of wood products
4. To serve as an information center about the industry

b. INSOTEC (Instituto de Estudios Socio-Economicos y Tecnologicos)

INSOTEC was founded in 1979 as a private Ecuadorian foundation for the promotion of small enterprise. INSOTEC programs include a Center for Educational Research, which provides training to entrepreneurs and business associations serving them, and a Center for Small Enterprise Development, which conducts research and provides technical assistance, primarily in cooperation with donor programs. Their long-term objectives are to promote and stimulate socioeconomic investigations, and to train research, supervisory, and management personnel of companies. Key subjects being addressed are: increasing productivity, improving technology, laboratory analysis, quality control, and others.

c. FENAPI (The National Federation of Small Industries)

All firms classified by the Ministry of Industry as small enterprises (fixed capital, excluding real estate, of 25 million sucres or less) are organized into provincial chambers of small industry, which in turn are members of FENAPI. FENAPI and its member chambers have been a primary area of emphasis for INSOTEC. National Sectorial Associations have recently been formed within FENAPI for each of the four sectors receiving INSOTEC assistance.

d. Corporacion Forestal Juan Durini

The Corporacion Forestal was established nine years ago by the Durini plywood group as a non-profit company to manage plantations and conduct research on reforestation. The

corporation currently has 2,900 hectares of pachaco, laurel, and other plywood species in the coastal region.

e. APIMA (The Asociacion de Pequenos Industriales de la Madera)

Working in collaboration with INSOTEC, FENAPI has recently organized four national sectoral councils of small industries. APIMA, which focuses on the wood sector, is one of these. As the organizations have only been established in the past few months, it is too early to assess their potential contribution to the sector.

APIMA aims to:

1. Emphasize the importance of small wood industry
2. Analyze and identify the factors which constrain the national development of small industries and recommend ways in which these problems can be overcome
3. Establish criteria to formulate and implement strategies, programs, and methods to promote small industry on a sectoral and regional level through development assistance

5. Donor Assisted Programs in the Wood Sector

a. AID

AID's forestry project provides US\$6.5 million in loan funds and a US\$1.6 million grant to support agroforestry and other forest programs in the Ministry of Agriculture. Started in 1982, the project has been extended to run through 1990. The program is currently being redesigned to shift the focus to encouraging small land owners in the cacao area (the

Oriente) to plant windbreaks and reforest cut-over areas and to explore agroforestry models in the Sierra and Costa regions. As redesigned, the project will have three basic components: institutional development to strengthen DINAF, the National Forestry Research System, and the National Forest Protection System; agroforestry demonstrations in Ecuador's three main ecological regions; and natural area delimitation and management (patrimonio forestal and parks).

AID's Private Sector Office also has a three-year US\$1.4 million small enterprise project under which INSOTEC will direct assistance to small enterprise, including small wood industries, in cooperation with the Chambers of Small Industries.

Wood industries have been a minor focus of AID's non-traditional export project, which is being implemented through FEDEXPOR, a private association of exporting firms. AIMA received a grant, which has been used for a variety of technical assistance and promotional activities.

AID's large housing program focuses on strengthening Ecuadorian financial institutions in the housing sector; design and construction materials have not been addressed directly within this program.

b. GTZ (Deutschen Gesellschaft fur Technische Zusammenarbeit)

GTZ's program consists of a five-year area development project with agrosilvicultural and industrial programs for the Lumbaqui area in Napo Province begun in 1983. The forestry component is coordinated with the sawmill improvement and training program in MAG. A demonstration and training sawmill

is being built in Lumbaqui, which will produce an estimated 3,000 m³ of lumber annually. Another is planned for Santo Domingo. Both mills will use the horizontal bandmill technology, and other improved equipment.

c. BID (Inter-American Development Bank)

The BID is currently finalizing plans for a US\$12 million reforestation program in cooperation with EMDEFOR in the Sierra. BID also has a small program to promote non-traditional exports, including wood products.

d. Other Donors

Three other donors have small programs in the wood sector:

- . Japan has provided funding of 100 million sucres for a preinvestment study for industrialization and commercialization of tropical forests in Napo Province; the study began in April 1985, but unanticipated problems have put this activity on hold.
- . Belgium has established 1,000 ha. of pine as part of a planned 4,000 ha. reforestation project in Palmira, Chimborazo, funded at BF 100 million, which started in January 1983.
- . The UNDP has funded a three-year program to restructure the furniture industry to realize the potential for export, implemented by CCI (the International Commerce Center).

Several donors are cooperating in an integrated rural development project in Loja which will include forestry activities, funded at US\$18.9 million. Forty percent of the

funds are from BID, 30 percent from FIDA, 10 percent from other donor sources, and 20 percent local counterpart.

B. Key Problems and Opportunities in the Ecuadorian Wood Sector: The INFORDE Response and Recommendations for the Future

As the foregoing discussion demonstrates, the Ecuadorian wood sector offers excellent prospects for future growth, but only if the serious problems plaguing the sector can be overcome. Each of these problems also creates opportunities for action by host country and donor institutions aimed at removing barriers to faster, more equitable, and more sustainable growth in the sector. This section reviews the INFORDE program with respect to ten of the most important problem areas facing the wood sector:

1. The decreasing availability of the wood resource, including the increasingly remote location of natural tropical stands, and the difficulties encountered in attempting to expand the supply of wood through plantations
2. The high production costs and low efficiency of the small sawmills and chainsaw operations, including the negative impact on downstream markets for construction material and furniture, as well as the waste and poor allocation of the wood resource and the impact on the firms themselves
3. The high costs of marketing primary wood products, entailed in the high and rising distances that wood must be transported to market, as well as the fragmentation and disorganization of the transport and wholesale/retail lumberyard operations
4. The limited access to the international market for plywood, resulting from the closing of the Andean markets, as well as the industry's limited success in penetrating other international markets, which is closely linked to such

issues as capacity utilization, log supply, and quality control

5. The weak domestic demand for wood for construction, produced by the local preference for other materials, but also reflecting limited information on wood construction technology, the technical advantages of wood, and other factors
6. The absence of a market for high-quality construction materials, due to the limited demand for wood and the failure of the wood industry to produce graded, standard-dimension material, and to establish a market for structural plywood
7. The underdevelopment of the export market for furniture, reflecting the need for quality improvements, style changes, marketing information, and higher volumes to enable the domestic furniture industry to penetrate international markets
8. The inadequacy of technical information and research support for the wood sector, including poor information on plantation techniques and financial return; limited technical support to sawmilling, wood processing, and furniture production; the lack of established systems for grades and standards and quality control; and poor information on alternative resource use strategies, such as wildlands tourism
9. The need to strengthen private sector support institutions to enable them to increase their services to their members, improve the generation and distribution of technical information, strengthen contacts with market outlets, and represent the sector more effectively in the national policy arena, including closer cooperation among private institutions and between them and the public sector
10. The need to raise income and employment in rural wood-based industries, in order to reverse the trend toward increasing dualism in the sector, to prevent the marginalization of small enterprises, particularly in the rural areas, and to ensure that firms of all sizes

benefit from the development of the domestic and international markets for Ecuadorian wood products

To put these problems into context, it may be useful to review the very large differences in value that characterize the different segments of the wood market. As the table below (Table 3) indicates, the value of a cubic meter of wood varies all the way from 200 sucres for standing timber of low quality to 100,000 sucres or more for furniture (since furniture is rarely measured by the cubic meter, the latter estimate is derived from the ratio between product value and wood consumption in an informal sample of Ecuadorian furniture factories).

Table 3. Comparative Values of Wood in Alternative Uses

Use	Approximate value (sucres/cubic meter)
Standing timber	200-1,200
Fuelwood	500
Logs sold to sawmills	3,000-3,500
Logs sold to plywood mills	4,000-5,000
Rough-cut boards (tablones)	10,000-15,000
Tongue-and-groove siding (duelas)	30,000
Plywood (hardwood)	35,000-40,000
Furniture	100,000

Source: INFORDE and evaluation team estimates.

These wide differentials underlie INFORDE's strategy of seeking to promote sound resource management practices by increasing the value of wood products. Even duelas, of uncertain quality and dimension, are worth two to three times the value of rough-cut lumber. The value of the final product

clearly translates to an increased value for the wood input, as shown by the 40 percent differential between the prices paid for logs by sawmills and plywood plants. These differentials also highlight the potential attractiveness of assisting small farmers to tie into the plywood subsector, rather than relying on low-value markets such as that for fuelwood to raise small farmer incomes.

1. Decreasing Availability
of Wood Resource

a. The Problem

For many years, easily accessible timber has been exploited in the Pacific Coast forests. The loggers began at the coast and worked their way up the rivers and creeks, cutting the closest timber and floating the logs down to the coastal mills. At the same time, much of the better forest land was converted to agriculture (bananas, followed by coffee, cacao, pasture, and, lately, oil palm). Some of the conversion was done on an agri-business scale, but most was small farming. Added to this was the country's colonization program, intertwined with land speculation, which converted even more forest to agriculture. With the construction of plywood plants in the 1960s, even more pressure was put on the coastal forests for specific species and large diameter logs. The plywood companies today must take direct action to procure logs and many are doing the logging themselves. They have pushed up the coastal rivers to the beginning of the Sierra, seeking virgin timber. Some second growth from previous cut-over areas has been tapped to supply some of the demand and a broadening of acceptable species has also occurred. Exploitation costs of the coastal forests will continue to rise disproportionately, as distance increases and logging

moves into higher elevations. At the same time, sawmills are experiencing a decline in log size, particularly for valuable species such as laurel, increasing their waste and costs. Unable to follow the lead of the larger firms by establishing their own plantings, the small sawmills are becoming increasingly marginalized.

The beginning of plantations of commercial lumber and plywood species has taken place in the past 20-30 years. Today, small sawmills are cutting plantation laurel 18-20 years old, with logs as small as 8 inches in diameter. One plywood company is investing US\$200/ha./yr. on some 5,000 ha. of peeling species such as pachaco, laurel, and terminalia.

In the Sierra, it is a different matter. Half of the population, and thus the domestic market for forest products (excluding paper, which is wholly imported), is in the Sierra, where the only wood source is pine and eucalypt plantations. MAG estimates that 30 percent of the nation's lumber now comes from plantations, including those in the Coast. MAG estimates that by the year 2000, 45 percent of the country's lumber will come from plantations.

The remaining natural forest resource is the Oriente. An estimated 40 percent of the wood is now coming from this area. A large part of the lumber is cut by chainsaw, with waste factors as high as 75 percent, as discussed above.

Logging is rapidly pushing east into the Amazon forests. The chainsaw operators are often the first to arrive, and they cream the highest-value species. Later, when circular sawmillers arrive, they must work with cut-over forests and less desirable species. Meanwhile, the chainsaw operators have moved further east and receive lower prices for their cants

and boards because of the increased transportation costs of their customers, the private transporters.

Private and public reforestation activities are not well-documented. Official figures indicate total planting of 100,000 ha., but most observers believe the true figure is not over 70,000 ha. and may be much lower. Annual plantings are officially put at 10,000 ha., but here again, knowledgeable sources place the figures at 5,000-7,000 ha. at most.

The Ministry of Agriculture has the primary responsibility for promoting reforestation, although a large number of other institutions are also involved, particularly EMDEFOR, a mixed enterprise. The Forest Directorate (DINAF) operates nurseries throughout the country, selling seedling below cost, but availability of seedlings is, nonetheless, a problem. The reforestation activities suffer from confusion regarding the priority of several competing aims, each of which would imply a different strategy (species, location/management). The emphasis has been placed on watershed protection and soil conservation, with a secondary focus on raising farmer incomes. The future market for commercial timber does not appear to have been a major factor in reforestation planning.

The area in private sector plantations is estimated to total fewer than 10,000 ha., although the private sector is currently responsible for about 40 percent of annual plantings. The remainder is government-sponsored plantation, much of which is on small farms or communal land in the Sierra. Private nurseries are limited to those established by plywood companies to supply their own plantations.

Both public and private plantation programs suffer from lack of specific technical information, not only on the

appropriate species; but on spacing, management, and growth rates.

The government initiated a program, Plan Bosque, to promote private sector reforestation in the mid-1980s, with funding provided by petroleum export earnings. The program, which provided funding at highly subsidized rates, was greeted enthusiastically by the private sector. The sharp drop-off in oil export revenues, the effects of inflation, and complex bureaucratic procedures in DINAF and the National Development Bank (BNF) have brought the program to a virtual standstill.

While Plan Bosque represents a major move forward in the government's recognition of the potential value of private sector forest plantation, the program suffers from a number of problems. The reliance on subsidized credit and the lack of prioritization (any idle land is eligible, whether or not it is in an important watershed area or is a promising site for commercial planting) jointly reduce the probability that the program will encourage economically sound tree planting activities. In addition, the lack of funding for plantation management may lead to production of a large volume of unmarketable or very low-value trees in the future.

Plan Bosque has not been integrated effectively with the most important forest exploitation activity going on in Ecuador: the logging off of the tropical forests in the Costa and Oriente. The development patterns in these two regions differ sharply. In the Oriente, the process is led by the colonos, who move to occupy land just beyond the end of the existing road network. They begin the process of logging off the land, using chainsaws themselves or selling the standing timber to chainsaw operators or mountain (movable) sawmills. After the commercial species have been logged off, the colonos

continue the process of clearing the land, which is a requirement for titling, using some of the trees but leaving most to rot. They then apply for title, a process of several years, and begin cultivating the areas cleared.

The colonos do not have a sustainable agricultural technology at their command. After a few years of growing crops, the land loses its fertility or becomes overgrown by uncontrollable grasses. The colonos sell their land, if anyone is willing to buy it, and move on deeper into the Amazon. In some cases, they pasture cattle on the land, but this use is no more sustainable than cropping. The grasses become increasingly unpalatable and low in nutrient content, making grazing unprofitable. It is an open question whether the colonos are essentially farmers or land speculators.

The process in the Costa is somewhat different. Here the logging companies associated with the plywood firms begin the process, building roads into the Western foothills of the Andes in agreement with the government's colonization authority. They remove the valuable species and move on. The colonos follow, clearing the land and applying for title. Lacking a sustainable cropping technology, the Costa colonos may move on eventually as well, or they may plant part of their land to coffee, bananas, or another crop they hope will be sustainable. Often they sell their land to other large firms, which assemble thousands of hectares into large holdings that may be planted to oilpalm or another commercial crop. Some of the land is now being purchased by the plywood firms themselves, to be planted in fast-growing hardwood species. The increasing cost of exploiting ever-more-distant tropical forests makes the handwriting on the wall clear: 20

years from now, whoever owns hardwood plantations may well have a monopoly on the wood supply.

This system has replaced the failed timber concession system, which broke down when it became apparent that the timber companies could not control access to land in their concessions and that colonos and small loggers were overrunning the concessions. It is not clear whether the large lumber companies were hurt financially by this activity, as they were often able to buy logs from lumber contractors at a cost not necessarily higher than their own costs of operation.

There is some evidence that the colonos in the Costa are beginning to see tropical hardwoods as a crop they can plant themselves on part of their land (the typical colono holding size of 50 hectares is far more than a single family can cultivate with annual or tree crops). Like the plantations of the plywood firms, this development is only in its earliest stages and is not at all widespread.

b. The INFORDE and AID Response

INFORDE has recognized the resource depletion problem and has approached it in three ways, all of which support INFORDE's overall strategy of promoting efficient use of the resource and investment in expanded forest production by raising the value of the final product. The first strategy has been to increase the forest resource itself through the promotion of investment in plantations. The second approach has been to reduce the wastage in the present wood flow through better sawing and better drying of the lumber. The third approach has been to promote the use of presently

underutilized species in construction. The latter two will be discussed under sections 2 and 5 below.

Data has been gathered under the cooperative program with NCSU and a final report on the economic returns to alternative plantation profiles has just been printed. These profiles show the potential investor and land owner the financial return that can be made by putting in plantations of five major species: pine and eucalypt in the Sierra, and laurel, pachaco, and teak in the tropical areas.

AID's project with DINAF is directed to encouraging and supporting agroforestry, forest protection, and reforestation in a number of ways. Although project support to public sector planting is being scaled back, the project will continue to emphasize agroforestry activities by small farmers in the Sierra, Costa, and Oriente, as well as a number of research activities, institution-building, and protection of forests. A study is ongoing on the relationship of growth and survival in existing plantations in the Sierra to the site, which is expected to guide future plantations, particularly, protective plantings at higher elevations. The results of this work will provide a plantation manual for future planting in the Sierra to try to match species to location. Additional trials are to be put in with AID-funded seed of various pine, eucalyptus, and other species. The seed will be planted primarily by private farmers.

c. Assessment of the Response

The response of INFORDE and AID has been positive on this issue, especially on the existing site and species analysis. If the site evaluation study is extended to the Costa as planned, it will provide a complete source of information on

site and species selection for Ecuador. The investment analysis of NCSU is a step in the right direction, but there remains a need to find the right vehicle to sell these ideas to the land owners and investors.

At the same time, it should be emphasized that INFORDE and the Mission are pursuing essentially separate strategies in this area. USAID/Quito's program is ultimately aimed at private farmers, but the implementing responsibilities remain with the public sector, while INFORDE has worked exclusively with private sector interests. While both sides have made positive and useful contributions, neither has succeeded in bringing public and private interests into more effective collaboration.

This will not be an easy task. Initial efforts by INFORDE to interest the Corporacion Forestal in supporting colono plantations have not been successful, although relations are cordial and some progress in this direction is apparently being made. Separate efforts by AID to involve the Corporacion in a variety of reforestation activities have been equally unsuccessful, and AID has apparently dropped the effort. At the present time, the potential for cooperation is limited, as AID's revised forestry project does not emphasize plantations, stressing instead agroforestry and protection of existing forests.

d. Opportunities for the Future

In order for the work of NCSU plantations profiles to be effective, the findings must be effectively communicated to private investors and farmers. If the extension service in DINAF cannot do the job, another vehicle should be sought, such as EMDEFOR or Corporacion Forestal Juan Manuel Durini (a

private reforestation company). This sales program can be greatly helped by the AID site manuals now being written. Closer follow-up on seed being purchased under the AID Forestry Project needs to be organized so as not to lose the benefit of these trials, and serious consideration should be given to renewing efforts to interest a private sector group, such as Corporacion Forestal, in implementing some of these trials. The Corporacion's ongoing experiment with plantation management is convincing its technical leadership that tropical plantation management is more expensive and more labor-intensive than anticipated. This realization, together with the Corporacion's first tentative steps to assist colonos interested in plantations, creates an opportunity to approach the Corporacion again. The Corporacion should not be subjected to the double standard that often affects AID evaluation of private sector institutions: if AID had withdrawn from cooperation with DINAF because the initial contacts were not wholly successful, there would be no forestry program today.

Distribution of the excellent (and complementary) information being generated by AID and INFORDE might present an opportunity for renewing contacts. Dissemination should, in any case, be a major priority for INFORDE in the next few months, in order to realize the benefits of previous work.

A larger issue surrounding the divergence between USAID's and INFORDE's forest sector programs is the choice of a development strategy for the tropical areas. The underlying rationale of INFORDE's strategy relies on encouraging small farmers and colonos in these areas to plant fast-growing commercial hardwoods on part of their land for sale to industrial users (although admittedly INFORDE has not carried this strategy very far forward into action). USAID's strategy, by

contrast, relies on developing agroforestry or silvo-pastoral systems in which trees are combined with pasture, crop, and other land uses. INFORDE's strategy is most applicable to the Costa, where the large plywood firms are an integral part of the transformation of the natural forest into agricultural land, but could also be applied to the non-tropical Sierra. USAID hopes that its strategy will be applicable in both the Oriente and the Costa, as well as the Sierra.

Each of these strategies has unanswered questions. The unanswered question regarding the INFORDE strategy is whether the colonos moving into the areas opened up by the plywood companies will find it profitable and attractive to grow hardwoods for sale to these companies in the future, and whether the plywood firms can be made to realize that it is to their advantage to encourage and assist the colonos to do so. To date, they have shown very little interest in moving in this direction, nor does it appear that the government has attempted to encourage them to do so. Both USAID and INFORDE have made efforts in this direction, with limited results.

The unanswered question regarding the USAID strategy is whether sustainable and profitable agroforestry and silvo-pastoral technologies can be developed for the Costa and the Oriente. Recent technical progress (including development of a tropical forage clover by CIAT) are promising, but the record of agriculture in Latin American lowland tropical areas with poor soils is dominated by failure.

An equally important question, also unanswered, is whether the Ecuadorian Government has the technical capacity to assist colonos in applying these technologies on a sufficiently large scale to make a difference. If it proves that

plantation culture of tropical hardwoods for the plywood mills is profitable, and can be combined with the systems being tried by USAID, it would be appropriate for the GOE to direct its forest extension resources toward establishing these systems wherever possible. This potential is not unlimited: assuming that all the existing plywood mills returned to full capacity and therefore that log use doubled, the mills would require 180,000 cubic meters annually, which, at a growth rate of 15 cubic meters of commercial wood, per hectare, could be produced on 12,000 fully stocked ha. of plantation.

2. High Production Costs and Low Efficiency in the Sawmills

a. The Problem

The 400-odd fixed sawmills and the thousand or more "mountain" sawmills operating in the country today are sawing small logs very poorly and with a recovery estimated by MAG of 19-36 percent. Many of the mills are in financial difficulties due to competition with the chainsaw operators and the inability to produce or sell a high quality product.

Another constraint facing the prospective sawmiller willing to invest in new technology is the fact that the banks will not lend money to a sawmill, the result of a Central Bank ruling regarding a particular loan program that has been interpreted as a blanket prohibition by the banks. Until this restriction is lifted, there appears to be little hope of convincing the circular sawmillers to change. The lack of access to formal credit is symptomatic of a larger problem facing the sawmills: falling profits due to increasing competition with the chainsaw operators. The chainsaw operators produce a low-quality product for a low price, with a

high degree of waste. The circular saws could in theory produce a higher quality product, but the market for such a product is extremely underdeveloped. A few sawmillers have been able to identify a niche for themselves by producing for particular customers willing to pay a higher price, but these are the exception.

Observers differ sharply on the appropriate direction for technical change in the small sawmills. GTZ, the German assistance program, is proceeding to install and operate two horizontal band mills in the near future (CORMADERA's will be vertical). The province of Pastaza has a program to aid the provincial wood industry by setting up a demonstration and training center for the wood products industry. Again, a horizontal band mill will be put in place with other processing equipment. But several observers, including some mill owners, believe the horizontal saw is too slow and too inflexible for local conditions, and that the savings from reduced wood loss are not sufficient, given the drawbacks, to justify the cost of the equipment. Close cooperation with GTZ and the group in Pastaza is recommended to learn from the results of their efforts and to determine whether the horizontal bandsaw has distinct advantages or disadvantages over the vertical band mill under Ecuadorian conditions.

b. The INFORDE and AID Response

AID has not addressed this problem directly, but INFORDE has attempted to do so through the CORMADERA proposal (see section 8 below) and several smaller studies. CORMADERA's proposed demonstration sawmill will take the risk of introducing higher quality lumber, to attempt to develop a market for "4-square" lumber. Much effort will be required in the

planning and operating of the sawmill phase of the CORMADERA project, for which donor funds are currently being sought.

The sawmill improvement program has just gotten underway. The thrust will be on a demonstration band sawmill as part of CORMADERA, the idea being to shift the sawmill industry from 3/8"-kerf circular saws to 1/8"- or 3/16"-kerf band saws as a second level priority.

Other INFORDE activities include an effort to get small producers to form a cooperative dry kiln operation, so far unsuccessful, as described in Appendix B, a well-attended dry kiln seminar in July 1986, and studies of the market environment for sawmills, as well as support to an NCSU graduate thesis on sawmills management at the nation's only large-scale integrated mill.

c. Assessment of Response

INFORDE's strategy to build a market for high-quality lumber from the supply side is an attempt to break the vicious circle of low-quality lumber leading to low demand for wood products and continued poor quality. If the CORMADERA sawmill were an isolated exercise, there would be little reason to expect it to be more successful than other "demonstration" projects that have proven costly white elephants. As an element in a program with broad support from the wood industries, however, the CORMADERA sawmill may be successful in influencing the market for lumber and in demonstrating improved technologies.

Much more will need to be done, however. The proposed sawmill and lumber drying improvement program and a program to

develop lesser used species have yet to be put into practice and must wait until CORMADERA is a reality. Changing the circular sawmills to band mills faces severe obstacles in that the investment in a band mill is about eight times more than an Ecuadorian circular mill, and the returns appear to be unattractive, despite the reduction in losses.

INFORDE has not addressed the problem of securing bank loans for financing the sawmills, although this is currently a major problem for the smaller mills. While it is true that access to credit would not help many of the mills, which are simply unprofitable, the credit crunch is creating a working capital shortage even for the better-run and potentially profitable mills, which could easily go under if this situation is not remedied.

d. Opportunities for the Future

Improvement of sawmill technology is suffering from disagreement among the donors regarding the appropriate technical package for the mills. GTZ personnel appear ready for a serious look at whether the horizontal bandmill is the right answer, and trials underway with GTZ assistance in Pastaza, Napo, and Santo Domingo should provide the information to settle the question once and for all of whether this technology is an improvement over the traditional circular saw. Unfortunately, no one is trying alternative technologies (vertical bandmills, edgers, and resawing operations) in a small sawmill setting, so the information is not being generated to answer the equally important question of which technology is best for these small operators. CORMADERA will eventually provide some of this information, but INFORDE should consider working with INSOTEC to expand the number of

technologies being tried through the USAID/INSOTEC small enterprise program in Santo Domingo.

As a start, a deeper, practical study now needs to be made as to whether or not the small sawmills can economically benefit from purchasing bandsaws at 8-10 times the cost of a circular sawmill. Estimates of what the market might pay for "4-square" lumber range from 20 to 40 percent more. Will this price increase, plus an estimated decrease in kerf waste of at least 15 percent, pay for the increased cost of a band mill? Careful design of such a study should be made, so as to reflect the real market situation.

3. The High Cost of Marketing for Wood Products

a. The Problem

With few exceptions, sawn lumber produced by mountain sawmills, fixed sawmills, and chainsaw operators passes through several hands before it reaches the final purchaser, whether the latter is a furniture producer, a construction contractor, or a private individual. Only the largest plywood firms are vertically integrated backward to the logging operation and forward into marketing, and even they may rely on contractors to supply part of the roundwood for their operation. Some of the largest construction contractors and furniture firms deal directly with sawmills to fill part of their wood needs, but the smaller firms do not.

This situation impedes the development of the sector in two ways. First, the cost of lumber escalates rapidly as it passes from the producer to the transporter (who is generally a commercial intermediary as well as a transporter) to the

lumberyard or, in some cases, directly to the user. The costs of transportation are high, as a result of the poor condition of many rural roads and the need to transport lumber from increasingly remote locations. But the costs of intermediation are also high, as the transporter/intermediaries face high search costs at both ends of the operation. Production of lumber at any given site is limited in quantity, irregular, and unpredictable, raising the cost of assembling a load worth transporting. The market, particularly for hardwood, is similarly disorganized, forcing the transporter to go from potential purchaser to potential purchaser until a buyer is located, starting with the towns closest to the mills and then moving on if no purchaser is found. The marginal financial condition of many of the furniture firms and other potential customers makes this task doubly difficult, as purchases tend to be as irregular, limited in quantity, and unpredictable as the supply.

Second, the extreme disorganization and fragmentation of this process impedes the flow of market information to the producer. A few sawmills have been able to establish direct contact with one or more buyers, enabling them to differentiate their products somewhat by quality and gain a higher price, but most sawmills and virtually all chainsaw operators sell into a void. Their operation is too far removed from the marketplace to create an incentive for quality improvement. Even if they produce a higher quality product (more standardized dimensions, for example), the market is not organized to reward them with a higher price. Even if the retail lumberyard manager is interested in selling graded or standardized lumber at a higher price, the market is not organized to provide such a product. As a result, users who need a standardized product must resaw it themselves, raising their

costs and exerting downward pressure on the price of lumber and reducing demand.

b. The INFORDE and AID Response

Although INFORDE management recognizes this marketing problem, it has not been given priority. INFORDE's approach to the problem has been primarily from the perspective of the seller (particularly the small sawmills) and the purchaser (the construction or furniture firm), based on a long-term strategy of reducing intermediation by establishing direct contacts between the producer and the final customer. In this model, some sawmills would produce graded, standard-dimension, and possibly dried lumber for sale directly to customers willing to pay the price for higher quality. This strategy underlay the unsuccessful attempt to organize a cooperative for production of dried duelas (tongue-and-groove siding or panelling) in the rural sawmilling center of Puyo. It also underlies some elements of the CORMADERA proposal, which will include a demonstration sawmill selling improved products directly to the consumer as a means of strengthening the market for standardized lumber.

c. Assessment of Response

Neither INFORDE nor AID has to date formulated an adequate response to this problem. The intermediaries have been implicitly classified as part of the problem rather than as possible participants in and beneficiaries from the solution. The high cost of intermediation is attributed to unscrupulous practices rather than to the inherently high cost and high complexity of the process in a disorganized market. While this problem is widespread, it is based on assumptions rather than

actual measurement of costs and returns. When these costs have been measured elsewhere (e.g., for grain marketing in other countries), these assumptions have not been borne out. Virtually no information is available on the transport or lumberyard operations, but the large number of small operations suggests that these functions are highly competitive in Ecuador and, in consequence, that their prices are probably in line with their costs.

The transporters and lumberyards are a key element in the total system and deserve further study. If the production of graded lumber is ever to become accepted on a wide scale, small construction enterprises and small furniture firms must be able to purchase it at local lumberyards, as it is not practical for them to deal directly with the sawmills, much less the chainsaw operators. To the extent that lumber is dried or graded at present (and this is limited to air-drying during storage and rough sorting), it is the lumberyard and the final customers that perform these operations. To date, INFORDE has not addressed this situation, nor the opportunities for increased employment and income in the lumberyards themselves.

d. Opportunities for the Future

The inherent nature of the informal transport sector puts it virtually out of the reach of any organized effort that INFORDE might undertake, but such is not the case with the lumberyards. Several possible lines of attack can be considered for improving the lumberyard operation as part of INFORDE's overall effort to upgrade the lumber market.

First, INFORDE should initiate contact with lumberyards in the Quito area, as the basis for gaining a better understanding of their situation and identifying potential co-operators. This step would be desirable to improve understanding of the market, even if no further actions are possible. Second, INFORDE might work with progressive managers to introduce a basic grading system, even if only the basic three-grade (good, acceptable, reject) system used by larger lumber producers such as MAPRESA. Third, INFORDE might explore their interest in establishing a drying capacity. The long time that many of these firms appear to hold lumber would reduce the capital cost implied by such an investment. Several of the lumberyards reportedly plane some of the lumber they sell, and it may be possible to expand the scope of this operation to include a modest resaw operation.

Finally, INSOTEC should expand the scope of its investigations and training programs in the wood sector to include the lumberyards, with other assistance programs to be designed based on an assessment of their needs.

4. Limited Access to the International Market for High-Quality Plywood

a. The Problem

Over the past 20 years, Ecuadorian investors have established five plywood factories and three producing particle-board plants. All of the firms are large, heavily capital-intensive operations, particularly by Ecuadorian standards. They produce hardwood plywoods from tropical woods, which are used primarily in furniture and other interior uses (although they are also used for concrete forming and other structural applications in Ecuador, where no

other plywood is available). All of the producers are members of AIMA.

Ecuadorian plywood mills are currently operating well below their installed capacity, with the result that several of the mills are in financial difficulties. Underutilization of capacity results, in part, from problems of supply associated with the cessation of logging during the rainy season, cash flow problems in the firms themselves, and the increasing scarcity and cost of high-value logs. A second major explanatory factor behind the underutilization of capacity is the loss of access to the Andean market. Prior to 1983, Ecuadorian mills exported a significant proportion of their production (approximately 48 percent in 1982, for example). Colombia and Venezuela accounted for over 90 percent of this trade. This market was closed abruptly in 1983 by the erection of protectionist barriers in the two countries, with predictably grave impacts on the plywood industry.

The plywood firms, particularly the largest firms, have moved aggressively to replace the lost Andean market by moving into other international markets, particularly the United States market, where imports from the Far East have already captured a large share of the market for hardwood plywoods (used primarily in furniture and other interior uses). Quality problems currently prevent Ecuadorian plywood from penetrating the European market effectively.

b. The INFORDE and AID Response

INFORDE has helped the plywood firms to position themselves for greater exports in a number of ways. First, the firms have received assistance in strengthening their contacts

with potential U.S. customers. Through AIMA, firm managers have been put into contact with the International Hardwood Producers Association (IHPA), a U.S.-based trade association representing international as well as domestic interests. This contact has enabled the Ecuadorian producers to gain direct knowledge of their ultimate clients, whereas before they dealt primarily through brokers.

Second, INFORDE has moved to help the producers tackle their quality problems and achieve greater acceptance for their product outside the Andean market. INFORDE identified a U.S. firm specializing in quality control and certification of wood products, and arranged for representatives of the firm to provide consultancy services to Ecuadorian producers. Tentative arrangements have been made for a licensing arrangement whereby the U.S. firm's certification would appear on Ecuadorian products with quality control performed in-country. If CORMADERA goes forward, this function will be completed by CORMADERA staff, and will be a significant source of income for the organization. (The plywood firms currently pay U.S. consultants for quality certification on a shipment-by-shipment basis, a service that could be performed much more cheaply in-country.)

Finally, a relatively small firm in the Oriente, which sells hardwood veneer to the larger plywood manufacturers, received assistance in improving the quality of its product to reduce the percentage rejected by its clients. This assistance may make the difference between survival of this firm and its disappearance.

c. Assessment of the Response

INFORDE's involvement with the plywood industry is subject to two interpretations. On the one hand, the plywood industry merits AID's support as a source of non-traditional exports. Plywood is by far the largest export currently produced in the wood sector and the loss of the Andean market was a major blow to the industry. Plywood is an important input for local furniture makers, large and small, particularly those producing furniture for the lower and middle segments of the market. Greater capacity utilization is clearly consistent with reduced prices for these producers, most of whom are small enterprises. It is also consistent with increased use of plywood in construction, which would be a boon to the many small firms producing (or potentially producing) complementary wood products (studs, etc.). Some of the mills are an important market for hardwood logs produced by small logging contractors.

On the other hand, the plywood firms are universally large, capital-intensive operations, with multi-million-dollar investments in equipment and relatively few workers (the large chipboard/waferboard factory, for example, employs fewer than 20 people). Even by international standards, they cannot be classified as small enterprises and they would not usually be considered appropriate candidates for AID assistance, given the agency's mandate. At the same time, their current difficulties, the result of non-tariff barriers within the Andean Pact, have reverberated throughout the industry. As long as these plants are operating below capacity, it will be difficult to lower the cost of their product to furniture makers or to encourage new plants producing more plywood for low-cost and moderate-cost wood construction.

d. Opportunities for the Future

While it would not be appropriate or useful to exclude the plywood firms from participation in INFORDE activities, it is suggested that INFORDE should not give priority to further assisting these firms. The firms have sufficient resources of their own to follow up on the contacts that have been made, and INFORDE should give greater emphasis to helping firms at the lower end of the scale.

5. Weak Domestic Demand for Wood in the Construction Industry

a. The Problem

Wood is not used extensively in much of the construction in the country. Custom is hard to change, especially when the cost of using wood is thought to be very close to that of competing materials, if not actually higher. Limited and uncertain availability of wood in the sizes, quality, and quantity desired is universally agreed to be a major part of the problem, as is the lack of familiarity with improved wood construction techniques. On top of this, consumers fear fire, insect damage, and decay. The wood market is poorly organized and undertakes very limited promotional activities.

b. INFORDE and AID Response

INFORDE has recognized the problem and considered it a priority from the start. Initially, a major push was planned in this direction. A program was written for developing housing prototypes, quotes were obtained from U.S. firms, and outside funding was sought, but unsuccessfully. INFORDE had to cut the program back to a scale consistent with its own

funds. A manager was hired and a design was drawn up for a demonstration wood house which was shown at the Fifth Architectural Bienale. This house combined the demonstration of roof trusses using secondary wood species with non-traditional roof construction and has since been located in a prominent site in a public park. The cost limits placed on this exercise have greatly reduced its impact, as the house suffers severe technical problems that detract from its demonstration impact.

Surveys were also completed in Cuenca, Quito, and Guayaquil to determine the public's likes or preferences for wood (or partial use of wood) in construction of new houses or remodeling of old ones.

INFORDE has also worked with local architects to develop a proposed rural school wood design, but the government has thus far not taken up this initiative. DINACE, the Direccion Nacional de Construcciones Escolares, has prohibited the use of wood in school construction. The government housing authority also has restrictions on the use of wood. These constraints, plus the public's fears and preferences, have made it difficult for wood to increase its share of the construction materials market.

INFORDE plans to develop a computerized model for updating the cost of construction elements as a marketing tool to compare wood components used in construction with other materials.

c. Assessment of the Response

INFORDE has made the use of wood in construction a top priority and has taken some strong actions to sell the idea of

using wood, but more follow-up is needed. Given the fact that there are no major lumber producers selling in the marketplace, it is a difficult marketing problem. AIMA's membership includes few lumber producers, although the members do have a vested interest in the use of plywood in construction -- but plywood's interior usage already has its niche. Given the short time INFORDE has been working on the problem, their progress has produced some favorable impressions among architects and construction people, but the impact is, in concrete terms, fairly marginal. One avenue that has been overlooked is that of the Camara de la Construccion (Construction Contractors Association). Officials of the Association contacted by the evaluation team were unfamiliar with INFORDE's program, a strong indication of the need for more action on the demand side. It would behoove INFORDE to make a special effort to court the Association's attention and support, and to encourage AIMA to do so as well.

d. Opportunities for the Future

There are four areas open for attacking the construction market problem. The first is institutional: to assess the possibility of organizing the lumberyards, dealers, and sawmillers selling to the construction contractors, either within AIMA or as a new association. A lumber association official from the United States might be able to offer some suggestions on how to go about organizing a lumber association. APIMA, the newly-formed association of small wood industries could also be brought into this effort.

The second avenue is promotional. INFORDE, AIMA, and others in the wood sector should consider joint action to promote demand for their product by any or all of the standard means: advertising in the public media and in journals

catering to the construction trade, and so on. INFORDE's research has identified the main factors that this advertising should address: wood's attractiveness and its cost advantages, on the positive side, and wood's relative safety and durability, both negatives that need to be combatted.

A third area needing attention is the training of architects and building professionals in the use of wood. Representatives of the construction chamber indicated that professional training in these areas is weak, and that, while schools are again teaching wood-using techniques, the young architects who graduated in the past five to ten years have relatively little training in this area. Cooperative courses could perhaps be arranged with the construction chamber. INFORDE would be doing AIMA a major service by helping them to broaden their view of the wood industry's need for greater promotion in Ecuador.

Finally, AIMA and others in the sector should redouble their efforts to get DINACE and other public sector agencies that undertake major construction activities to join in the promotion of wood construction techniques. The public sector offers a large and relatively stable source of demand that could play a major role in getting the market out of its no demand-no supply trap. While DINANCE's main mission is building schools, not promoting local industry, the GOE should be lobbied to recognize the potential gains to both aims from greater use of wood in construction of small public buildings.

6. Absence of a Market for High Quality Wood Construction Materials

a. The Problem

With no grading rules and standards for lumber and construction plywood, the construction industry has not provided a market incentive for high-grade products. The problem of imposing standards on a fragmented distribution and purchasing system is immense. How to write the standards and rules for the various products is the least of the problems. How to implement them is the main issue.

The Construction Chamber is currently working with the Ecuadorian equivalent of the Bureau of Standards to devise standards for a wide range of construction materials, including wood. Their interest is indicative of the need to involve those demanding the product as well as those supplying it in any effort to build a market for high-quality wood.

b. The INFORDE and AID Response

INFORDE has been aware of this problem from the beginning and has identified it as a priority, yet few steps have been taken of a concrete nature. The wide variety of wood products makes the problem difficult to attack. Some progress has been made in export plywood and treated lumber and poles. INFORDE has assisted local wood industries to establish contact with PFS, a U.S.-based company specializing in quality certification for wood products. Tentative arrangements have been made for PFS to certify the quality of Ecuadorian export plywood and some other products under the umbrella of CORMADERA. These certifications, which the mills currently perform by contracting with specialized personnel on a shipment-by-

shipment basis, will save the plywood firms money while also generating considerable revenues for CORMADERA.

c. Assessment of the Response

INFORDE's efforts to bring standardization, inspection and certification to wood construction materials are a step in the right direction. The program will be slow in getting started since it will come under the CORMADERA umbrella. The PFS Company connection and tentative agreement should bring credibility to the program. The products most likely to be the first to use such a service will be the export plywood and treated lumber, poles, etc. Both of these industries have some quality control program in effect already. The difficult part starts in trying to implement such a program on lumber with over 400 sawmills. Although it is hoped that CORMADERA will be able to address this problem, more immediate action would be desirable.

d. Opportunities for the Future

A possible approach could be to prioritize the products and begin setting standards for particular relatively high-value products, such as flooring, molding, doors, tongue and groove siding, etc. Standardization of other products should be left for the future.

7. Undeveloped Export Market
for Furniture

a. The Problem

Ecuador would appear to be well-positioned to move into the international market for furniture on a number of levels.

It has a good supply of hardwoods and softwoods, a long tradition of woodworking, and a large network of firms producing furniture for the local market. These firms produce furniture across the full market spectrum, from high-quality, solid-wood furniture of traditional design, to modern knock-down furniture, to low-quality formica and pine products. Skilled labor is relatively inexpensive in Ecuador, although quality hardwood is increasingly expensive and difficult to acquire. Many of the firms are interested in moving into the export market, given the potential for expanding production and the saturation of the local market.

These firms face a number of problems in their efforts to export. First, only a few of the largest firms have any direct experience with exporting. The entrepreneurs are not familiar with the design requirements of the U.S. market, they have no contacts with potential importers, nor do they have a good understanding of the structure of the U.S. market, and the quality of even the best producers currently falls short of the requirements of the U.S. market with respect to important details such as finishing and hardware. One of the greatest problems is the low volume produced by most of the firms and their justified hesitation to redirect their current production from established local markets to new and much riskier international ones.

b. The INFORDE and AID Response

INFORDE has worked closely with AIMA to begin realizing Ecuador's potential for export. Following a seminar in November 1985, a group of six firms formed an export consortium that has served as the focus for INFORDE's effort in this area. The consortium has proven to be an extremely useful vehicle for its members, enabling them to pool resources to

hire U.S. expertise in design and marketing, and also to divide up the considerable investment of time and energy necessary for the firms to gain knowledge of the requirements for export. As described in Section I above, members of the consortium have attended a number of U.S. furniture fairs (as observers, not as showers) and a number of U.S. buyers have visited Ecuador.

INSOTEC, with assistance from AID's Small Enterprise Project, is directing greater attention to the needs of the wood sector, including furniture producers. As this program is still in its earliest stages, little attention has as yet been directed to the potential for exports, but this issue is expected to receive attention in the future.

c. Assessment of the Response

INFORDE's efforts to promote furniture exports appear to be headed in the right direction. The program has focused specific assistance to a few firms that have a strong possibility of entering the international market, rather than diffusing attention with general seminars or other activities unlikely to produce concrete results. The participants have already gained a much better understanding of the problems they face and are in the process of identifying solutions suited to their means and corporate strategies. Although only the largest of the firms has to date realized concrete benefits in the form of increased overseas sales, several of the other firms are making real progress.

INFORDE's assistance has been directed to middle-sized firms (although all but one are officially classified as small industries) rather than to small firms and artisans. This emphasis is appropriate for the export market, as the smaller

firms do not realistically have the potential for export at the present time. If the medium-sized firms are able to establish even a small market for Ecuadorian products, the smaller firms will be in a position to benefit through subcontracting arrangements and other piggy-backing arrangements with the more established ventures. INFORDE has, therefore, concentrated its extremely limited resources where they are most likely to achieve results.

d. Opportunities for the Future

The INFORDE export promotion activities are designed to assist Ecuadorian firms to establish their position in the market on a sound base of knowledge and technique, rather than to take short-term actions that might prejudice success in the long term. This strategy appears sound and likely to bear fruit in the future.

For the reasons cited above, it is not recommended that the small enterprise program devote a large share of its resources to promoting small enterprise exports. The experience of the larger firms demonstrates that Ecuador's small furniture firms are simply not ready to enter the extremely demanding and competitive international market. Some potential exists for production of parts (e.g., drawers) for export, but local firms will have to improve their quality, volume, and reliability before they will be in a position to realize this potential.

8. Inadequate Technical Information
and Research Support for the
Wood Sector

a. The Problem

There are many points all along the production chain where the lack of technical information and research support is a major impediment to growth. From the growing of the wood resource through the processing and final sale to serve local or export markets, private sector managers lack access to verified technical information adapted to Ecuadorian conditions. Specific problem areas include the mix of species, where and how to plant them, management of plantations for alternative end uses, logging techniques to minimize losses and other costs, appropriate lumber sizes to minimize construction costs, drying times and techniques for local species, and a wide range of technical problems affecting the furniture industry and other secondary products. Throughout the sector, lack of information on current and potential markets is also a factor discouraging innovation and investment.

Information is also lacking on alternative productive uses for the forest resource. One of the most promising is wildland tourism, a growing field in the travel industry. Ecuador's unique and varied topography, the relative accessibility of many regions, and the "leg up" provided by the established Galapagos market all suggest that this may be an area with the potential for growth.

b. The INFORDE and AID Response

Improvement of technical information has been a major priority for INFORDE during its first 18 months. Concrete

progress has been made in several areas through preparation of a summary of the technical properties of key Ecuadorian wood species and the completion of a set of profiles detailing the costs and returns of private sector plantation.

The main INFORDE initiative in this area has been support to AIMA's initiative to establish a non-profit technical center for the wood industry. CORMADERA, as the center has been named, is planned as an innovative cooperative effort between the public and private sectors. CORMADERA will build on existing MAG research and testing facilities near Quito, which have languished since the cessation of donor funding several years ago. The government has agreed to turn these facilities over to CORMADERA and to contribute toward payment of salaries and other operating costs. Plans for CORMADERA call for a wide range of programs, including quality control for export and, ultimately, for the local market; promotion of grades and standards, and technical studies directed to specific production problems throughout the wood industry and forestry sector.

A particular priority will be improvements in sawmilling techniques designed to promote the development of a market for dimensioned lumber suitable for modern construction techniques. This program will be supported by a modern sawmill producing dried, graded, dimensioned lumber for the market, with the profits, in turn, being used to support other programs of CORMADERA. Additional funding will come from fees charged for services such as quality certification, as well as donor support.

INFORDE has played a key role in developing the proposal for CORMADERA, which will be used to seek donor funding for start-up costs. Although the concept originated with AIMA,

the leadership of the association stated that they would never have been able to develop it fully without INFORDE support. INFORDE was also instrumental in broadening the coalition of organizations to provide greater representation for small enterprises, key to obtaining donor funding, although this move has not been well received within AIMA. INFORDE also provided an institutional home for a six-month training program for four Ecuadorian professionals who are intended to provide the core of the CORMADERA technical staff.

The future of the CORMADERA proposal is currently in doubt, unfortunately, due to disagreements between participating organizations over the management structure for the organization, as well as the failure to identify a donor definitely interested in funding the program. Although neither of these difficulties is irresolvable, they nonetheless cast doubt on whether CORMADERA will go forward.

AID personnel support CORMADERA but have thus far not taken an active role in promoting it, possibly because AID itself is not in a good position to fund the program. Other AID programs in the area of forest technology have been undertaken as part of the forestry project, which has funded some excellent work on tree species selection and placement.

In the area of wildlands tourism, both INFORDE and AID have taken some initial steps but are uncertain what measures, if any, should follow. INFORDE supported a study of the potential for wildlands tourism in Ecuador, resulting in a description of some promising avenues for further study, and AID undertook a similar effort. The INFORDE director and the SCFER research director visited several areas for possible development, but neither AID nor INFORDE is in a position to devote the resources necessary to turn these ideas into

concrete investments in hotels, lodges, guest houses, tour companies, and other facilities.

c. Assessment of the Response

The CORMADERA proposal receives wide and enthusiastic support throughout the Ecuadorian wood industry sector. It appears to be the only solid initiative with a chance of providing more than token assistance to the industry in addressing the very complex problems associated with tropical forest production. INFORDE has perhaps made some tactical errors at some points in the process, but such missteps are practically inevitable when navigating the political battleground between the competing Ecuadorian interests in the wood sector.

d. Opportunities for the Future

Although CORMADERA failed in a major bid to attract funding from the BID this spring, at least one more effort should be made to bring the concept to fruition. Knowledgeable individuals in the sector expressed the view that the corporation must be established within the next year, in order to gain momentum before the change of government expected in mid-1988.

Two actions appear to be appropriate at this time. First, INFORDE could take a more active role in facilitating direct communication between the different parties to CORMADERA. Conversations with the evaluation team indicated that the differences are not irresolvable, but that the process of communication has not advanced to the point where the parties are able to reach a compromise. All parties agree that AIMA must take the lead, given its technical leadership

in the sector, and this agreement should provide a basis for settling the dispute over the management structure. (NOTE: The INFORDE director followed up on this suggestion in the draft evaluation report and, before this report was finalized, made another effort to bring FENAPI and AIMA together. This effort was successful and the two organizations have recently signed an agreement paving the way for collaboration on CORMADERA. The director's quick response to the evaluation team's suggestion is indicative of his initiative and determination to make things work, despite the problems.)

AID could also contribute by providing more active support to the CORMADERA proposal, even if only token financial support is available. AID support would be of considerable assistance in enlisting other donors, particularly as AID funding has underwritten the development of the proposal. INFORDE should continue in its efforts to repackage CORMADERA to meet the diverse interests and requirements of possible donors, although this will probably entail piecing together the total funding needed from a number of sources, none of which is willing or able to finance the whole project. Once CORMADERA is established as a working operation, it should prove easier to attract additional funding.

In the view of the evaluation team, AID support for CORMADERA is justified even though the organization will benefit large firms (notably the plywood firms) as well as small ones. Indeed, a strong case can be made that the institution would not be viable without the political and financial support that only the large firms can provide. By participating in CORMADERA, AID is not stepping outside its mandate to help small enterprise; on the contrary, it is

mobilizing the talents and resources of the large firms to serve the interests of the small firms as well as their own.

Mission programming considerations make it unlikely that AID will be able to fund CORMADERA. Nonetheless, AID can play a useful role by encouraging other donors to participate as opportunities to do so present themselves. Enthusiastic AID support for the concept is particularly necessary to dispel potential doubts about CORMADERA that might arise if donors mistakenly concluded that AID had dropped the concept. This misapprehension could easily arise, given the significant AID investment in developing CORMADERA in the form of INFORDE's technical assistance and support.

Additional action in the area of wildlands tourism is not recommended at this time. What is needed now is investment in new tourism ventures, such as hotels in suitable locations. While the GOE might pursue such ventures with appropriate investors, such as the large hotel chains, it is not clear what AID or INFORDE could add to this process. The record for donor sponsorship of particular investments is not a good one.

9. The Need to Strengthen Private Support Institutions and Public-Private Linkages

a. The Problem

The Ecuadorian wood sector benefits from a number of private sector institutions providing services to their members. The oldest and best known of these is AIMA, a private association with approximately 60 members drawn from all segments of the industry. A majority of AIMA's members are classified as small industries, but the leadership and

most of the financial support for the organization comes from a handful of large, capital-intensive firms. While AIMA represents the interests of the wood sector as a whole, it gives priority to the interests of its large members and is generally perceived by others as the organization of "los grandes." AIMA's main activities include publication of a number of informational and promotional pieces for its members and an annual wood industries fair (MADEXPO), as well as lobbying for policies favoring the wood sector. As is the case in any such organization, there is room for improvement in AIMA's programs, particularly in the areas of providing more market information and training for its members and improving contacts with other organizations, both internationally and locally.

Other private institutions serving the sector are relatively weak. INSOTEC, a private foundation directed to assisting small enterprises, has a well-trained and enthusiastic staff, but little concrete experience in assistance to small enterprises. Its emphasis is somewhat academic and it has little capacity to help enterprises in a specific sector to address the very real technical problems that they face. With donor aid, including major assistance under AID's Small Enterprise Project, it is making rapid progress in improving its programs. FENAPI, the National Federation of Chambers of Small Industries, is also a relatively young organization with a large and diverse set of responsibilities stretching well beyond the wood sector. FENAPI and its member chambers are working closely with INSOTEC to improve their programs, which are constrained by its lack of resources and staff.

Corporacion Forestal is a non-profit member of the large Durini plywood group, established to promote reforestation in tropical areas and, to a lesser extent, in the Sierra. Its

programs in reforestation show considerable promise, particularly given the strong financial interest of the plywood firms in promoting plantation of hardwood species. To date, the corporation has had only marginal involvement in public sector reforestation programs, and the latter are the weaker for it.

Several promising institutions exist in sectors relevant to wood industries. The Construction Chamber, in particular, undertakes a number of activities, such as publication of price lists, standardization of construction materials, and training for its members, that are extremely relevant to the promotion of wood as a construction material.

On the public sector side, there are a number of organizations and units charged with promoting reforestation, rationalization of resource use, small enterprises, exports, and other issues touching on the wood sector. The Ministry of Agriculture has direct responsibility for the national forests as well as the industries depending on the forest, but their programs have generally not addressed the needs of the private sector, as discussed elsewhere. The Ministry of Industry and Commerce has not given wood products a priority in its developmental or export promotion programs.

Communication and coordination among all these organizations, public and private, is weak. With competing agenda and complex political considerations, it has proven difficult for the diverse parties to collaborate in a substantive manner, nor are all the parties sufficiently familiar with the activities of the others to recognize the potential gains that exist. The great diversity of wood-based industries and their intermediate position between agriculture and industry further complicate the situation.

b. The INFORDE and AID Response

Both INFORDE and AID have devoted considerable attention to strengthening organizations that support private sector development. INFORDE's assistance focused initially on AIMA, as the main private sector institution in the wood sector. INFORDE sponsored a study tour to the U.S. by the AIMA Executive Director, to acquaint him with the programs of U.S. trade associations such as the IHPA. INFORDE also funded an institutional profile of AIMA's members by a local consulting firm to provide AIMA with information on its members' needs and concerns, assisted AIMA with the publication of a species brochure to help promote Ecuadorian wood products in the international market, published a price bulletin in cooperation with AIMA, and helped the organization to expand its subscriptions to trade publications and its library of reference materials for its members. INFORDE has also played a valuable facilitating role by providing technical support to AIMA programs with FEDEXPOR and MICIP.

In the past six months, INFORDE has given greater attention to INSOTEC, with results that are highly praised by the INSOTEC staff. INFORDE's presence encouraged INSOTEC to select the wood sector as one of its four areas of emphasis. INFORDE has provided technical assistance to the INSOTEC staff in issues related to wood industries, which has given the organization the confidence to move aggressively into a new area. INFORDE has supported and encouraged INSOTEC activities such as the formation of a national association of small wood industries, an economic evaluation of horizontal bandsaws completed under contract to the German assistance agency, GTZ, and surveys of the wood industry in a number of provinces. INFORDE also supported INSOTEC's work with small industries in Puyo by advising a group of firms planning to establish a

cooperative for producing improved siding (as discussed above, these plans were not brought to fruition). Finally, INFORDE is currently advising INSOTEC on the implementation of its assistance program in Santo Domingo.

INFORDE's programs are complementary to those of USAID/Quito's Small Enterprise Project, which is being implemented in cooperation with INSOTEC. Although the latter program is still in its early stages, the relationship established between INFORDE and INSOTEC has provided a number of opportunities for reinforcing activities.

There has been less overlap with the Mission's other private sector program, non-traditional agricultural exports, as this project has focused on a different set of commodities. INFORDE has, however, given indirect support to AID's program with FEDEXPOR by providing technical assistance to AIMA in implementing a modest program of joint action with FEDEXPOR.

AID's programs in the housing sector focus on the development of financial institutions, not on the development of low-cost housing techniques or other issues directly linked to the construction industry. While INFORDE and AID have attempted to coordinate by exchanging information, there is little to coordinate.

AID programs in the forestry sector present a different picture. While the forestry project is designed to provide assistance to private individuals, notably small farmers, the institutions chosen to deliver these benefits are largely public sector. Most of the project's activities are being implemented in cooperation with DINAF or other sections of MAG. The project experienced considerable difficulty in its early years and has now been redesigned to emphasize on-farm

programs and to reduce the number of activities to a more manageable number. Some of the project's components stress activities, such as national park management, that do not readily lend themselves to a private sector emphasis, at least not in Ecuador at the present time.

c. Assessment of the Response and Opportunities for the Future

As discussed in more detail in section 9 below, INFORDE's attempts to work with a range of institutions with quite different objectives and clienteles have sometimes put it in an awkward position. The relations between large and small firms and between the public and private sectors in Ecuador are highly charged politically, a minefield that even Ecuadorian organizations navigate only with great difficulty. INFORDE faces a dilemma with regard to its relationship with AIMA, the strongest private sector group, but also the one with the weakest ties to small enterprise.

The existence of AIMA was a major factor behind the selection of Ecuador as the site for the private sector forestry demonstration. INFORDE's initial activities focused almost exclusively on AIMA and AIMA has continued to be the vehicle for most of INFORDE's activities. The INFORDE Director made a conscious decision not to try to establish INFORDE as an independent organization with its own programs, in order to give maximum emphasis to the role of Ecuadorian institutions and to multiply the impact of INFORDE's limited resources by joining forces with local organizations under their banner, not INFORDE's. This approach cannot be criticized, particularly in view of INFORDE's impermanence.

Nonetheless, the initial emphasis on AIMA and INFORDE's lack of a strong independent image have created resentment and confusion on the part of AIMA as INFORDE has sought to move beyond it to other organizations in the sector. Similarly, INFORDE's close association with AIMA has given rise to some misunderstanding on the part of other organizations with a different perspective.

INFORDE can take two actions to try to resolve this difficulty. First, INFORDE should broaden its contacts with other institutions. INFORDE is currently caught in a power struggle between AIMA and various small enterprise groups (INSOTEC and FENAPI). INFORDE would do a great service to both groups if it would help them to recognize that this struggle does not serve either group's interests. INFORDE can do this by bringing other institutions into the picture, particularly groups such as the Construction Chamber that are not already claimed by either side. There are strong technical reasons for working more closely with the Construction Chamber, further discussed below, but INFORDE may also find it advantageous to expand its clientele simply to send AIMA a message that INFORDE is not going to play an us-versus-them game.

Second, INFORDE can encourage AIMA to expand its own contacts with other organizations, which are currently very weak. For example, senior technical personnel at the Construction Chamber did not attend MADEXPO, a serious lost opportunity from the point of view of expanding the market for wood. If AIMA is sincere in its often-expressed concern for small enterprises, it should be encouraged to establish contacts with FENAPI in order to buttress the very limited support that the latter can provide to its wood industry

members. AIMA has little to gain by further isolating itself or reinforcing its image as the "big guys' group."

INFORDE and AID face a common dilemma in selecting a counterpart organization for assistance to small enterprises in the wood sector: should they work with an established sectoral organization, knowing that small enterprise is not its first priority; should they work with a federation of small enterprises, knowing that its politicization and limited technical capacity are serious barriers to effectiveness; or should they work with a private, socially motivated foundation or PVO, overlooking its weakness in technical matters and its total reliance on donor funding to continue its programs? AID has most commonly chosen the last of the three, as indeed USAID/Quito's Small Enterprise Project has done. INFORDE's experience indicates that the first type of organization is a valid target for assistance and a potentially useful vehicle for reaching small farmers and entrepreneurs.

It is too early to tell whether INFORDE's efforts to improve coordination among public and private organizations in the forestry sector will lead to a sustained improvement. Given the limitations on the resources available to each organization to carry out its main tasks, a sustained effort to coordinate may be too much to expect. There has been a real one-time gain from INFORDE's efforts at improving communication, however, and it may be hoped that the organizations will be able to use their improved understanding of each others' capabilities to cooperate on additional ventures in the future. Even though past efforts have not been notably successful, the time may be ripe to try again. The Corporacion Forestal is increasingly concerned with the high labor cost of plantation management (suggesting a new interest

in alternatives to direct management by the plywood firms) and the recently completed plantation profiles have made new information available indicating the profitability of such activities.

The failure to mobilize private sector resources to support Ecuador's forestry programs constitutes a serious lost opportunity, not only for INFORDE, but for USAID/Quito and the GOE. After years of disappointing results with the Ministry of Agriculture, it is time to recognize the potential that private sector firms offer as a vehicle for reforestation and agroforestry. It is unfortunate, but understandable, that AID is not able to pick up on the CORMADERA proposal due to the lack of funds for new initiatives. It is equally understandable that AID cannot drop the programs it has underway with the Ministry of Agriculture. Nonetheless, private sector organizations such as the Corporacion Forestal arguably offer a greater chance of success in encouraging economically viable reforestation activities than existing public sector entities.

INFORDE should redouble its efforts to bring AID forestry activities into a closer relationship with the work of the private sector in tree plantation. Corporacion Forestal's association with one of the most powerful industrial groups in the sector has, unfortunately, discredited it in AID's view. AID has perhaps been too quick to conclude that the corporation does not need or deserve assistance and that the financial interests of the large plywood firms are inherently different from those of the small farmers.

In fact, the opposite is true. The corporation's resources are very limited resources with respect to the large number of technical issues surrounding tropical plantations in

Ecuador, although they are doing more to resolve them than the Ministry of Agriculture. Equally important, the plywood firms are one of the best potential markets for small farmers' trees, particularly if greater attention is given to linking plantation programs to the location of the plywood plants and producing trees with the right characteristics for the mills. Landholdings in the tropical areas are sufficiently large to make tree farming for the mills a potentially attractive venture for the colonos, as demonstrated by INFORDE's analyses of plantation economics, almost surely more promising than tropical ranching, given the many technical problems associated with the latter. Indeed, the large labor requirements imposed by management of tropical plantations may give small farmers a comparative advantage.

10. The Need to Raise Income and
Employment in Rural Wood-
Based Industries

a. The Problem

Ecuador faces a serious employment problem, particularly in the rural areas. The nation's extensive forest resources must be mobilized to address this problem, especially in the tropical zones of the Costa and Oriente, where sustained agricultural production is problematic, to say the least.

A large and growing number of individuals earn their living by what might be termed informal forestry. This group moves ahead of the colonization process and, using chainsaws, logs off the economically valuable species from the forest as the first stage in the colonization process. This group constitutes a serious threat to the realization of the forest's potential contribution to the economy, but they must

also be viewed as an important beneficiary group in their own right. There are few studies of the economics of the small chainsaw operations, in particular, but it is evident that they are realizing only a fraction of the potential value of the trees they harvest and, in the process, producing a product so degraded that much of its potential value to downstream users is lost as well.

In an ideal world, the chainsaw operators would not exist. They do exist, however, and they will continue to exist for the foreseeable future. It is estimated that the chainsaw operators currently account for at least 40 percent of all logging (excluding firewood gathering), and that losses in this sector are on the order of 70-80 percent. If their losses could be reduced even to the level of the circular saw operations (35-50 percent), the impact on the supply of wood and the chainsaw operators' income would be significant.

The poverty of the chainsaw operators, and the colonos with whom they contract, should not be allowed to obscure the damaging and unsustainable nature of their activities. With their current technology and the disorganized state of the market, these operators are not able to make improvements in their operations. They are only competitive with the sawmills because the resource they are tapping has no price. All parties, including the forest resource, could be better off if a system were devised permitting the chainsaw operators to sell rough-cut cants to the sawmills for resawing, but such a system is a long way from development.

Very little information exists regarding the chainsaw operators, their costs, and returns. It appears likely that they number several thousand, however, and are therefore

probably the second largest category of small wood-based enterprises, after furniture-makers. Their problems -- technology, information, and management -- are technically different but generically the same as those facing other small wood-based enterprises. Excluding sawmills and furniture, the extreme diversity of wood-based industries makes them a very difficult target for effective assistance.

Wood-based small industries (excluding sawyers) account for about 8 percent of all Ecuadorian small industries. They face increasing difficulty in acquiring their raw material, due to the depletion of the tropical forests close to urban markets, and also suffer from the standard range of problems afflicting small industry, such as lack of credit and sources for technical improvement, a difficult economic environment, uncertain markets, and so forth. No special programs exist to help these firms, although they may participate in the range of programs offered to small enterprises by Ecuadorian public and private business development organizations, including FENAPI and INSOTEC.

b. The INFORDE and AID Response

Neither AID nor INFORDE has addressed the needs of either the chainsaw operators or the small rural wood-based firms, although the new Small Enterprise Project will make a beginning in helping the latter. INFORDE's resources are not sufficient to incorporate assistance to the chainsaw operators into their already very extended program. AID, however, may be in a position to begin developing a program for this important group that is aimed at helping them to increase the value of their product and use the resource more efficiently. Such a program would clearly be a long-range effort, requiring

extensive design work to identify technical improvements to the chainsaw operations consistent with increased profit, as well as reduced losses. The potential benefits make the effort worth undertaking.

INFORDE has attempted to support the development of small wood-based industries as a whole in a number of ways. Assistance has been provided on an informal basis to several small firms, such as a parquet manufacturer in Puyo who was assisted to reduce his costs by improving the flow of material through his operation. INFORDE's efforts to promote furniture export, described above, also deserve mention in this regard.

INFORDE has devoted a significant share of its resources to assisting INSOTEC in the initial stages of developing a program to meet the needs of small enterprises in the wood sector. The long-term results of these efforts are unclear. While wood-based industries can clearly benefit as much as any small enterprise from improved management, the potential for growth in the wood sector does not appear to be as attractive in Ecuador as it is in other countries lower down the scale of development. With the possible exceptions of construction materials and furniture, the room for market expansion is not encouraging. Insight into this problem was provided by a survey of small wood-based industries carried out by INSOTEC in cooperation with INFORDE. This survey explored a wide range of enterprises, but did not identify any product group with substantial growth potential. On the contrary, many of the products surveyed -- ice cream sticks, for example -- were under increasing competition from plastic products.

The diversity and poor potential of secondary wood-based enterprises has thus far prevented AID and INFORDE from

developing an effective strategy to help the sector, except as part of the small enterprise sector overall. Such a strategy will be sought during the USAID-funded Small Enterprise Project, now getting started. While it is difficult to generalize about the wood-based sector as a whole, it would appear that cost-cutting technologies will be a major priority for the immediate future, as the sector comes under increasing pressure from plastics and the rising cost of the raw material.

The main source of benefits to the small firms likely to arise from INFORDE's activities is the development of a market for wooden construction materials. The labor-intensive nature of many of these materials makes them appropriate for small firms, whether aimed at the high- or low-quality end of the market. The market for these goods should rise with the overall market for wood construction materials. Consequently, INFORDE's strategy for the wood sector as a whole would appear also to be the best strategy for wood-based small enterprises.

C. Summary of Recommendations

While the INFORDE program has made noteworthy progress in a limited time and has provided valuable assistance to a wide range of firms and organizations in wood-based industries, the ARIES team identified a number of areas where the INFORDE program might be strengthened over the coming months. Continued cooperation with AID, and Mission support, will be key to building INFORDE's short-term successes into a more lasting impact on the Ecuadorian wood sector.

Five main recommendations follow from the detailed discussions above:

1. INFORDE should continue and expand its efforts to bring public and private sector groups together, working in close cooperation with AID assistance to these groups. Two areas appear to offer the best opportunities for the immediate future:
 - a. Forest plantations. Although both AID and private sector forestry organizations (principally the Corporacion Forestal Durini) express disappointment in past efforts to work together, the potential gains from a partnership between the public and private sectors in promoting for-profit plantations by smallholders in the coastal areas are too great to allow the current lack of cooperation to continue. INFORDE should build on its recently completed plantation profiles to identify opportunities for getting the large private forest industry firms involved in actively promoting and assisting private plantations by colonos and other smallholders. While current market considerations argue for focusing initially on the coast, these activities should proceed with an eye to expanding plantations into the sierra as industrial demand for pine and eucalyptus grows.
 - b. Development of wood-based construction. INFORDE's efforts to promote wood-based construction have generally not produced the results anticipated. These efforts should be redirected to focus on the potential market constituted by the public sector, particularly in the construction of schools and other public facilities. The development of a reliable market will be key to building construction firms' skills in wood construction and to providing the basis for a private market for dimension lumber. INFORDE, working with AIMA and other organizations in the construction and wood industries, should encourage public sector institutions to see their role as promoting Ecuadorian business as well as building schools, housing, and other facilities.

2. INFORDE should give greater attention in its assistance to private sector associations and support institutions to encouraging communication and cooperation between large and small firms. In particular, the established organizations -- notably AIMA -- need encouragement and assistance in addressing the needs of smaller firms (particularly the hard-pressed sawmills). AIMA should also be strongly encouraged to reach out to new members (including small sawmills) and other organizations (including those on the demand side, such as the construction chamber). INFORDE should also continue its current effort to redirect its assistance in the direction of smaller firms, by working with INSOTEC to provide assistance to get APIMA going.
3. INFORDE should recognize the role of lumberyards and construction contractors in developing a market for high-quality lumber in Ecuador and open channels of communication and cooperation with them, in addition to encouraging AIMA to do so. In particular, INFORDE should work with representatives of the construction industry to clarify the cost-competitiveness of lumber and to develop a market for dimensioned lumber. The needs and potential of the lumberyards are poorly understood and have not received the attention they deserve from INFORDE, which might consider establishing a dry kiln for resaw operation at a lumberyard as an alternative to further efforts with sawmills, which have been unsuccessful to date.
4. INFORDE should continue to devote priority to getting CORMADERA funded and operational. This may mean retailoring the current proposals to match the funding needs of a range of donors and it will almost certainly mean continuing to play a facilitating role in holding together the coalition of private and public sector groups supporting CORMADERA. INFORDE should also devote attention to prioritizing the CORMADERA initiative to focus on activities with the greatest immediate potential to provide benefits to the greatest number of firms. While CORMADERA should aim to provide the full range of services outlined in the proposal, this scope is too ambitious for a

fledgling organization. The sawmill work, development of a market for dimensioned lumber, and certification of plywood for export would appear to be the strongest contenders for priority during the immediate future.

5. Finally, INFORDE should devote less priority to supporting development of a furniture export market, while continuing to work with the existing consortium and others when opportunities present themselves. The potential for future export development remains promising, but it must be recognized that the long time frame required for real progress in this area (given the position of most Ecuadorian firms at present) is inconsistent with INFORDE's own schedule.

*From:
Shift
focus to
internal
Ecuadorian
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III. APPLICABILITY OF THE INFORDE MODEL TO OTHER COUNTRY SITUATIONS AND OTHER SECTORS

INFORDE, the Private Initiative for Forestry Development in Ecuador, is a pilot field activity designed to test and develop techniques for promoting private forestry development. INFORDE, implemented by USDA, North Carolina State University, and the Southeastern Center for Forest Economics Research (SCFER), is part of AID's Forestry Support Program, a project of the Office of Forestry, Environment, and Natural Resources in the Bureau for Science and Technology (S&T/FENR). The initiative fielded a wood products market development specialist to Ecuador for a two-year period, backed up with limited funds for research and technical support to the Ecuadorian forestry sector, technical support from SCFER, and administrative backstopping in the United States.

INFORDE's primary aim is to promote private sector wood-based activities in Ecuador. But it also constitutes an experiment in private sector approaches to development. INFORDE's focus on the forestry sector, where donor assistance has traditionally emphasized public sector approaches, has provided an opportunity to test an alternative approach to small enterprise development with potential applicability to a wide range of sectors and country situations. This section explores the INFORDE experience from this perspective, assessing its potential replicability both as a tool for forestry

development and as a mechanism for promoting private enterprise development generally.

While this section focuses on the replicability of INFORDE's overall strategy, the initiative has also generated significant experience with particular research and technical assistance activities designed to support private enterprise activities in the forestry sector. Many of these individual activities could clearly be incorporated into a wide range of private enterprise development programs, whether or not these followed the overall INFORDE model.

This section is therefore organized into four parts. The first summarizes the key elements of the INFORDE strategy; the second assesses the factors affecting INFORDE's success; the third reviews experience with several specific activities, both successful and disappointing; and the final section discusses the conditions under which the INFORDE model as a whole might best be applied.

A. Key Elements in the INFORDE Strategy

Abstracting the INFORDE program from the specifics of the Ecuador situation, the strategy can be divided into two parts: forestry strategy and a private sector strategy.

1. INFORDE's Forestry Strategy

INFORDE's forestry strategy is based on improving resource management and resource productivity by increasing the value of the product, in this case, wood. As a corollary, INFORDE seeks to raise the market for and value of products made with wood, in order to support the market for wood

itself. This strategy is particularly appropriate for forest products in Ecuador, given the very high proportion of the wood resource that is being lost due to improper management of the logging and sawing operations, but it is potentially applicable to a number of activities where low profitability and weak markets encourage technical inefficiency and impede technological improvements.

INFORDE has also sought to identify and encourage investments that are profitable in themselves and that will directly increase the supply of wood over time. In the case of Ecuadorian forestry, INFORDE's evaluation of private plantations of species with high in-country demand indicates a potential return that is quite attractive in comparison with other agricultural activities. This finding contradicts the widespread assumption that private sector replanting must be subsidized, although its applicability to other countries or lower-value species is not clear.

INFORDE's forestry strategy is strongly market-based, that is, it places a high value on careful analysis of the market for trees. This approach is in marked contrast to that of simply assuming that trees grown will find a market, or, worse, ignoring the final sales value altogether. The INFORDE approach highlights the large variation in the value of trees destined for industrial use depending on where they are planted and how they are managed.

Under this strategy, the needs and location of potential customers such as plywood plants have as much importance as soil types and other silvicultural considerations in selecting sites for plantations. The management program is designed to maximize the values sought by the specific customer, e.g., the

plywood plants, which may be quite different from those appropriate for other uses, such as pulping, where bulk and fiber characteristics are more important than the diameter or shape of the tree. Small farmer programs consistent with this strategy aim to integrate the farmer into a profitable industry with potential for growth by producing a product beneficial to both parties. INFORDE's size prevents it from giving this approach the full-scale test it deserves, nor is USAID currently in a position to make such a test within its current portfolio. It is to be hoped that a future opportunity will be found to try this strategy, either in Ecuador or elsewhere.

INFORDE's strategy to build demand for wood has been equally long-range in orientation. The ultimate aim is to establish a market for higher-value wood construction products as the basis for expanded and more efficient use of the wood resource. INFORDE has worked primarily at the demand end of the system, promoting wood construction through a variety of means. While concrete results have been limited, INFORDE has set an excellent example for the Ecuadorian private sector to follow, and there is evidence that they are doing so. As argued above, this program could be strengthened by involving organizations on the demand side, both public and private, and strengthening their linkages to supply-side organizations in the wood sector.

INFORDE has had less success in tackling the supply end of the system, that is, in expanding the production of dried, dimensioned lumber attractive to the modern Ecuadorian construction industry and competitive with alternatives such as reinforced concrete. It has been argued above that INFORDE has not given sufficient attention to the role of the intermediaries in creating a dynamic market for improved wood

products, particularly the lumber yards. This situation underscores the need to take a systems approach to analysis of complex markets, with a high degree of diversity and fragmentation on both the supply and demand sides.

INFORDE's assistance to the furniture industry has been partially justified as another means of increasing the demand for wood, but this argument is weakened by the very small proportion of sawn wood going into the furniture industry (perhaps one-sixteenth of the total, estimating very roughly). The furniture industry would be a major beneficiary of better quality wood, however, and INFORDE's attention to them is justified on employment and export-generation grounds in any case.

2. INFORDE's Private Sector Strategy

INFORDE's strategy for strengthening the private sector has been based on close collaboration with local private sector organizations, supporting existing programs and attempting to promote new programs responsive to the needs of the wood industries sector. The strategy has also included attention to the potential for public-private sector cooperation, in particular through mobilization of donor resources in support of private sector approaches.

INFORDE's limited resources have been a source of strength as well as weakness. INFORDE has been responsive to the needs of its clientele by necessity, as well as by preference, since its own resources are too few to undertake programs on its own. This limitation has prevented INFORDE from falling into the tempting trap of independent action.

In a significant departure from the traditional AID project strategy, INFORDE is not attached to any specific Ecuadorian counterpart agency, public or private. While INFORDE has established strong ties to two organizations and weaker ties to several other, it is not under anyone's jurisdiction. This has given INFORDE great freedom of action, but has also given rise to resentment in some instances.

INFORDE's lack of an Ecuadorian institutional home would appear to have reduced its stature in the eyes of its counterpart organizations, but this same low profile has been consciously cultivated by INFORDE as a means of preserving neutrality and supporting the development of the Ecuadorian institutions already on the scene.

B. Factors Affecting INFORDE's Success

Eight factors may be cited as contributing to INFORDE's success, in the view of the evaluation team.

1. The Strength of Existing Organizations

First and most important, INFORDE moved into a situation with several strong private sector organizations already in place and receptive to suggestions for improvement. The priorities and preferences of the lead institution, AIMA, strongly shaped INFORDE's programs and underpinned its accomplishments. If AIMA had not existed, INFORDE would undoubtedly have been a much different program. Nonetheless, the absence of AIMA would not have crippled INFORDE, given the presence of a number of other strong institutions (although none devoted exclusively to the wood sector).

2. The Political Environment

A second factor is the political climate in Ecuador, which strongly favors private initiative. It is widely agreed that many of the private sector programs now being undertaken, including those supported by INFORDE, would have been much more difficult to implement under a government with a different focus.

3. INFORDE's Low-Profile Approach

INFORDE's low-profile, alluded to above, has been a third factor in its success. Perhaps the ideal situation would be for INFORDE to be completely invisible outside of the organizations it is working with, while at the same time maintaining sufficient identify vis-a-vis these organizations to preserve its independence and freedom of action. This balanced ideal is clearly difficult to achieve in practice.

4. The Diversity of INFORDE's Program

The diversity of INFORDE's program has also been a source of strength, even though it has stretched the resources of personnel and money painfully thin at times. By working with a number of institutions on a variety of different projects, INFORDE has been able to shift resources to those areas where assistance would be most productive. Indeed, the ability to shift attention has been critical to maintaining forward momentum, as INFORDE is totally dependent on the support of other institutions to achieve any real progress.

5. INFORDE's Temporary Status

INFORDE's impermanence has helped the unit to prevent a non-threatening face to other institutions, but it has also been a source of frustration to the staff. It may be argued that the lack of an ongoing presence has encouraged the staff to give too much attention to creation of a new institution in the form of CORMADERA, but in fairness it should be noted that CORMADERA was initiated by AIMA before the advent of INFORDE.

6. Interaction with Donor Programs

INFORDE's influence on other donor programs has been modest, but noteworthy, as a source of success nonetheless. While INFORDE has had virtually no impact on the Mission's forestry programs, it has helped to direct the small enterprise programs to include wood-based industries. Whether this is seen as a benefit depends on one's attitude toward the wood sector, but in any case, it is clear that INFORDE's technical support has been a source of strength and focus for broad-brush institutions such as INSOTEC. INFORDE's experience demonstrates the difficulty of influencing donor organizations from outside without the strong backing of the host government. It is unfortunate, but axiomatic, that local private sector organizations do not enjoy such backing, even in a pro-business climate such as Ecuador's. INFORDE's experience also demonstrates the long lead time needed for a donor organization to move an idea from concept to funding and implementation, a time frame inconsistent with that defined by INFORDE and often by the private sector as well.

7. Technical Excellence and Business Experience

The technical excellence and action orientation of INFORDE's staff has been a major factor behind its success. The value of strong and dynamic leadership scarcely needs emphasis, and INFORDE has been fortunate in this regard. What is noteworthy is the importance of the Director's strong technical background in the wood industry. Even more than the public sector, the private sector requires that newcomers demonstrate concretely that they know their field. They must have technical mastery of the subject to earn the respect of businessmen who have spent a lifetime in the business. They must also demonstrate their worth by tapping sources of expertise that meet three criteria: the source must be unknown to local businessmen, it must offer information of immediate practical value, and it must come with an established reputation. In the business world, only individuals with personal experience in a given field are likely to be able to meet these requirements. Even with a strong business background, it is extremely unlikely that a given individual will meet these requirements in more than one field. A program directed at several sectors at once would have a very hard time duplicating INFORDE's success in winning the confidence of its clientele or in providing them with information that they, not just the advisor, regard as valuable.

8. Export Orientation

INFORDE's export orientation may be cited as a final source of its success. For better or worse, local firms are more willing to cooperate in gaining access to new information and markets than in improving their position in markets where they are already active. While new markets often require a

major investment in gathering information and retooling to meet new requirements, these tasks may be easier to accomplish than restructuring an existing organization. Thus, INFORDE has had greater success making new ties between exporters and their customers than in straightening out the tangled knots of the domestic wood market.

C. Lessons from Individual INFORDE Activities

As noted earlier, many of the INFORDE activities are well-suited to replication in a wide range of small enterprise projects, whether or not they focus on forestry and whether or not they follow INFORDE's institutional model. This section evaluates some of the most innovative activities undertaken by INFORDE, with a view to providing guidance for others wishing to implement them in another context. Five categories are considered: (1) the private plantation profiles; (2) the price bulletin and the species brochure; (3) the AIMA institutional profile and other market surveys; (4) the housing prototype; and (5) the furniture export promotion program.

Another activity, promotion of a cooperative kiln in Puyo, deserves a more in-depth discussion, which is provided in Appendix B. The Puyo experience is particularly interesting for the insights it provides into the difficulty of convincing small entrepreneurs to enter into a new and potentially risky venture. INFORDE found that private enterprises are far less eager than anticipated to make changes in their businesses, even when the case for profitability is strong.

1. Private Plantation Profiles: Information for Potential Investors

It is too early to assess the impact of INFORDE's plantation profiles, which are only now being published in their

final form. Nonetheless, the profiles would appear to offer a promising approach for encouraging private investment in a new area. The profiles are intended to provide technical information in a readily comprehensible form together with specific information on the likely costs and returns to the new ventures. The profiles differ from feasibility studies of specific investments in that they are intended to provide the basis for individual investors to develop their own feasibility studies, not to justify a planned investment. In this, they differ from the hundreds (if not thousands) of feasibility studies languishing on donors' shelves for want of interested investors. It remains to be seen whether the plantation profiles provide sufficient information to enable investors to develop specific proposals tailored to their own conditions and whether the profiles prove useful in bringing these proposals to fruition (by, for example, reassuring bankers on the estimated returns offered by such investments).

2. The Price Bulletin and the Species Brochure

These two publications both constitute efforts to bring together information useful to participants in the market, but here their similarity ends. The price bulletin was intended to serve as a demonstration of a publication of use to participants in the lumber market. INFORDE did not intend to continue publishing it, but instead hoped that another organization, such as AIMA or the Ministry of Agriculture, would pick up the idea. INFORDE found that the preparation of the bulletin was more costly than expected, and was unable to draw firm conclusions regarding the utility of the publication. It appears unlikely that anyone will continue the effort after INFORDE stops. Moreover, as commented above, the evaluation team found that another group, the construction chamber, was

already publishing similar information on a regular and much larger scale. By contrast, the species brochure was designed as a one-time effort to put information about Ecuadorian woods in a form that would be useful to potential customers unfamiliar with such tropical hardwoods as chanul and fernan sanchez. This information was not available from other sources, nor was any private firm likely to publish it on its own. The brochure includes specific technical information likely to be of interest to serious importers as well as attractive color pictures showing the grain and color of the wood. Although it is not possible to assess the specific results obtained from the brochure, this type of publication would appear far more useful than the price bulletin.

3. The AIMA Institutional Profile and Other Market Surveys

INFORDE assisted AIMA in conducting a survey of its membership to assess their needs and their familiarity with AIMA's program. INFORDE also conducted a number of surveys to improve understanding of the market for wood. The purpose of the former survey is clear: to help AIMA improve its service to its members. While the information contained in the second group of surveys is potentially useful, the clientele for it is not immediately apparent, beyond their value for showing the potential significance of the private forestry sector to other AID missions. The information is intellectually interesting and could, in the right hands, be helpful in developing promotional campaigns. At this point, however, no one is planning such a campaign. It might have been of more immediate benefit to follow up the first survey with a survey of non-AIMA members to help AIMA understand the needs of the wood sector as a whole and to aid it in reaching out beyond its limited membership.

4. The Housing Prototype

INFORDE's experience with design and construction of housing prototypes is also instructive regarding market promotion activities without a specific audience, as well as the difficulty of carrying out a complex demonstration activity successfully. The prototype house, constructed wholly of wood, was designed and constructed with INFORDE assistance and placed in a public park in a prominent location in Quito. Though intended to serve as an exhibition hall, to promote frequent public viewing, technical problems in the design have forced the house to remain closed for several months. INFORDE does not have the funds to repair the facility. This problem is only the latest in a series of difficulties surrounding the financing of the exhibit house, which has proven to be much more costly than expected. In its present form, the house is not a good advertisement for wood building techniques. AIMA and INFORDE have had better luck with a house constructed and installed at MADEXPO, the annual wood fair, which has resulted in several sales to individuals by the designer. The design of this house, however, is intended to appeal to relatively wealthy individuals for use as a vacation home, and it is not clear that the prototype is effective in demonstrating wood's potential as a low-cost construction material. Experience with other prototypes in Ecuador has been equally discouraging. The American Plywood Association, for example, constructed several houses as demonstrations of wood construction, but the style was so dissimilar from local housing that the public response was generally negative. This disappointing experience reflects the generally unsatisfactory results obtained from artificial demonstrations, whether in wood products or another sector.

5. Furniture Export Promotion

INFORDE's experience in export promotion contains both encouraging and discouraging aspects. The hallmark of the program has been its focus on specific firms and specific technical needs, rather than general promotional activity. A second strength of the program has been the success in bringing Ecuadorian exporters into contact with organizations and individuals in the U.S. market that can provide specific marketing assistance to the Ecuadorian firms. Nonetheless, the overall results of the program in terms of expansion in exports have been meager; only the largest of the Ecuadorian furniture consortium's members has succeeded in increasing its exports. This perhaps disappointing result is instructive, because it indicates the difficulty LDC firms experience in breaking into a complex and competitive market, even where the firms are as sophisticated and well-managed as the Ecuadorian firms. The modest aims of the program -- helping the Ecuadorians to understand the U.S. market and assisting them to identify sources of technical and market support -- will not lead to a sudden explosion upward in Ecuadorian furniture exports, but the firms themselves are not ready to move to this stage in any case. As AID and other donors move to promote exports in a wide variety of markets, the Ecuadorian experience offers a useful lesson in humility.

D. Applicability of the INFORDE Model

The INFORDE experience offers a model with a high potential for replication in private sector forestry and in enterprise development programs generally. INFORDE demonstrates that a great deal can be accomplished with very limited

resources if they are focused on specific problem areas where the private sector is ready and willing to take action.

At the same time, INFORDE's experience underscores a major potential drawback to private sector forestry programs, that is, the tendency of wood industries towards dualism. The large economies of scale in logging and industrial processes, such as plywood, reinforce an industrial structure that tends toward dominance by a few large firms, in the United States as elsewhere. At the same time, furniture, construction, and many other wood-using industries tend to be highly fragmented, with a very large number of small firms. In Ecuador, the situation is complicated by the existence of a significant informal logging subsector and an important small sawmill sector, which compete with each other in addition to competing with and complementing the activities of the large mills. A similar situation exists in the United States as well.

The wood products industry is by no means unique in exhibiting a tendency toward dualism. It may be hypothesized that such a dualistic structure is likely to arise in any sector where there are strong comparative advantages to capital-intensive activities for certain operations and to labor-intensive activities for others. A similar situation can easily arise in the textiles sector, for example, where the large capital investment required for weaving and spinning operations tends to promote control of these activities by large ventures, while the labor- and management-intensive nature of clothing production tends to result in this operation being dominated by small firms, particularly in the early stages of development. As in the wood products industry, the interdependence of capital- and labor-intensive firms in the

Textile industry is an important feature of the sector's development.

AID and other donor agencies wishing to emphasize the development of small enterprises in strongly dualistic sectors must take into consideration the role of the larger enterprises in the development of the sector as well as the mutual dependence of firms at different stages in the production process. A wholly private development strategy may imply working closely with large firms as well as small to create new market opportunities, facilitate export expansion, and develop strong private institutions.

Forestry is also an area where government involvement tends to be relatively heavy, given the definition of the forest as a natural resource and the dominance of government control over large areas of forestland in many countries. In Ecuador, and indeed in most developing countries, the distribution of government benefits and the avoidance of governmental disfavor takes on much more importance for private sector activity than it does in the United States, regardless of the sector.

These two factors -- dualism and government involvement -- make it almost inevitable that private sector involvement in forestry will be heavily politicized. This politicization may take the form, as it has in Ecuador, of institutional conflict and enmity between large and small firms, making it difficult to build on the very real opportunities for cooperation and symbiosis. These benefits are too important to set aside lightly, and private sector forestry is undoubtedly worth the effort, despite the difficulties.

Experience with public sector forestry programs indicates, moreover, that the donors are deluding themselves if they hope to avoid this politicization by working exclusively with the local government. In an ideal world, public sector institutions would be neutral in their dealings with the private sector, neither favoring nor ignoring any particular group of firms. In practice, this is rarely if ever the case; government regulatory and promotional activities frequently display an implicit bias toward specific firms. As in the United States, this bias is reinforced by personal and professional ties between government officials and individual entrepreneurs. In Ecuador, for example, two of the most senior officials in the Ministry of Agriculture dealing with forestry are, respectively, an owner of one of the largest balsa firms and a former executive of the only firm producing treated wood. Even excluding any potential for personal gain implied by the government's regulatory power, it is reasonable to assume that the experience and background of senior officials will color their perceptions of the sector.

INFORDE also demonstrates the potential benefit of a technical assistance program directed to a specific private enterprise sector, even in the absence of complementary inputs such as credit and formal training programs. Indeed, INFORDE's empty hands proved to be an advantage, leaving the organization free to concentrate on technical assistance and ensuring that no programs would be undertaken without strong private sector support.

Many instances can be cited where INFORDE played a facilitating role, mobilizing small amounts of donor funds, bringing consultants targeted to particular problems, encouraging local entrepreneurs to enter an area where they

might otherwise have hesitated, and improving the effectiveness of ongoing trade association programs. The addition of credit resources or a large training program would not have contributed to any of these accomplishments.

At the same time, we hesitate to recommend that the INFORDE approach be adopted as a paradigm for private sector assistance organizations. As argued above, INFORDE's temporary, informal structure and the strong business expertise of its staff were major factors underlying its success. Both of these advantages would be difficult to preserve if INFORDE were transformed into a permanent organization.

The INFORDE experience does, however, highlight the potential advantages of placing technical assistance resources in an informal, free-standing, and temporary unit with few resources (and, therefore, few administrative requirements) and a built-in self-destruct mechanism. The possibility of lasting impact from such a structure depends entirely on its ability to affect the firms and organizations with which the unit works, not on the programs and activities of the unit itself. Although it is, of course, too early to draw a conclusion regarding the permanence of the changes brought about in the institutions with which INFORDE has worked, it seems at least likely that these impacts -- better coordination between private institutions and between public and private groups, as well as stronger programs in each institution -- will be more permanent because INFORDE's role has been limited to facilitating and supporting these activities rather than actually carrying them out itself.

APPENDIX A. LIST OF INFORDE ACTIVITIES AND ACCOMPLISHMENTS

Since INFORDE began operations in Ecuador in September 1985, the program has undertaken activities in seven main areas: (1) promotion of lumber use in construction and housing; (2) promotion of private tree plantations; (3) support to sawmill improvement; (4) development of the CORMADERA proposal for a technical support institute for the wood industry; (5) support to private sector associations in the wood sector; (6) promotion of furniture exports; and (7) other applied research. The following list includes the major activities undertaken in each area. It does not include the many initiatives begun, but, for one reason or another, not pursued, nor does it include activities currently in the planning stages nor those related primarily to management of INFORDE itself. In addition to these specific program outputs, INFORDE staff have provided technical assistance and support to individual firms and private institutions in the wood sector on a continuous basis.

1. Lumber Use in Construction and Housing

- . Design and construction of a housing prototype
- . Placement of the prototype in a public park in Quito
- . Completion of a survey by a local firm covering homeowner expenditures on housing expansion and consumer attitudes toward wood as a construction material

- . Identification and support of a local architectural firm interested in promoting wood in house construction
- . Promotion of a low-cost wood-based design for schools

2. Private Tree Plantations

- . Preparation of a report detailing the costs and returns to private plantation of six commercial species in Ecuador
- . Support to policy dialogue activities resulting in an increase in the GOE's seedling price, to promote private nurseries

3. Sawmill Improvement

- . Completion of market studies covering sawmill activities in the three major retail markets
- . Support to an NCSU graduate student thesis on management of log supply in a large integrated sawmill
- . Technical assistance in operations management to firms in the Puyo area
- . Technical support to a proposed cooperative venture to produce high-quality siding in Puyo (not successful)
- . Development of a proposal for a sawmill improvement program in Ecuador
- . Completion of a study of grades and standards for sawmill production

4. CORMADERA

- . Organization of a consultancy to identify the technology needs of the wood sector and develop a program responsive to these needs
- . Development of a detailed feasibility proposal for CORMADERA to be used in soliciting donor support

- . Identification of a U.S. firm capable of providing quality control and certification services for Ecuadorian wood exports and development of a proposal for a joint program with CORMADERA
- . Implementation of a training program for four future CORMADERA staff specialists to sharpen their skills and acquaint them with similar programs in other countries

5. Institutional Strengthening

- . Completion of a study profiling the members of the largest association in the wood sector (AIMA), including member needs and interests, to support association planning
- . Assistance to AIMA in developing a library of reference materials and trade publications for its members
- . Publication of a brochure in English describing Ecuador's main commercial species, as an aid to penetrating the international market
- . Publication of a price bulletin giving current prices for major wood products in the main Ecuadorian markets as a prototype of a possible future AIMA activity
- . Organization of a study tour for the Executive Director of AIMA to strengthen AIMA contacts with other wood industry associations and improve knowledge of their programs
- . General support to AIMA agreements with FEDEXPOR and the Ministry of Industry
- . Technical support to INSOTEC's planning of activities in the small wood enterprise sector
- . Assistance to INSOTEC in identifying opportunities to participate in other donor-funded programs in the wood sector, to develop their skills base, such as a GTZ-funded feasibility study of horizontal bandmill technology
- . Organization of a study of the secondary wood product market implemented by INSOTEC

6. Furniture Export Promotion

- . Formation of an export consortium of AIMA furniture manufacturers
- . Facilitation of consortium contracting for technical assistance in furniture design
- . Support enabling the consortium to operate a stand at the Ecuadorian Wood Products Fair
- . Conduct of a seminar on wood-drying techniques, jointly with INSOTEC
- . Assistance to local firms in establishing contact with IHPA, an international association
- . Coordination of a contract with a U.S. agent for Ecuadorian furniture producers, including assistance in providing financial information needed by the agent
- . Study tours to U.S. furniture fairs for AIMA personnel and members of the consortium, with site visits to U.S. furniture and finishing firms
- . Support to a seminar on Ecuadorian furniture exports conducted by AIMA and FEDEXPOR
- . Technical support to buyers' missions for furniture and other wood products
- . Communications support for AIMA and individual firms (FAX and telex), as an aid to contact with the international market

7. Other Applied Research

- . Support to NCSU research under the project, including a study of small sawmills and furniture producers in Ecuador
- . Implementation of a seminar on project evaluation for wood industries at Loja University
- . Completion of a study of the potential for wildlands tourism in Ecuador
- . Identification of possible topics relevant to wood industries for forestry graduate students at Loja

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APPENDIX B. THE COOPERATIVE KILN AT PUYO:
WHAT WENT WRONG?

Puyo is the site of one of INFORDE's most concentrated efforts to promote production of high-quality wood products for the construction industry. INFORDE worked closely with a group of local wood-products firms for several months in an attempt to establish a cooperative venture to make high-quality, kiln-dried siding (duelas) and other construction products for the Quito market. Despite good intentions on both sides, it is now clear that the venture will not go forward. This appendix examines the Puyo program in an effort to explain why it was not successful. The conclusions offered here must be regarded as tentative, since the evaluation team did not have an opportunity to review the Puyo effort in depth, but the experience nonetheless would seem to offer a number of valuable lessons for small enterprise promotion, both in Ecuador and elsewhere.

Background

Puyo is a major market center for Ecuador's Oriente frontier. Located at the mid-point between the older Sierra region and the zones of rapid colonization in the upper Amazon basin, Puyo has grown rapidly in the past 20 years. Its commercial base is expanding to include the beginnings of industrial activity. Growth is centered around the wood and

livestock products that are the region's main exports to the larger national market.

The wood industries are well-represented in Puyo, with several sawmills, uncountable chainsaw operators, numerous wood-based artisans, a range of small manufacturing firms producing boxes, siding, parquet, furniture, and other products, and at least one large firm producing veneer for the nation's plywood firms. The wood industries in Puyo depend exclusively on logging in the virgin Amazon hardwood forests to the east of Puyo, one of the richest sources of high-quality hardwoods in Ecuador. Puyo's location close to the source gives it an inherent advantage in competing for the Ecuadorian market for wood products.

Puyo was therefore a natural choice for an initiative aimed at promoting production of high-quality components for the construction trade. This choice was reinforced by a history of INSOTEC involvement with the local Chamber of Small Industries, which has an active wood products association.

The Project Concept

With help from INSOTEC, INFORDE made contact with a group of small entrepreneurs operating in Puyo. Most of the firms in the group were producers of shaped boards for interior paneling or exterior siding (duelas), but some of the firms manufactured parquet, furniture, and other wood products. The group had no formal structure; instead, it consisted simply of a subset of the members of the wood products association who expressed interest in pursuing a possible investment in a high-quality product.

In cooperation with INFORDE personnel, the project concept gradually took shape. The project was to be centered around investment in a dry kiln, which would be owned and operated cooperatively. The kiln would be used primarily to produce standard-dimension, dried duelas for sale directly to the Quito market, but would be used in addition to dry wood for other products produced by the members. Additional equipment would also be purchased for the new venture to aid the members in upgrading their products.

Of the 20 members of the Puyo wood association, only four or five expressed serious interest in the project, but this group appeared to offer a good basis for going forward. The group included several of the association's leaders and generally represented the more progressive elements of the Puyo business community. INFORDE offered technical assistance in designing the cooperative's production program, completing the necessary analyses, identifying equipment sources, and starting operations. INFORDE did not have funds to underwrite the investment itself, but this did not initially appear to be an obstacle, as calculations indicated that the venture should be sufficiently profitable to attract private capital or justify a bank loan.

Despite this promising start, the project bogged down before reaching the implementation phase. INFORDE personnel made repeated visits to Puyo, a four-hour drive from Quito, but little concrete progress was made toward realizing the project. INFORDE helped the group to resolve organizational issues and to identify a likely source of attractively-priced credit offered by the BID, but the group did not take the actions necessary to begin the investment process. Group members delayed making commitments such as purchase of a plot

of land for the new operation. Although the group members continue to express their support for the concept, INFORDE and, indeed, the group's members themselves are convinced that the project will not go forward.

Why not? Why did support unravel when all parties agreed that the investment would be a good idea?

What Went Wrong?

A brief review of the Puyo experience suggests several possible explanations for the project's lack of progress, some related to the project's environment, and others related to the project itself.

Three barriers in the project's design appear to have hindered its success. First and most important, the project differed too much from the investors' current operations. It would have required them to cooperate much more closely than they ever had, to produce a product quite different from their current line, to use a new technology with which they had no experience, and to market their output in a new way. This a lot of change for small entrepreneurs to tackle all at once.

Second, the project was not a natural adjunct to the group members' current operations. If the project had consisted only of a cooperative dryer to be used by all the members to improve their current lines of production, it might have had a greater chance of success. Indeed, one of the group's members went ahead to purchase a dryer on an individual basis, demonstrating the group's willingness to accept technological improvements that would not require major changes in their whole operation. Given the other demands on

their time and management skills, the investors appeared unwilling to commit to an additional enterprise that offered few advantages for their current lines of business.

Third, the project concept came from outside the group. Whether the potential investors are large or small, experience indicates that it is very difficult to get an investment project off the ground when the primary sponsor (in this case, INFORDE) will not itself be a participant. Hundreds of feasibility studies undertaken by governments and donors in hopes of sparking investor interest have met a similar fate, despite expenditures many times greater than INFORDE's at Puyo.

There were also problems in the project's setting. First, the project was implicitly competing with another donor-sponsored project in Puyo, this one aimed at establishing a central wood products facility under the sponsorship of the provincial development council. Plans for the new facility included most of the equipment that would have been purchased under the INFORDE project (dryers, planers, etc.). Many of the entrepreneurs in the group expected to be able to use the new facilities. This option was clearly more attractive than investing in their own equipment, as they would not have to take out a loan and someone else would have the responsibility for managing the venture. Even though the investors would have to share the facility with a much larger group, the presence of the public sector program put a damper on their willingness to make an investment themselves.

Finally, the group members themselves were not fully committed to the wood business nor to producing duelas, the main product planned for the new venture. Several of the

firms were in another wood business entirely, making furniture or parquet. Some of the entrepreneurs already had significant involvement in other activities (one was a lawyer, for example, and another a local politician). One of the firms that was producing duelas when INFORDE began working in Puyo subsequently shifted to making fruit boxes. Duelas fit into INFORDE's strategy of promoting improved construction materials, but not necessarily into the Puyo entrepreneur's diverse and somewhat haphazard strategies for making a living.

Lessons Learned

Two lessons with broader applicability to small enterprise development can be drawn from the Puyo experience:

1. Promotion of cooperative action should be limited, at least initially, to activities that are directly linked to the members' ongoing enterprises (supplying goods and services that they use or marketing their product). The activities should fit in well with existing business lines and should not require major financial or managerial investments. INFORDE's furniture exporters' consortium is a good example of cooperative action that fits these criteria.
2. Enterprise promoters should generally start with needs and potential investments identified by specific entrepreneurs, rather than starting from an attractive idea and trying to identify and recruit investors.

The Puyo project has been a disappointing entry in INFORDE's otherwise successful record. INFORDE's effort to promote a cooperative duela venture has failed, but the project has nonetheless had a beneficial impact on Puyo's small wood-based enterprises. At least one entrepreneur has been motivated to invest in a dryer for his establishment and

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several businessmen have made minor improvements in their operations, apparently motivated in part by INFORDE's efforts to open up new technical and marketing possibilities for the wood sector in Puyo. The Puyo experience demonstrates that cooperatives do not necessarily offer an easy or appropriate solution to the problems of small entrepreneurs.

APPENDIX C. ABBREVIATIONS AND TECHNICAL TERMS
USED IN THE TEXT

AIMA:	The Association of Wood Industries of Ecuador, the established private association for the wood sector
APIMA:	The Association of Small Wood Industries, a recently-formed association under the umbrella of FENAPI
Bandmill (band saw):	A motorized saw comprising a straight, flexible band that saws lumber by moving back and forth as the band is drawn through the log or as the log is moved forward into the saw; it may be oriented either horizontally (the band parallel to the ground) or vertically (the band perpendicular to the ground)
BID:	See IDB
Cant:	A rough cut log section
Circular saw:	A motorized saw comprising a circular blade with teeth around its circumference and a carriage for carrying the log forward into the saw
CORMADERA:	The Corporation for Technical Support to the Wood Sector, recently established with support from AIMA, DINAF, and FENAPI
Costa:	The coastal region of Ecuador
DINACE:	The National Directorate for School Construction

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DINAF: The Directorate of Forestry in MAG

EMDEFOR: The Mixed Enterprise for Forest Development, a parastatal

FEDEXPOR: The Ecuadorian Federation of Exporters

FENAPI: The Ecuadorian Federation of Small Industries

FPEI: The Forestry Private Enterprise Initiative, an activity of the FSP implemented by SCFER

FSP: The Forestry Support Program, the S&T/FENR project sponsoring the FPEI

IDB: The Inter-American Development Bank

IHPA: The International Hardwood Products Association, an international private sector association

INFORDE: The Ecuadorian field demonstration of the FPEI

INSOTEC: The Institute for Socioeconomic and Technical Studies, a private Ecuadorian foundation designed to help small enterprises

Kerf: The width of the cut made by a saw (and therefore lost)

MAG: The Ecuadorian Ministry of Agriculture

MADEXPO: The annual fair of Ecuadorian wood products in Quito

MAPRESA: A private firm producing treated lumber and other wood products

NCSU: North Carolina State University

Oriente: The Amazonian region of Ecuador

Plan Bosque: The national program to finance private tree plantations

SCFER: The Southeastern Center for Forest Economics Research, a cooperative venture of the U.S. Department of Agriculture, Forest Service, Duke University, and NCSU

S&T/FENR: The Office of Forestry, Environment, and Natural Resources of AID's Bureau for Science and Technology

Sierra: The mountainous central region of Ecuador

Sucre: The Ecuadorian currency (160 sucres = USD 1)

USAID: The U.S. Agency for International Development's Mission in Quito