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Forest Sector Socioeconomic Impact Model for Northern Ontario Communities

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FOREST SECTOR SOCIOECONOMIC IMPACT MODEL FOR NORTHERN ONTARIO COMMUNITIES

INTRODUCTION

Northern Ontario communities, known for their heavy dependence on resource-based industries such as forestry or mining, generally found the 1980s to be difficult times. Unemployment rates were high and local populations declined as families moved to seek employment elsewhere.

Communities dependent on resource extraction have traditionally suffered from the "boom and bust" cycles of fluctuating prices and the depletion of economically accessible resources. These were particularly pronounced during the 1980s. The 1990s have compounded problems from this earlier decade with a new set of difficulties and challenges. The Free Trade Agreements, federal Goods and Services Tax (GST), increased environmental concerns, industrial restructuring, and a host of new technological impulses have combined to alter the operating conditions and norms of the economy. It may not be possible to disentangle cyclical from structural influences, but it is clear that the two components of change now operate simultaneously and reinforce one another.

Too many communities ignore or dismiss the need for economic renewal and diversification until after the closures and layoffs are announced. Although community and government interests in, and support for, economic renewal usually increase after a plant closure or a layoff, it is often more difficult to kick start the economy under conditions of uncertainty.

Generally, there are two major components to accelerating community economic renewal and diversification. The first involves creatively identifying, exploring, and evaluating existing and potential economic opportunities so as to focus on the ones that have the highest probability of expansion and success. The second component consists of the parallel and ongoing initiatives the community can undertake to create the environment and conditions conducive to economic expansion and entrepreneurship. Both must be coordinated into a comprehensive and consistent work plan. This coordination process necessitates a comprehensive, up-to-date database of the local economy, interregional markets, and international markets. The availability of an analytical economic model capable of processing available information and detailing alternative configurations of the economy, as well as measuring the impacts of complementary or competing activities, is also critical to the success of the coordination and planning effort.

Economic expansion or diversification often triggers a complex set of reactions that may lead to permanent changes. The magnitude of these changes depends on a number of complementary factors. Access to jobs and markets depends not only on transportation, but also on the employment and population base. This complementarity creates thresholds that must be achieved before industrial investments can cause significant development impacts. The intended analytical model must incorporate these development thresholds.

A variety of approaches has been used to gauge the developmental impacts of industrial expansions (contractions). These approaches can be grouped into two broad categories: comparative equilibrium models and cycle models. The comparative equilibrium models compute two static equilibria corresponding to before and after industrial expansion (contraction), and use the differences between the two equilibria as indicators of developmental impacts. The second basic modeling approach (Lowry cycle models) involves a cycle in which new employment opportunities in manufacturing or other basic industries lead to increased population and new demands for housing and services, which in turn lead to further employment. The reverse may also be true. This approach emphasizes stages that may or may not be part of a smooth growth process. Rather, growth often proceeds in spurts with the next stage appearing only after threshold levels of available services, demand, and manpower are reached.

Community economic development is currently experiencing many changes due to recent developments in the banking and financial system, drastic decline of many rural and urban communities, high unemployment rates, fluctuations in the economic base, and changing governmental policies. The current economic uncertainty experienced by urban and rural communities has facilitated a new emerging pattern of organizations and strategies for local economic development. Both traditional and alternative approaches are being examined. Many innovative approaches currently being tested show great potential. Examples are given of many successful developmental projects achieved by local people, with assistance from the federal and provincial governments.

In 1948 the term "community development" (CD) was first used officially at the British Colonial Office's Cambridge Conference on the Development of African Initiative. Shortly thereafter, the term and concept spread rapidly to various external donor agencies, as well as to many

national and local governments. A number of modest national CD efforts were launched, primarily in British Africa, around 1950. The first major CD program, however, was initiated in India in 1952. The CD approach in the developing world in the 1950s had its early roots in:

- experiments by the British Colonial Service;
- United States and European voluntary agency activities abroad; and
- United States and British domestic programs in adult education, community development services, and social welfare.

Community development was defined as a process, method, program, institution, and/or movement based on scientific and democratic principles in the solution of common problems. In particular it (a) involves direct participation of the citizens of a community in the solution of their common problems, (b) teaches and insists upon the use of democratic processes in the solution of community problems, and (c) activates and facilitates the transfer of technology to people of a community for a more effective solution to their common problems.

Its keystones were seen as community organization, community education, social action, and self-reliance. A precise definition was believed to be neither realistically possible nor desirable. A rigid definition was seen as producing rigid, ritualized, and standardized programs that would ultimately be self-defeating.

Community development proponents envisaged it as an enterprise by which government and local citizens would be brought together to improve the standard of living of the more downtrodden, vulnerable, and less fortunate people and communities. It is a far broader concept than merely a technique for modernizing or stabilizing a community. Ultimately, it is a process and a system for change.

The 1980s witnessed the rebirth of interest in community development as trickle-down economics left behind large segments of the population and many communities, and subordinated their capacities to catch up with the more dynamic strata of society and the more vibrant and diversified communities. New interest in community development coincided with greater emphasis on development as a social organism.

COMMUNITY DEVELOPMENT AND STABILITY: LITERATURE SURVEY

Introduction

The purpose of this section is to evaluate selected pieces of current literature on community economic development in general and on forestry-dependent communities.

A number of key articles, which extensively cover many aspects of community economic development, have been chosen. The literature is reviewed in the following terms: the financial market, traditional and nontraditional strategies for development, resource-dependent communities, and the governments' roles and policies in development initiatives. Community approaches to economic development are examined primarily in Canada, but examples of American and European experience are also provided.

The literature review is organized into a small set of specific and relevant topics, and articles reviewed are assigned to the topics chosen. Most emphasis is on the more recent literature, but classic contributions are also included.

Propulsive Factors: The Role of Entrepreneurship

There are numerous reasons to believe that rural areas will always be inferior to urban areas in terms of economic growth. One major difference between the two appears to be rooted in the absence of an entrepreneurial class in the rural areas. Reid (1988) examines the role of entrepreneurship in community development in the southern United States.

The author examines how entrepreneurship can be used as a strategy to aid rural areas in improving their economic growth. Pulver (as cited in Reid 1988) stated: "Rural America cannot live off the creativity of urban areas without paying a severe economic penalty. Entrepreneurship is critical to the maintenance of a healthy rural economy." Indeed, entrepreneurship appears to be a beneficial component of an economic strategy for the rural southern United States.

The meaning of the term entrepreneurship was examined and it was concluded that despite the mountains that have been written about the subject, public understanding of it, especially its applicability to rural areas, is not good. Several definitions of the term were examined, but the following one was chosen: the creation of new, independent business (i.e., not branches, franchises, or subsidiaries).

The author focused on ways that entrepreneurship can benefit rural communities. It would increase the number of jobs, and generate income. Further, a correlation likely exists between a high rate of births and deaths of firms, and a high capacity of a community to respond to changing economic conditions. In other words, the more entrepreneurial enterprises, the stronger the chance the community will respond to faltering economic conditions. Also, entrepreneurship may strengthen human capital as it educates citizens. This, in turn, could increase new business. Finally, locally controlled business may be preferable to firms managed from the outside.

Realistically, entrepreneurship may not be as successful in rural settings as in urban areas. Because urban areas are already centers of economic activity, they have certain advantages that rural areas characteristically lack. Urban areas have diversified labor markets, which means that new businesses are more likely to find local employees with needed skills. Furthermore, urban areas have a network of firms that collectively formulate a supportive economic framework that allows new firms to focus on their innovations, and not all aspects of business operations. Finally, urban areas provide ready markets for products, even specialized products. Reid (1988) summarized: "The advantages of agglomeration enjoyed by urban areas are not only responsible for their economic success, but they are, in effect, the principal features that define and distinguish urban economies from rural." Indeed, urban areas possess many advantages over rural areas when dealing with entrepreneurial pursuits.

Entrepreneurship will also work better in some local communities than it will in others. Thus, looking at each rural area on an individual basis is far more beneficial than is lumping all such areas together. In other words, the factors that affect entrepreneurship should be examined in each individual community to assess if a favorable climate for entrepreneurship exists. Reid (1988) identified levels of knowledge and skill within the local labor force, the quality of communications and information flows, the level of vitality in the small business sector, and the current pattern of self-employment as factors that affect entrepreneurship.

The author examined the prospects for entrepreneurial growth in the southern United States, and stated that entrepreneurship should not be regarded as a panacea for all of the rural South's economic problems.

There will be obstacles that must be overcome in order to experience success with entrepreneurship. For example, the quality of education must be improved in the South, and community support must be increased. The South possesses strengths, such as strong urban areas, which would influence surrounding rural areas. Overall, Reid (1988) summarized in the final analysis that entrepreneurship presents rural areas with an opportunity and a challenge. The opportunity is to reshape their economies in ways of their own choosing. The challenge to community and regional leaders in the South is to perceive and seize this opportunity. Indeed, entrepreneurship could be a valuable resource in rural communities that possess a favorable climate for such experiences.

Traditional and Alternative Opportunities for Local Economic Development

New industries have increasingly located in the southern United States due to the availability of low-wage labor.

However, with the evolving internationalization of the economy, this trend is changing. Green and McNamara (1988) focus on strategies, both traditional and alternative, that may be implemented in the South to stimulate the economic climate. Alternative approaches are favored because they would provide greater benefits in rural communities.

Despite the approach taken to stimulate economic development in rural communities (i.e., traditional vs. alternative), it is essential to examine those factors that affect local development, as well as the conceptual foundation for rural development. The rural South has many unique attributes that must be taken into account. Included in these attributes are demographic changes, a crisis in the agriculture industry, and financial deregulation of the banking industry.

Strategies for economic development were grouped into the following five categories: industrial recruitment, industry expansion and retention, new business formation, capturing local dollars, and increasing state and federal transfers. According to Green and McNamara (1988), each of these strategies (not necessarily mutually exclusive) offers growth potential for local economies through export expansion, import substitution, or increased productivity. The key for successful rural economic development is the identification of strategies that provide the greatest potential returns to the community from some combination of these three sources of growth.

The strategy of industrial recruitment, which stimulates growth through export expansion and import substitution, has been a foundation of economic development in the rural South. However, with the change in industrial migration patterns, industrial recruitment is no longer a strong option for the South. Also, the strategy of expansion and retention of existing industries in the rural South is not a strong option.

The strategy of new business development can be useful for communities that lack the physical, social, and human capital infrastructure to attract and/or retain manufacturing industry Green and McNamara (1988). Furthermore, the strategy of capturing local dollars, which is a form of import substitution, is not realistic because of the improved transportation links with urban areas. There has been a steady decline in rural retail spending, and this is unlikely to reverse. Finally, the strategy of increasing federal and state transfers has experienced some success. Green and McNamara (1988) stated: "Many local governments have been successful in reacquiring dollars taxed away by broader governmental units. Planning district commission staff have provided immeasurable assistance in these efforts, especially for rural county governments that do not have the human resources for grant writing."

Nontraditional alternatives for stimulating economic growth in the rural South were also examined. The authors suggested that the success of these nonrecruitment strategies, however, is based on the existence of traditional community institutions for human and financial capital to provide the basis for sustained economic growth. Two factors were focused upon when analyzing alternative approaches: access to financial capital, and patterns of company ownership and organizational structure.

Business and Industrial Development Corporations (BIDCOs) are an alternative method to aid companies, which have problems obtaining loans from a commercial bank, to obtain capital. The approach taken by a BIDCO is referred to as a 'risk return initiative' (Green and McNamara (1988). BIDCOs use two methods to channel credit to small businesses: first, BIDCOs can make a Small Business Association (SBA) loan and sell the guaranteed portion of such loans on the secondary market; second, BIDCOs can borrow from private sources and make non-SBA loans (Green and McNamara 1988).

The nontraditional approaches of Capital Access Programs have their bases in the portfolio or pooling concept. An example of this program is the Loan Loss Reserve Program, formulated by the Michigan Strategic Fund, which gives banks a special reserve to cover loan losses. The reserve is established through matched payments made by the borrower and the bank. Borrowers and the bank must make a contribution between 1.5 percent and 3.5 percent.

The approach of the Community Reinvestment Act (CRA) of 1977 has become an effective method to challenge the loan practices of commercial banks and to increase support and attention of community economic development. The CRA (and the Home Mortgage Disclosure Act [HMDA]) were passed by the United States Congress to decrease the practice of redlining. Redlining is discrimination against poor and minority neighborhoods in the areas of bank lending and consumer services.

The HMDA provided information on banks' lending patterns, and subsequently the CRA could be used to challenge applications by banks to open branches, merge branches, etc.

The final alternative approach examined was employee-community ownership. The main benefit of employee-community owned companies is that they can continue to operate despite the trend of relocation of other companies overseas. Green and McNamara (1988) stated: "Employee ownership also creates a transition in which the base of the community's economy is owned by outside or corporate interests to direct local ownership and control." The main drawback to this approach is the amount of capital required to buy a company.

Urban Community Development in Canada

Perry et al. (1993) have studied the comparative experiences of urban community development in Canada, the United States, and Europe. This work makes use of one specific section of their report—Appendix D: Remarks on Development Policies in Canada and Elsewhere. Focus was placed on community economic development trends in Canada. Community development programs and policies emerged during the early 1960s in the United States, Canada, and the majority of European countries.

The main community development programs in this country were implemented through Employment and Immigration Canada (EIC) during the early 1970s. This department also introduced the Local Employment Assistance Program (LEAP), which lasted for 12 years. It was aimed at both urban and rural communities. The EIC also initiated Local Employment Assistance and Development (LEAD) to support community business initiatives.

In 1986, the Communities Futures Program (CFP) was created from the LEAP and LEAD programs. The CFP consists of the following five areas:

1. Community Futures Committee
2. Business Development Centre
3. Self-employment Incentive Option
4. Community Initiatives Fund
5. Purchase of Training Option

Fontan (1993) stated that the Community Futures Program is addressed to communities or groups of communities seriously devitalized and located outside major urban centers. The devitalization indicators are linked to high unemployment, to higher-than-average poverty levels, to a major exodus of young people, and so on. The program's aim is to find solutions for bringing long-term stability to the local job market by encouraging communities to gain control over their own development.

Other government departments that have had an important role in local development are the Department of Indian Affairs; the Department of Industry, Science and Technology; and Health and Welfare Canada.

The community development issue has been mandated only at a federal level. No provincial policy exists on local development. However, some provinces have been intervening in local employment ventures. An example of this is the city of Montreal. Currently, seven CEDCs exist in Montreal. Fontan (1993) stated that Montreal's CEDCs tackle the poverty issue through job creation, business development, training, and community and land use development. CEDCs also serve as intervention tools through which public funds for vocational training are set aside to develop the job-readiness of the areas' population.

Fontan (1993) sought to observe if any of the theoretical approaches or constructs reviewed are applicable to the forestry industry. The report was focused primarily on urban Canada, and based on research on 44 community economic development (CED) initiatives. Thus, limited information was found that would be applicable to the forest sector.

The report describes intervention models and how they may be developed. This would be applicable to the forestry issue only if there is a desire to develop an intervention model.

A survey done in 1986 refers to different CED models in rural Canada. Fontan's (1993) survey describes several models created for rural development organizations in Newfoundland, New Brunswick, Quebec, Manitoba, and Alberta. The 'regional development associations' in Newfoundland may also be adaptable to the forest sector. Fontan (1993) stated they were: "Born out of the resistance to government resettlement policies, and now functioning as intermediaries between residents and government in the absence of a dynamic system of local government." Fontan (1993) suggested that if the survey was done today, the results would be very different.

The CED model described by Fontan (1993) emphasizes an innovative approach to economics. Fontan (1993) described the model as follows: "It establishes a new economy based essentially on the development of autonomous communities...To achieve the desired local autonomy, Bruyn states the importance of creating viable democratic institutions, that is, institutions that are controlled by community representatives and serve the local population. These different institutions are planned and "governed" by a central structure, the community economic development corporation."

The CDCs offer the most comprehensive mechanism for revitalizing distressed communities. They engage in a wide range of activities: housing development, commercial revitalization, business financing and assistance, daycare centres, job training and placement, social service delivery, cultural activities, advocacy, and the creation of other institutions such as credit unions, coops, and loan funds.

Examples of CED corporations that may be useful to the forest sector are as follows:

1. Technical Resource Groups—involved with research, consulting, publishing, documentation, training volunteers, and other activities.
2. Community Land Trust—involves the purchase and management of property (land and buildings) by community representatives.

3. Community Loan Fund Association—this corporation has two functions: an investment fund, and provision of aid to economic projects within a community.

New Approaches to Local Industrial Development

Local industrial development is currently undergoing changes that emphasize local initiative and resources, supported by local, state, and federal governments. This section focuses on Whyte's (1985) study of the potential of these new changes and his examples of successful initiatives undertaken at a local level with support from government officials (at all levels).

The underlying reason for the changes in local economic development is the lack of success of the current system. Overall, the government is not doing an effective job at creating employment and stimulating the economy. Whyte (1985) suggested one reason for this is due to local governments competing with each other; this cutthroat competition does not provide an overall benefit to the national economy.

There has been some confusion and lack of clarity in development attempts as initial establishment of this new pattern emerges. However, there have also been some highly successful initiatives. The success of the initiatives depend, in part, on a major shift in the roles of the state and federal governments. Whyte (1985) stated: "Instead of doing things for and to local people, federal and state officials are beginning to devise programs designed to help local people do things for themselves. In this new framework, successful projects are those that achieve a skillful combination of federal and state support, and guidance with local initiative and resourcefulness."

Whyte (1985) cited examples of the enabling organizations and programs of state and federal governments that allow local initiatives to occur. One example of a higher level of government that enabled a local project was the Economic Development Administration (EDA) program that was established in 1965. The program was geared to areas that suffered from high unemployment and slow economic growth. The EDA provided initial financial support, but the recipients of this support were expected to contribute in increasing proportions over time.

This chapter also examines the example of the Mohawk Valley Economic Development District (MVEDD), which highlights the variety and complexity of activities that can be undertaken to stimulate and support economic growth in a community. This is one of the most effective EDD initiatives in the United States. The MVEDD has undertaken traditional tasks and services (e.g., helping cities to get funds for sewage treatment). However, the MVEDD was also engaged in innovative activities. For example, a

mill in the local community was being forced to close. This would have caused 260 workers to lose their positions. Through the efforts of the MVEDD, a group of private investors was brought together to keep the plant operating. Otherwise, liquidators would have stripped the plant and left it of little value, except as a warehouse. Thus, the efforts of the MVEDD saved 260 jobs and prevented a functional building from potentially remaining empty.

Another example is the Chatauqua County Industrial Development Agency (CCIDA), which was involved in the successful economic growth of Jamestown, New York. The CCIDA aided during the Jamestown plant shutdown crisis by working in conjunction with local bankers to reorganize and refinance the five plants that were threatened with closure. Also, the CCIDA raised funds from industrial revenue bonds. This money was used to finance community stabilization and expansion activities. Many new industrial projects are currently in process through the IDA.

Community Development Corporations (CDC) have also been experiencing some success. Whyte (1985) stated: "The controversial character of community development corporations seems due, in part, to unrealistic expectations that these new and unfamiliar organizations, without highly trained and experienced leadership, and with a small and insecure financial base, would accomplish in a few years what private organizations have so far been unable to accomplish." Whyte (1985) suggested that the CDC should be thought of in more realistic terms. Despite the fact that the CDC is a new organizational model, which is still under formulation, there have been enough success stories to merit more attention and support from the public. Some cities have had major activity from CDCs in the form of housing rehabilitation and economic stabilization of neighborhoods. Furthermore, some states, such as Minnesota and Massachusetts, have established programs to finance CDC initiatives.

The most effective way the federal government can support local initiatives is to take an enabling role, which would encompass stimulating and supporting local initiatives through legislation, technical assistance, and financing. However, Whyte (1985) posed the following question: "Can the federal government meet its responsibilities for accountability in the expenditure of public funds without imposing rules and regulations, controls, and reporting procedures that destroy the local initiative and resourcefulness necessary to solve local development problems?"

Forest Sector Dependent Communities

The forest resource has fostered the formation of many single-industry communities. This is not different from other natural resource-based economies located in remote

areas. To the extent that natural resources are found and developed far from urban centers, and to the extent that the technologies used in harvesting and processing are weight- and size-reducing technologies, the economic activities involved in the development of natural resources tend to be clustered around the resource and away from higher order central communities.

Communities with narrow economic bases are very vulnerable to fluctuations in the demand for the products that they produce. Given that much of Canada's resources are exported, these communities are susceptible to foreign business cycles, particularly those in large, industrialized western economies. Demand shocks are augmented by short term and long term supply shocks.

When the fortunes of the dominant industry in a community wane, the entire life and stability of the community suffers. Fluctuations in the dominant (sometimes single) industry are transmitted throughout the entire economic structure of the community because other sectors are generally totally dependent on it. The share of the dominant industry in total community employment is often a poor estimate of its importance and role in the community.

At present there does not appear to be a readily and generally acceptable method for identifying the extent of dependence of a community on its dominant industry. Equally important is the absence of an explicit definition of the term "community dependence". The literature often confuses dependence with the share of the export base of the community. Tiebout (1956) and Pleeter (1980) classified communities as dependent on a particular industry if that industry comprised a significant portion of the direct export or economic base. Economic-base theory is rooted in the notion of the basic sector. The latter comprises any activity that derives its income from sources that are external to the regional economy. Exporting industries are the engines of growth of the community. The nonbasic sectors produce only to support the basic sectors. While basic sectors generate income, nonbasic sectors recirculate income.

Tiebout (1962) was the first to conceptually develop a straight-forward method for measuring the economic base of a community. It involves a tally of the goods leaving the community. The value of these goods (exports) will be a measure of their contribution to the economy. More recent measures involve the use of the *location quotient*. This measure is based on the implicit assumption that if a community is highly specialized in an activity relative to the national or provincial average, then the portion of that industry's activity above the average is considered to be export activity. However, the accuracy of this technique is in doubt because of four major problems:

- There may be no national exports, or indeed the nation could be a net importer or it could be self-sufficient in that industry. In either case the location quotient will under (over) estimate the export base.
- Consumption patterns differ across regions and between a region and the nation. The location quotient assumes that consumption patterns are identical across regions.
- To the extent that labor productivity within an industry differs across regions, differences in the location quotient may be due more to differences in productivity than to differences in export performance.
- Aggregation of heterogeneous commodities into homogeneous products undermines the accuracy of this measure.

There is an extensive literature on salvaging the location quotient as an unbiased estimate of the community economic base. White et al. (1986) and Fletcher et al. (1991) have presented imaginative attempts to define forest-dependent communities in Canada using adjusted location quotients. The adjustments revolve around using disaggregated industry data; adjusting for productivity and consumption preference differences across industries and regions; and segregating local, dependent industries from basic industries.

SELECTED MEASURES OF SUSTAINABLE FORESTRY AND COMMUNITY DEVELOPMENT

The Need for Quantifying the Multiple Benefits of Forests

It is now evident that the role of the forest sector as an engine for growth and stability in Ontario's northern communities has not been sufficiently analyzed in quantitative terms. General statements about the multiple benefits of forests abound in a number of policy papers, management manuals, and Crown Timber Acts of the Ontario Ministry of Natural Resources (OMNR), but no specific study has been made at the community level to determine the extent and strength of dependency of communities on their forestry sector. For example, the OMNR's Forest Policy Panel recommended in 1993 that community sustainability and resource use sustainability be building blocks of an adaptive ecosystem management policy framework. More specifically the objectives of a new Crown Timber Act, Bill 171 of the provincial government, focus clearly on managing Crown forests to meet the social, economic, and environmental needs of present and future generations. A draft version of the *Forest Management Planning Manual for Ontario's Crown Forests* stipulates:

"Various ecological, social and economic criteria and indicators are selected to provide the basis for setting forest management objectives that distinguish sustainable from non-sustainable forest management approaches. Periodic monitoring of a set of measurable indicators for each criterion allows assessment of progress toward a goal of sustainable forest management. ... Sustaining communities and forest based industries is second only to sustaining the forest."

Forest managers, however, still face real problems in managing in a sustainable manner all the jointly produced goods and services of a forest. They have to meet the demand of the industry for timber and that of the general public for all the goods and services of the forest: such as, recreation, aesthetics, climatic regulation, soil and water conservation, wildlife habitat, and so on. Complications arise from a number of related sources:

- First, when firms make choices about production levels and quality for a wide range of goods and services, there is a strong interdependence between current output choice and the level of capital stock (timber). On the one hand, there is little flexibility in the output mix except through alteration of the timber stock itself. On the other hand, the nontimber outputs (services of the forest) are dependent upon the characteristics of the land and its stock of standing timber.
- Second, as explained elegantly by Bowes and Krutilla (1989), the lack of competitively determined market prices is a source of great difficulty in the forest manager's choice of an appropriate mix of products and quality of services. Without prices to make users aware of the social costs of their activity, there is always a tendency to overuse and pressure to increase the level and quality of the nonmarket services. The manager, without prices as a clear signal of relative value, faces a complex planning process, balancing demand pressures against the realities of limited budget and the professional paradigms of good forest management. Thus, quantitative analysis of both the marketable and the nonmarketable forest products is a prerequisite to developing a viable forest management strategy.

Definition and Stability of a Community

O'Neill (1994) has pointed out that the term community has been defined in a variety of ways: administrative, spatial, cultural, economic, social, religious, and so forth. A social approach would define a community as a collection of people with similar ethnic backgrounds, cultural attitudes, racial origins, and so on.

The concept of stability as used in forestry has many meanings (Waggener 1977). Generally, an absence of sudden and unpredictable change in key variables is

believed to be a sign of stability. But, the difficulties associated with community stability as a forest policy objective need to be identified.

- First, what is to be stabilized and what are the commonly accepted indicators of stability? In the forestry literature, reference is made to several measures of stability. These include stability in timber supply, output levels of manufactured products, prices of both inputs and outputs, and employment and income levels. But, one should keep in mind that stability in one variable is often accompanied by instability in other variables.
- Second, is it possible to establish a geographic reference point as a stability measure? In the view of these authors, it is not. Any attempt to do so leads to a parochial concept of community. It is important to realize that in modern economies the concept of community is neither clear nor simple. In the advent of technological progress, in both production and communication, the concept of a *socioeconomic community* has altered greatly. Consequently, the geographical concept of community in a strategic policy formulation for forest management may have to be altered. This is because forest management should take into account a number of spatially linked and dynamic social, economic, ecological, and institutional forces.
- Third, what is the time dimension of community stability? Regardless of whether stability is defined as constancy or as an orderly rate of change of selected measures or in terms of the variance of change around a trend variable, identifying a time dimension for determining whether stability has been achieved is important. Whether one uses a month, a year, a decade, or a full timber harvest rotation age as a measure will make a considerable difference in forest management decision making.

In summary, the latest coinage of powerful concepts such as: (a) biodiversity, (b) adaptive ecosystem management, (c) sustainable timber harvest levels, and (d) community stability and dependency should not be used simply to influence public opinion and policy makers without being based on solid results from quantitative analyses. The Community Development Impact Model (CDIM), which is described later in this report, is designed to alleviate some of the difficulties community planners face in formulating strategic plans for community development. It offers some concrete measures of a key variable in policy discourse, i.e., community dependence on forestry.

The Concept of Community Dependency: A Reassessment

Dependence is a relative term, and it can seldom be defined precisely. If there is socioeconomic dependence

of a community on the forest sector, it is a certain degree of dependency. For the purposes of implementing the new Crown Timber Act (Bill 171), for example, a forest sector dependent community has to be clearly defined.

Different countries appear to apply different definitions. For communities of 9 999 or less inhabitants, a Canadian Forest Service report by Pharand (1988) defines a community as forest-sector dependent if the percentage of the labor force in the Standard Industrial Classification (SIC) groups devoted to the forest sector is 30 percent or greater. For the purpose of implementing the Forest Management Act of 1976, a dependent community has been defined by the USDA Forest Service as one where (1) primary forest products manufacturing facilities account for 10 percent or more of the local community work force, and (2) national forest timber has accounted for at least 30 percent of the annual timber supply in the last 5 years (Waggener 1977).

Two dependency ratio measures were developed and used in this study to broaden the perspective of the measurement. The first attempts to measure the excess of local employment in a particular basic sector over the provincial average. To the extent that the community shows a higher share of employment in basic Sector *j* than does the province, the community is said to be so much more dependent on this sector than is the province. This is still in the general framework of earlier work on dependent communities alluded to above.

$$D_j = \frac{\left(\frac{E_{rj}}{\sum_j E_{rj}} \right)}{\left(\frac{\sum_r E_{rj}}{\sum_r \sum_j E_{rj}} \right)}$$

where:

- D_j = dependency ratio for Sector *j*
- E_j = provincial employment in Sector *j*
- E_{rj} = community employment in Sector *j*

The share of direct employment in Sector *j* is generally not an appropriate measure of the extent of dependency and importance of Sector *j* in the local economic base. The closure of a mill does not only deprive a community of the direct employment in the mill, but would involve contractions in other sectors linked indirectly to it. This is why the authors present the total added employment in the community as a multiple of the added direct employment in Sector *j*. For example, a value of 2.0 for this multiplier suggests that the community derives one job outside

Sector j for every direct job in Sector j. This cannot be accomplished without a broad and comprehensive community impact model of the type discussed below. The total impacts, and not the direct impacts, are the true measures of the community dependency on the forest sector.

COMMUNITY DEVELOPMENT IN NORTHERN ONTARIO

In the 1960s and the early 1980s, the Canadian government initiated a variety of strategic policies designed to generate structural adjustments in underdeveloped regional and provincial economies. Different organizations were created to implement the policies. They include: in 1962 the Atlantic Development Board (ADB), in 1963 the Area Development Agency (ADA), in 1969 the Department of Regional Economic Expansion (DREE), and in 1982 the Department of Regional Industrial Expansion (DRIE). However, as O'Neill (1994) explains, an increased interest in and acceptance of locally based economic development in the 1990s was partly due to the failure of past attempts to deal with the disparities in income and employment opportunities in different regions, provinces, and subprovincial areas.

The Quest for Diversification

The strategy of basing development on advanced stages of processing natural resources is generally motivated by the desire to capture the high value-added component of such activities, to diversify production and exports, and to exploit such comparative advantages as may exist in the production of competitive commodities. Processing may also contribute to several other development goals. It often entails high degrees of utilization of local resources and fits well with the resource endowments of northern communities. Diversification of exports is important because the markets in which finished products can be sold are more diversified geographically than are those of logs and crude forestry products. When the processing of natural resources is carried to the fabricating or manufacturing stages, it may also encourage local production of products not related to the natural resources. In this way, forward and backward integration of the input/output structure of the local economy might lessen its dependence on forestry, and thus promote, more generally, the important objective of economic diversification.

The successful involvement of northern communities in the processing of natural resources and semifinished goods will rely on a number of interrelated factors. Three such factors will be decisive:

- input availability;
- conditions of processing; and
- characteristics of output.

Input availability must be measured by comparative cost criteria. Natural resources and other complementary inputs must be assessed in terms of their availability in sufficiently large quantities to make it possible to process them economically *in situ*. Whether they can be imported at advantageous prices, as an alternative to domestic supply, is another critical consideration.

Conditions of processing are determined by the technologies used in the processing activities, and here there are three main considerations. The first pertains to the extent to which economies of scale facilitate or impede the locating of productive capacity in the local area, because of the abundance or lack of either the raw material itself, or of other complementary inputs. The second relates to the range of technological choice available within the industry, and possibly to the availability of processing systems that are particularly suited to the conditions of the region. The third has to do with the development of new technologies, or variance of existing ones, which may alter some of the circumstances militating against processing in the region.

The characteristics of output that are of special importance are those that determine the difficulties encountered in supplying end products to distant markets, including transport and storage problems, marketing and distribution difficulties, and tariff and nontariff barriers.

Traditionally, industrial development has been viewed from a *horizontal perspective*. That is to say, attention has been focused on activities as they relate to products classified by major sector of production or by categories of subsequent use. Typically, analyses of manufacturing are carried out in terms of light and heavy industry, or in terms of consumer and capital goods. This approach makes it difficult to distinguish different activities within a given branch of industry. On the other hand, an examination of resource-based industrialization requires a *vertical perspective*. That is, activities must be examined according to their stage of processing in terms of primary, semifinished, or finished goods, rather than according to the characteristics of the final product. Moving down or up along the processing stream may reveal as much diversification as moving off-stream.

Impact Analysis and Community Development

Impact analysis provides a quantitative assessment of the economic consequences and secondary effects of economic measures and activity. To the extent that impact analysis is capable of identifying second-order effects of economic projects and programs that are not typically identified and gauged by qualitative analysis, it provides a framework for analyzing alternatives.

Impact analysis concentrates on a number of macroeconomic measures. These are beyond the microeconomic assessment of feasibility. Rather, impact analysis should be considered as a complementary tool to financial feasibility. It goes beyond the financial aspects of a project and program to the likely amount and types of jobs that are expected, and to changes in the tax base of the community as new activities come on stream or disappear.

There is a general and pervasive tendency to adopt and to concentrate on the multipliers of impact analysis. This approach is fundamentally flawed. First, these multipliers are the end result of impact analysis and not the initial tools. Second, these multipliers, if they exist, are specific to an initial weighting of the expenditure stream associated with a particular activity. They are not transferable and/or transportable. They apply to that particular situation only. A different vector (composition) of expenditures would generate an entirely different multiplier.

Communities face alternatives. Resources are scarce and choices must be made. Impact analysis is an efficient tool for aiding in the evaluation of alternatives, but it is one such tool of many. A multiple social accounting framework will always include impact analysis but it is not restricted to it.

IMPACT ANALYSIS: A SYNOPSIS

Economic impact analysis is a useful mathematical tool capable of quantifying the patterns and magnitudes of interdependence among sectors and activities. It is predicated on two fundamental propositions. First, regardless of the inherent value of primary activities, such as recreation or tourism, to the extent that projects involve the use of scarce resources they generate economic consequences that can be measured and compared. Second, economic impacts are only partially captured by assessing direct expenditures. Inasmuch as the economy is a complex whole of interdependent and interacting activities, there are some significant indirect and induced impacts associated with every direct expenditure. These indirect and induced impacts are often larger than the direct impacts.

A dollar spent on either the construction or operation of a project circulates and recirculates within the economy, multiplying the effects of the original expenditures on overall economic activity. This process is referred to as the economic *multiplier effect*. It operates at several levels. The initial construction expenditures on wages and materials are generally referred to as the direct costs of construction. Their effects are referred to as the *initial (direct) effects*. Subsequent purchases by suppliers of materials and services to sustain the original and derivative expenditures are called the *indirect effects*. *Induced effects* emerge when workers in the sectors stimulated by initial

and indirect expenditures spend their additional incomes on consumer goods and services. The circulation and recirculation of impacts are contingent, however, on local sourcing of materials. To the extent that imports are purchased, the circulation process is aborted.

Cost-benefit and Economic Impact Analyses

Cost-benefit analysis (CBA) and economic impact analysis (EIA) are two critical components of a broad social accounting framework for the evaluation of projects, activities, and programs. While CBA is directly concerned with valuation of the primary benefits of activities, EIA is more concerned with the secondary economic consequences that follow and sustain primary functions. For example, the benefit of tourism is in the recreational value to the tourist. But tourism expenditures also sustain economic impacts in the communities where the expenditures are made. At times the two analyses are confused for one another, but they are not substitutes; rather they are complements. Both are needed for a thorough evaluation of a program.

In CBA, employment is a cost to the extent that labor in one activity could be used in alternative activities. The cost of labor in Activity A is the foregone output of Activity B that could have employed the labor in Activity A. In EIA, employment is a positive contribution to the economic base of the community, particularly if the community is experiencing unemployment or is heavily specialized in a narrow set of economic activities.

EIA uses input-output analysis to identify the increase in value added, employment in the community, and changes in the overall economy of the province. Changes in value added and employment are measures of changes in economic activity and are not measures of benefit and cost in the welfare economic sense. These measures are merely the upper limit on the opportunity cost of the resources employed in the various activities that generate the value added.

EIA practitioners often neglect the need to consider alternative uses of funds and opportunity costs embedded in undertaking one specific activity rather than another. They are also frequently guilty of using gross impacts instead of incremental impacts. To the extent that the projects considered are small and the economy is operating with generalized excess supplies, neglecting alternative uses of resources and concentrating on gross impacts do not lead to exaggerated or distorted impacts. This is not the case if the projects are large and the economy is operating with bottlenecks and shortages. Large investments involve the use of scarce resources that have alternative uses and require large funds that have to be paid sooner or later. In these circumstances the use of EIA

without concern for CBA is unwarranted and will lead to distorted results.

Alternatively, the use of CBA without regard for EIA of activities gives only a micro perspective of the contributions and costs of the project. EIA bridges the gap between micro- and macroanalyses of activities.

EIA is best performed to evaluate alternatives that can be scaled to the same level of expenditures or the same level of output. Furthermore, net impacts and not gross impacts should be calculated. For example, if a project is financed by raising taxes, the positive impacts on employment by the expenditures should be compared with the negative employment impacts of higher taxes and lower consumer and business expenditures. Care must also be taken to insure that the results of the EIA are consistent with the implicit assumptions made about the state of the economy and the financing schemes.

STRUCTURE OF THE COMMUNITY DEVELOPMENT IMPACT MODEL (CDIM)

The impact model described here is a special application of the generic impact model developed by Econometric Research Limited (ERL). It is unique in that it captures the economic impact of expenditures on investment projects and other activities at the community level and the provincial (Ontario) level. The model is based on a novel technology that integrates input-output analysis and location theory. The system has already been applied to study the economic impacts of the Windsor Casino, the West Edmonton Mall, the Ontario forestry sector, the frigate program in Atlantic Canada, the Great Whale Hydroelectric Project in Quebec, and a host of other activities both in Ontario and across Canada.

Generally, the economic impact of activities is measured from the demand side by considering the expenditures associated with the activity in the local area. Only rarely has this analysis been made from the supply side by considering the operations of affected establishments. The system adopted here measures impact from both sides—supply and demand. The authors' main motivation for emphasis on the supply side is based on findings in several applications that the two sides may be made to reconcile to a very small difference (this reconciliation procedure is a unique ERL system), and that the two sides present different perspectives of impact results. The demand side concentrates on expenditures of consumers, businesses, or foreigners (exports) and, as such, provides a good vehicle for measuring the differential impacts by sector (type of expenditure—machinery, construction, etc.) and by origin of expenditure (Ontario, other provinces, or foreign countries). Demand-side analysis, however, does not allow the analysis of impact on local

businesses by the type, location (central vs. noncentral), ownership (corporations, partnerships, or single proprietors), or size (top quartile, bottom quartile, etc.) of business. This type of information and analysis is of fundamental importance to the development of a policy strategy capable of assessing sensitivity of different sectors and businesses. Only supply-side analysis can provide these results.

A variety of approaches have been used to gauge the developmental impacts of industrial expansions (contractions). These approaches can be grouped into two broad categories: comparative equilibrium models and cycle models. The comparative equilibrium models compute two static equilibria corresponding to before and after industrial expansion (contraction), and use the differences between the two equilibria as indicators of developmental impacts. The second basic modeling approach (Lowry cycle models) involves a cycle in which new employment opportunities in manufacturing or other basic industries lead to increased population and new demands for housing and services, which in turn lead to further employment. Impact analysis belongs to the first group of comparative equilibrium models. Based on an accounting framework that is published regularly by Statistics Canada, it organizes the economy into sets of commodities and industries. While the national tables are produced on an annual basis, the provincial models are produced every 5 years.

The Provincial Model

The provincial economy is comprised of 25 industries and 43 commodities. However, only 20 industries are considered to be provincial sectors. The remaining five are considered only as local sectors. The provincial sectors cater to provincewide markets and demand inputs from other provincial sectors and from local sectors. Final demands (consumption, investment, government expenditures, exports, and imports) are defined in terms of the 43 commodities. Market shares assign commodities to industries and a technology matrix defines the cooking recipes of the various industries. For every commodity, a balance equation is defined that allocates it to intermediate and final demands. For every industry, inputs are either reproducible commodities or primary inputs whose income shares define value added (wages, rent, interest, and profits).

The Local Model

The sectors of the provincial model are divided into two groups: provincial and regional. The supply of output from a provincial sector is used first to satisfy the regional demands where it is located; any remaining output is then allocated to other regions in a declining order of geographical proximity. The closer a given region is to the

supplying region, the larger will be its share of the supply of the provincial sectors in the supplying regions. These supplies are assumed to be fixed proportions in any given region. However, they differ from one region to another for any sector and from one provincial sector to another for any given region. Local impacts are the sum of local sectors' output or value added and the proportions of provincial sectors operating within the region.

An Illustration of the Model

To demonstrate the utility of the system, the authors developed a hypothetical case where output of pulp and paper in Kapuskasing is put at \$150 million (Table 1). The economic impacts of this output on the province and on the local community were calculated using CDIM. The results of this scenario are presented below.

Economic Impacts

Operating the pulp and paper industry in Kapuskasing at the \$150 million level has an impact of \$348 million provincewide in gross output. More than \$210 million in income is also generated. The total provincial employment associated with this industry is 3 428 person-years.

All levels of government collect \$77 million in taxes. Kapuskasing retains only a fraction of these impacts. The local gross output impact is estimated at \$92 million, whereas the income impact is put at \$56 million. About 895 person-years of employment represent the local contribution of this industry. More than a million dollars in local taxes are raised by the city on the operations of this industry.

Social Impacts

Economic systems do not operate in a vacuum. Rather, they are strongly connected to social and environmental systems. It is also difficult to portray the community system fully in terms of pure economic indicators. There exists a host of social indicators that complement and substantiate the economic indicators discussed above. Essentially, the two sets intersect and reinforce one another.

Two basic sets of social indicators are singled out in this study. The first set pertains to wealth (property) variables that connect flow economic variables to property values and the local tax base. They also relate new economic

Table 1. Economic impact results. (all \$ in millions)

Impact indicator	Provincewide	Kapuskasing
Gross output		
Direct	\$150	\$150
Indirect and induced	\$198	(\$58)*
Total	\$348	\$92
Multiplier	2.32	0.62
Value added		
Direct	\$50	\$50
Indirect and induced	\$160	\$6
Total	\$210	\$56
Multiplier	1.40	0.38
Employment (person-years)		
Direct	867	867
Indirect and induced	2 560	28
Total	3 428	895
Multiplier	3.95	1.03
Labour income		
Direct	\$33	\$33
Indirect and induced	\$107	\$5
Total	\$140	\$38
Taxes		
Federal	\$40	\$12
Provincial	\$27	\$7
Local	\$10	\$1

* The local community is not capable of sustaining the full input requirements of the total output impact. A portion is imported from outside the region.

values to their existing magnitudes (Table 2). The second set of indicators attempts to measure the extent of dependency of the community on its dominant sectors. These measures, reflective of the stability and the vulnerability of the community to outside shocks, have already been discussed above (Table 3).

The average wage in the pulp and paper industry in Kapuskasing under this scenario is \$41,262. This is 7.6 percent above the average wage in the city. Corresponding to this wage, the average price of a house is slightly above the current price.

It is clear from Table 3 that the dependency of Kapuskasing on pulp and paper is a multiple of the provincial norm. There is nothing surprising in this, as forestry is the mainstay of the community. Perhaps less appreciated is the fact that for every job in the pulp and paper industry, more than one-and-a-half jobs in the community at large owe their existence to this industry.

Assumptions of the CDIM

The entire study is based principally on input-output tables prepared for Ontario in 1984 by Statistics Canada. These tables portray in detail the intricate structural framework of Ontario's economy for a single period of time. The economy is divided into 25 industrial sectors and 43 commodities.

The inter-industry system is based on two fundamental identities. The first is that the total output of an industry is equal to the value of all inputs. The second identity is that the sum of primary inputs—wages and salaries and other value added—is equal to the sum of final demands (national income identity). The model used belongs to the general class of static models. It represents a static equilibrium in the sense that its variables balance out, without surplus or deficit, and reflect the structure of the economy at a given point of time. Demand equals supply at the price and/or income of the static equilibrium position.

Table 2. General social impacts in Kapuskasing.*

Pulp and Paper
Kapuskasing community.
Year of expenditure: 1994

General Social Indicators

Average price of a house sustained by new activity	\$90,636
Average annual wage sustained by new activity	\$41,262
Increase in house prices over current average	\$6,477
Increase in wages over the average annual wage	\$2,947
Increase in total property value	\$81,200
Increase in wages over the average annual wage	7.69%
Increase in total property value	0.02%

*Using 1991 as the base year.

Table 3. Pulp and paper dependency indicators.

Pulp and Paper
Kapuskasing community
Year of expenditure: 1994

Direct dependency on Pulp and paper	=	$\frac{\text{(Pulp and paper share in Kapuskasing employment)}}{\text{(Pulp and paper share in Ontario employment)}}$
	=	20.9
Total dependency on pulp and paper	=	$\frac{\text{(Total added employment in Kapuskasing)}}{\text{(Added pulp and paper employment in Kapuskasing)}}$
	=	2.65

There are several other basic underlying assumptions upon which the input-output tables and the model, built on them and used here, are predicated. These include the following:

1. Technology is assumed to be of the Leontief type. That is, all inputs (primary or intermediate) are used in fixed proportions.
2. The Keynesian assumption of a perfectly elastic supply of labor is stipulated. The money wage is fixed, and employment is determined by demand.
3. The supply of output is perfectly elastic at the prevailing equilibrium prices. Output is, therefore, assumed to be driven by demand. In other words, exogenous increases in final demand increase output and employment, but do not change prices.
4. Exports and investment are exogenously specified and do not respond to changes in other variables of the model.
5. Consumption is a linear homogeneous function of labor income, and independent of relative prices. This implies that individuals in the economy possess Cobb-Douglas identical utility functions.
6. No substitution among factors of production is permitted.
7. Exogenous changes in final demand are not sufficiently large as to change the average structure of the economy as depicted by the input-output table.
8. The subregions of the province are assumed to be too close to each other and sufficiently specialized that no interregional input-output system is required to analyze the subregional income and employment multipliers.
9. Each industry produces a fixed proportion of commodities determined by its historical market share.
10. Interregional flows of provincial and national sectors are directly proportional to the economic size of the receiving region and inversely proportional to the distance between them.

SUMMARY AND CONCLUSIONS

In analyzing economic impact, it is inevitably the case that policy makers are concerned with the effects of a policy change, or a decrease in a given activity, on individual households, industries, firms, and regions. Activity or policy changes are relatively abstract when viewed in terms of their aggregate impact, and estimates of aggregate effects are thus not very relevant. Consequently, it is highly desirable to estimate what the impacts of a given activity or change will be on a disaggregated basis that focuses on effects on particular industries or regions.

The input-output analysis adopted in this study is the most efficient and least costly method of assessing impact on regions and industries. Besides, by disaggregating the analysis to this extent, input-output models can provide a basis for obtaining more accurate estimates of the aggregate effects on total employment and other macrovariables.

The motivation for using input-output models here includes both an interest in disaggregated estimates of impact and a potential for improvement in the accuracy of aggregated forecasts.

It is also motivated by the authors' desire to outline the local impacts of projects and activities. Input-output analysis provides a convenient method for relating the local economic base to the provincial and national bases.

The CDIM is more than an economic impact model. Rather, it strives to model the socioeconomic processes of a community. Issues of dependency on an industry, the prices of houses, the average wage, the local tax base, and the wealth-income structure of the community are critical components of the system.

Impact analysis is often confused with cost-benefit analysis. An attempt was made here to differentiate the two and to draw the demarcation lines that separate them. The authors have also attempted to deal with the most pressing policy choices facing northern policy makers in the area of community development.

An illustrative example using the model was presented and discussed. Impacts on Kapuskasing and Ontario as a result of \$150 million of output in pulp and paper was chosen. The economic impact results were also supplemented with a discussion of some general socioeconomic indicators produced by the model. The power of CDIM to complement direct dependency on pulp and paper in Kapuskasing with measures of indirect and induced dependencies was also illustrated.

The report presents a wide reference list on forest dependent communities and socioeconomic impacts. As well, a thorough discussion is made of the mathematical structure of CDIM, its data sources, and its general assumptions.

This is a first attempt at modeling and quantifying difficult structures with limited data. There are many gaps and many simplifying assumptions had to be made. It is only through discussion and discourse that a better product may emerge.

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