FEASIBILITY OF COMMUNITY FORESTRY IN NORTHERN ONTARIO: A SOCIO-ECONOMIC AND BIOPHYSICAL EVALUATION FRAMEWORK

by

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ABSTRACT

Community forestry has become a much-discussed form of forest land tenure and management in Northern Ontario. It is a viable approach to community economic development especially among communities that are dependent on the forest sector. This study is a broadly-based investigation of the socio-economic and biophysical factors that give communities an inherently high potential for success in new community forestry ventures. The factors identified herein have been arranged into a framework which I propose government can identify those communities where community forestry may have a high chance of succeeding. The factors attributing to the success of the North Cowichan community forest in British Columbia have been presented for comparative purposes. A total of 15 variables have been examined in this study. This study area covers sections of Ontario Ministry of Natural Resources' (OMNR) former Northern, North Central, and Northeastern Regions of Ontario, altogether encompassing 22 communities. Based on the results of the study, the communities of Nipigon, Geraldton, Hearst, Wawa, and Marathon would be excellent candidates for pilot projects or in-depth feasibility studies on community forestry. The second group of communities that may be considered are Terrace Bay, White River, and Red Rock. I conclude that community forestry is a viable option for forest land tenure and management in some communities (with high inherent success potential) in Northern Ontario.

Key Words: community forestry, community economic development, forest-sector-dependent communities, local control, land tenure.

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INTRODUCTION

Community forestry is about the economic, social and ecological welfare of a community. Community forestry has become a much-discussed form of forest land tenure and management in Northern Ontario at present. It is widely perceived that if the community-forestry concept were applied among selected and suitable communities dependent on a single resource, many such communities would have their economies stabilized (CEIAC, 1987). I also believe that if the necessary institutional and policy framework to support such efforts were in place, many such communities would have their economies sustained and become more resilient to the vagaries of external economic forces.

The initiation of community forestry programs in Ontario is hampered by, among other things, a lack of diagnostic research to assess the need for community forestry within various communities across the province and to identify the appropriate characteristics necessary for successful initiation of community forestry projects. The Government of Ontario currently seems anxious to try the concept of community forestry, mostly among resource-dependent communities. This study is a broadly-based investigation into the socio-economic and biophysical factors that give communities an inherently high potential for success in new

community forestry ventures. The factors identified herein will be arranged into a framework that, I propose, can be used to identify communities where community forestry ventures may have a high chance of succeeding.

PROBLEM STATEMENT

Massive industrial adjustments due mainly to structural shifts in the economy, technological changes, and sometimes plant closures have affected many communities and individuals in Northern Ontario in the past several years. But perhaps none have been affected more than the communities whose economies are based on a single industry or sector. There are several thousand single-industry communities in Canada, concentrated mainly in the resource sectors and usually located in the more remote areas of the country (such as the hinterlands of Northern Ontario). It has been estimated that there are more than 4,000 single-industry, resource-dependent and economically vulnerable communities in Canada of which 2,172 communities depend on forestry, 1,284 on fishing, 129 on mining, 2,500 on agriculture, 33 on oil and gas; and those not dependent on resources (e.g. manufacturing) number 79 (Young, 1990). In all, these communities contribute about $55 billion to the Canadian economy in resource exports annually, which constitutes about 40 per cent of Canada's total exports (Young, 1990).

Plant closures are not new in Canada, as the remnants of so many ghost towns serve as reminders of communities that became the victims of exhausted resources, declining stocks and other adversities. The difference today is that the residents of these communities do not view the demise of their communities as inevitable but believe that with hard work, localized control and planning of their economies, their communities could well be on a path to sustainable development (CEIAC, 1987).

STUDY OBJECTIVES

The objectives of the study are:

1. to develop an evaluation framework for determining the feasibility of community forestry in communities in Northern Ontario; and

2. to make an initial determination of the degree to which community forestry is a viable option for forest-land tenure and management in a specific region of Northern Ontario.

A more general objective of the study is to provide direction for policy formulation in the application of community forestry under Northern Ontario conditions.

SCIENTIFIC JUSTIFICATION

It is hypothesized that community forestry is a widely

applicable concept of forest-land tenure and management in Northern Ontario. The hypothesis will be tested using a survey of 22 communities across Northern Ontario that will permit identification of those communities which have high success potential for community forestry according to a set of socio-economic and biophysical criteria. From a scientific point of view, the research problem is important and interesting, unanswered yet answerable, and the study will be the first of its kind in the province.

PRACTICAL JUSTIFICATION

There is currently no coordinated policy in place for development and economic sustenance of communities in the frontier regions of Ontario. This study will provide insight into promising policy directions for the initiation and application of community forestry projects in Northern Ontario. Since the sustained economic development of local communities has become such a major issue in Northern Ontario [Fahlgren (1977), Rosehart et al. (1986), and Conservation Council of Ontario (CCO) (1988)], community forestry may well serve as an effective tool in achieving sustained community development. The results of the study ought to be beneficial to both the Ontario government in its community forest policy initiatives and to communities. Furthermore, the evaluation framework developed in this study is expected to be applicable in other provinces in Canada.

BACKGROUND TO COMMUNITY ECONOMIC DEVELOPMENT AND SINGLE-INDUSTRY COMMUNITIES

COMMUNITY AND DEVELOPMENT - DEFINITIONS

Community

The word community means "fellowship" in Greek. Reflecting on the meaning of the word, Aristotle asserted that people came together in a community setting for the enjoyment of mutual association, to fulfil basic needs, and to find meaning in life. Christenson and Robinson (1989), on the other hand, saw community as the natural process of people coming together to maximize their self-interest. Christenson and Robinson (1989) felt that self-interest could be best satisfied in a group setting.

There are many definitions of "community". They do, however, have certain features in common. For instance, almost all view the community as (Ferrinho, 1980):

(a) a way of life, defined by a set of common values and interests around which institutions are developed and with which residents identify themselves (cultural approach);

(b) a network of social interaction within which people relate to one another (sociological approach);

(c) a system of reference for a set of common individual identifications (psychological approach); and

(d) a place from which a human population obtains the energy it needs to live and survive (ecological approach).

This means that it is impossible to think of a community in terms of isolated components such as "territory", "population", and so on. Equally, it is impossible to think of community merely as the sum of its parts. Instead, a community must be seen as a complex system of interaction between ecological, social, cultural, economic, political, and psychological elements (Campfens, 1983).

In summary, to facilitate discussion on community development one must be able to define a community, understand how it functions, and perceive elements stimulating consensus or common interest, while at the same time identify elements that might divide or polarize a community. The choices of both the socio-economic and biophysical factors in this study have been guided by the need to understand the foregoing characteristics of a community.

Development

Perhaps no single word has been more widely and frequently used by such a large number of people in so many countries of the world today than the term "development". Development implies improvement, growth, and change. Historically, development has been concerned with the transition of cultures, countries, and communities from less advanced to more advanced social stages (Newman et al. 1986). Such terms as "industrialization", "modernization", and "urbanization" have been used interchangeably with the broader concept of development.

When treated as a normative concept, the term development is synonymous with improvement. Today, after expensive and often painful experiences (in both developing and developed countries), the problem of development appears to be identified with the problem of social reform. In this context, development means social transformation in the direction of more egalitarian distribution of goods and services such as education, health services, housing, participation in political decision-making, and other dimensions of people's lives (Christenson and Robinson, 1989).

While development as "improvement" tends to focus on the social and psychological transformations in societies and

communities, development as "growth" involves technological and economic transformation and focuses on economic prosperity (Dykeman, 1988). It includes the institutional transformation of structures to facilitate technological advancement and improvement in the production and distribution of goods and services. Community development without involvement and participation of the members (citizens) can become economic deprivation. While communities struggle to improve, they should be able to keep up with technological innovations to achieve change. The will to improve should be harnessed with technological skills to achieve effective and meaningful change.

THEORIES OF COMMUNITY DEVELOPMENT

Community development is highly dependent upon the healthy maintenance of at least three community-based processes which together permit attainment of self-reliance. Bradfield et al. (1985) identified these three processes as economic viability, social vitality, and political efficacy.

Economic Viability

Economic viability refers to the ability of a community to sustain the material needs of its members over time. Economic viability is dependent upon the creation of an adequate level of locally controlled economic activity to ensure the community's economic survival independently of

any single or multiple outside interests (Bradfield et al. 1985). This means diversification in the local community economy, thereby fostering self-sufficiency and phasing out the conventional development-economics wisdom of "relative advantage" which cultivates ultimate dependency. The marginalization of communities by major developments, e.g. the mining industry, that provides temporary relief from economic decline is characteristic of many Northern Ontario communities that experience boom-and-bust cycles in their economies. Such economies are characterized by heavy external control, little or no locally initiated opportunities, and single-resource dependency without diversity.

Social Vitality

The second community variable that needs to be understood if community development policies are to be achieved is social vitality. According to Bradfield et al. (1985), social vitality refers to the process by which individuals engage in reciprocal relations to satisfy social needs, share knowledge, resolve problems and, as a result, establish and pursue life meaning. To achieve these core social requisites, a community must come to share a set of socially facilitating values, beliefs, and activities. In designing community development projects such as community forestry, it is important to ascertain beforehand that social vitality does indeed prevail within a community and

that the cultural context within the community is well understood.

It is important to note that the value systems of Northern Ontarians and Southern Ontarians, as well as their cultural realities, are different. For instance, Dykeman (1988) pointed out that the former is based on "co-operative reprocity" and the latter upon "private contract". Co-operative reprocity is a social process that encourages a merging of self-interest with community-interest (Bradfield et al., 1985). In this system, members value sharing of goods, skills and knowledge on a significantly non-commercial basis. The private contract is a belief system that encourages individuals or nuclear family units to try to "make it on their own" with minimal interference from, or responsibility to, others who are presumed to be doing likewise (Bradfield et al., 1985). In this system, monetary values are the primary symbols through which social success and life meaning are interpreted.

While elements of both co-operative reprocity and private contract exist within all communities, it makes a big difference which predominates in any given community and under what circumstances it may be substituted for the alternative. Co-operative reprocity is most certainly dominant within the native community tradition, and as

numerous comparative studies reveal, is also significantly operational within the most socially vital and economically viable non-Native northern communities (Bradfield et al. 1985). The private contract is dominant in Southern Ontario where financial implications rather than social effects become the criteria for evaluating any given development project.

Political Efficacy

The final community process variable is political efficacy. This refers to the process by which a community collectively creates and maintains a structure for power mobilization and distribution through which community (public) affairs are conducted and decisions concerning public welfare are made (Bradfield et al. 1985). In this regard, a system that encourages a consensus style of position-taking is favoured.

In presenting this perspective on how better to facilitate community development in Ontario's northern hinterlands, I have emphasized the importance of focusing on three community-based processes above. These are critical means of achieving collective understanding of self-interest and concerted effort.

COMMUNITY ECONOMIC DEVELOPMENT

According to Newman et al. (1986), community economic

development (CED) is both a movement and a process designed to marshall human, physical and financial resources to:

> integrate economic and social development at the community level;
> stimulate self-sustaining, socially-responsible economic growth;
> direct change and capture investment returns for the benefit of the community;
> engage in bottom-up planning and decision-making;
> promote a community self-determination and control over basic economic decisions such as employment, investment and location;
> encourage collective self-reliance; and
> develop organizations which are responsive and accountable to the community.

Therefore, CED becomes a community-centred development initiative where community members collectively engage in planning, design and execution of development programs with full accountability. Those involved in community development believe that this approach to development, in its various manifestations, can make noteworthy contributions to economically deprived communities. This is especially true for communities facing problems associated with "absentee economies", in which owners of

big industry reside and invest the profits derived from a particular community elsewhere.

Premises for CED

The premises of CED are mainly rooted in three important aspects: environment, community, and organization (Campfens, 1983). Campfens (1983) noted that profit-driven private enterprise has done little to safeguard the environment and that communities can best deal with local economic development problems through their own initiated institutions to gain autonomy. With respect to the environment, Campfens (1983) argued that the private, for-profit system has not sufficiently nurtured enterprise growth and development which can meet the present and future needs of communities. Campfens (1983) further pointed out that a community has a unity of purpose and thus commitment to place. Therefore, only those based in the community and responsible to it can effectively make decisions on trade-offs that may arise in socio-economic development.

With respect to organization, Ferrinho (1980) argued that communities should pursue development through their own organizational instruments which are: (a) autonomous from governments and other external organizations; (b) controlled by and responsible to the community; (c) able to engage in a long-term process of development and change;

(d) flexible and non-bureaucratic; (e) able to build community self-confidence; and (f) able to induce others to invest in the development process.

Problems/Concerns with CED

Community development specialists have identified several stumbling blocks to the success of CED projects. These problems pertain mainly to management and financial resources.

Management

Campfens (1983) asserted that where CED projects face problems serious enough to close down or significantly curtail operations, it is not because of lack of community support but rather because of problems arising from management difficulties and a lack of financial resources. However, management problems fortunately tend to wane with time as more and more people within the community become experienced with CED projects, developing a larger pool of expertise for staffing and advice. Nevertheless, it should be noted that in the initial stages of a CED project, lack of management skills could seriously hamper progress (Ferrinho, 1980; Campfens, 1983).

Finance

Lack of access to financial resources is, on the other hand, a problem which grows worse in a direct relationship with a worsening economy. Dykeman (1988) noted that a lack

of profit orientation eliminates CED groups from many government programs for business and industry. Community self-finance as a facet of community self-reliance is a concept that should be of great importance to CED. However, some form of public subsidy generally is considered essential in the initial stages of such projects. Many critics of CED feel that subsidies render this development model weak. Proponents of CED have dismissed such arguments on the premise that even corporate industry get subsidies from government (Dykeman, 1988).

RESOURCE DEPENDENCY AND SINGLE-INDUSTRY COMMUNITIES

Northern Ontario represents about 90% of the province's land mass yet contains less than 10% (fewer than one million people) of the population. Over 50% of the population in the north live in the five largest communities of Thunder Bay, Sault Ste. Marie, Timmins, Sudbury and North Bay (Smyth et al., 1989). In contrast, there are some 160 municipalities with fewer than 3,000 inhabitants each.

Historically, the economy of the north has been tied to the natural resource sectors of forestry and mining and is heavily dependent on the activities of large corporations. A much smaller, secondary dependency has existed on tourism and agricultural activities (Rosehart et al., 1986). About 50 communities in the north rely almost exclusively on a

single resource industry for economic activity, 30 of these on forestry and forest-products manufacturing (Smyth et al., 1989). Not numbered among these figures are the many Native communities in Northern Ontario (Duinker et al., 1991).

The reliance on natural resources has made many Northern Ontario community economies vulnerable to national and global market fluctuations. Rosehart et al. (1986) listed the inherent problems of resource-dependent communities as follows:

resource depletion;
vulnerability to corporate policy changes;
vulnerability to world commodity prices;
the cyclical nature of resource industries;
modernization associated with employee reductions;
community problems associated with new resource developments;
increasing and changing unemployment rates;
declining population;
climate;
difficulty of attracting and keeping professionals in the north;
social problems associated with uncertain future;
high costs of living and doing business;

distance to market and population centres; and

sparse population.

Over a third of all resource-dependent communities in Canada are in decline (Young, 1990). The impact of such decline has been quite pronounced in many communities including decrease in community social services, decline in local business and increased dependency on social welfare. The problems of resource-dependent communities, as highlighted above, can only be rectified through careful planning of such communities to enhance economic longevity and through local capacity-building to ensure local leadership.

Plant closures are not new in Canada. They are mostly driven by exhaustion of the resources which feed the operations. The Canada Employment and Immigration Advisory Council (CEIAC) (1987) listed the six major causes of industrial closures and cut-backs as follows:

exhaustion of the resource;
market decline;
competition from other producers;
low profitability;
technological change; and
public policy.

In periods of high product demand and favourable prices, closures due to market forces or poor profitability are rare. In reality, two or more of the above factors combined may contribute to a closure. There may be other reasons for closure, such as poor management, lack of transportation, and high production and labour costs. However, the bottom line is that whatever the cause of a closure, the concerned communities are negatively affected both socially and economically. Communities established on a single resource or economic activity must eventually decline or disappear when the resource is exhausted, unless something else takes the place of the sole economic base (CEIAC, 1987). Among other things, this calls for economic diversification.

Single-Industry Communities

Although it is generally understood what is meant by a single-industry community, there is no universally adopted definition. Most studies have used various percentages of the labour force employed in a particular industry or sector as a determinant. The proportions may range from 20% to 35% (CEIAC, 1987). By these definitions, larger centres such as Ottawa, where the federal government is the dominant employer, and Calgary, the economy of which is largely dominated by the oil and gas industry, could be considered single-industry communities. The size of a community is another criterion that has been used in

previous studies. The Department of Regional Economic Expansion (DREE) (1979) defined a single-industry community as:

> " ...one in which there exists a single dominant economic activity (a single employer or group of employers in a single activity/industry) which is not within commuting distance of another area or areas offering alternative employment opportunities."

There also appears to be little consensus on the total number of single-industry communities in Canada. The Department of Regional Economic Expansion (DREE) (1979) identified 811 such communities (Table 1). The forest sector accounted for 37% of the 811 communities (Table 2). The Canadian Association of Single Industry Towns (CASIT), on the other hand, claimed that there are 600 such communities in Newfoundland alone in the form of small fishing villages and towns along the coast (DREE, 1979). CASIT maintains that there are at least 1,500 one-industry resource communities in Canada. According to Young (1990), there are more than 4,000 single-industry, resource-dependent communities in Canada.

Table 1: Distribution of single-industry communities among the Canadian provinces in 1979 (DREE, 1979).

Province	Number of Single-Industry Communities
Quebec	220
Newfoundland	121
Ontario	115
British Columbia	99
New Brunswick	67
Alberta	51
Nova Scotia	42
Saskatchewan	39
Manitoba	32
Prince Edward Island	25

Table 2: Distribution of single-industry communities among major economic sectors in 1979 (DREE, 1979).

Sector	Number of Single-Industry Communities
Wood and Forests	302
Fisheries and Fish Processing	131
Metal Mines and Refineries	88
Non-Metal Mines and Refineries	54
Manufacturing	53
Construction, Tourism, Miscellaneous	48
Public Administration	68
Utilities and Transport	27

I find Young's (1990) estimate most agreeable because it includes the two northern territories where good examples of single-industry communities exist, such as Pine Point, Faro and Inuvik (CEIAC, 1987) as well as Native communities. Despite the disagreement surrounding the total count of single-industry communities in Canada, there is a general consensus among researchers, policy-makers and professionals that these communities exist and the economic survival of the majority of them is threatened. With so many single-industry communities dependent on the forest sector, there is a fundamental question of what should be done from a forestry and community point of view to ensure economic viability of these communities.

EXISTING POLICY INITIATIVES AND PROGRAMS DIRECTED AT SINGLE-INDUSTRY COMMUNITIES

A number of policy initiatives directed at single-industry communities exist. Dectar (1989), however, argued that these programs were not conceived to deal with or focused exclusively on such communities. The three most relevant initiatives are described below.

Community Futures Program

Introduced by the federal government in June, 1985, as part of the Canadian Jobs Strategy, the Community Futures Program is administered by Employment and Immigration Canada to assist communities hit by major layoffs and plant closures. The program facilitates establishment of

agreements between communities and Employment and Immigration Canada to engage in a process of local development and adjustment through Community Futures Committees for up to six years. In 1989, the Community Futures Program was active in over 200 areas across Canada (CEIAC, 1989). In Northwestern Ontario alone there were eight Business Development Centres under the program, distributed as follows: Atikokan, Ear Falls/Red Lake, Ignace/Dryden/Sioux Lookout, Kenora, Nakina/Geraldton, Rainy River, Terrace Bay/Schreiber, and Thunder Bay (CEIAC, 1989).

There is considerable concern that, while the Community Futures Program is deemed to be community-driven, decisions on its direction must often be approved by the regional headquarters of Employment and Immigration Canada, usually located in the provincial capitals (CEIAC, 1989). Another concern is that the program often does not involve the whole community at large, such as involvement of trade unions, Native people, and women (Macdonald, 1990). Furthermore, it has been found that Community Futures Committees seldom coordinate their efforts with those of other community development organizations and interests (Dectar, 1989). This has often perpetuated and produced a fragmented approach to community development issues. There is also growing concern that the program is administered by

a social-oriented department which lacks appreciation and understanding of business and economics (CEIAC, 1989).

All this notwithstanding, the program is probably the only one in the country with a presence in most slow-growth regions and communities, and also one of the few programs that encourages local input (Macdonald, 1990). Unfortunately, the program has moved at an unduly slow pace and, meanwhile, much time has been lost in the community economic adjustment process. This inertia may be a sign of the decision-making malaise embedded in the top-down approach. In spite of its assertion to the contrary, Community Futures is still largely a centralized program in terms of policy and decision-making and this characteristic, combined with a lack of focus, unless changed, may eventually lead to the program's failure. Macdonald (1990), however, reported that a review of the Community Futures Program and Committee role and structure is under way and the results should be ready by end of 1991.

Community Crossroads Program

The Community Crossroads Program was initiated by the Federation of Canadian Municipalities (FCM) in 1985. The program is a self-help program for community-based economic development and is funded by both the federal and provincial governments as well as the community. The

impetus for the program is to train community residents to deliver the program themselves, including community self-analysis to provide advance warning of possible crises, public awareness seminars to gain a vision of the next 10 years, and how-to workshops to establish a strategic plan and action plans (Young, 1990).

The objective of the program is to mobilize about 4,500 small towns in Canada to engage in self-help development programs. Results to date include five successful pilot projects in New Brunswick, four in Northern Ontario, and twenty in Saskatchewan (Young, 1990). One of the four communities identified in Ontario is Hearst. Hearst was the first community in Canada to have entered into a community development arrangement with the federal and provincial governments (CEIAC, 1989). The two senior governments each contributed two dollars for each dollar raised by the community. The result was the birth of Nord-Aski Frontier Development Inc., a regional organization devoted to greater self-reliance in the Hearst area by working together, and locating entrepreneurs to pursue identified development opportunities in the region.

There is concern that the Community Crossroads Program is not focused on single-industry communities' development needs, especially those that are economically depressed

(CEIAC, 1989). There is a need, therefore, to review the program's mandate and include single-industry communities as a primary focus. The program has worked well in Hearst because four local communities put up substantial amounts of money and both the federal and provincial governments readily assisted financially. One can only conclude that in the Hearst case, local capacity does exist and its economy is relatively buoyant.

Canadian Association of Single-Industry Towns

The Canadian Association of Single Industry Towns (CASIT) was born in May, 1985, following a conference held in Winnipeg and attended by 62 representatives from across Canada. The Association's main goal is to speak with a unified voice for the common good of all people living in single-industry towns and resource-based communities in Canada (CEIAC, 1987). It is estimated that CASIT now represents over 100 such communities across Canada (Dectar, 1989).

The Association's other goals include the sharing of ideas among members, to support each other's priorities and to create a public awareness of the importance of the primary resource sectors to Canada's economic health and social well-being. The Association also strives to assist communities and governments to develop and improve crisis response mechanisms for these communities and to help them

to assess and resolve the many social dilemmas faced by their residents (CEIAC, 1987). The latest initiatives by CASIT include a joint project with FCM to develop a data base for vulnerability indicators of single-industry communities and a comprehensive list of such communities across Canada.

Although CASIT is more of a lobbying than a financing institution, it is the only organization with a clear focus on single-industry communities in Canada. Its networking activities with other organizations involved in community development has helped increase understanding about the plight of single-industry communities and also narrow the focus to these communities.

Other Programs

There are many more federal and provincial policy initiatives rhetorically directed at saving single-industry communities from economic collapse. However, current federal regional-development programs appear to be applied in an ad-hoc manner, without regard for weaving together all the essential components into the country's regional economic development strategy. One of the contributors to the inefficiency of the existing regional economic development process is the involvement of numerous federal as well as provincial departments and agencies, nearly always working in isolation from each other (CEIAC, 1989).

The coordination of their activities, and the removal of the duplication of effort which results, is another way in which savings can be obtained in a period of restraint.

Many distressed single-industry communities see the absence of a lead federal department responsible for their economic welfare as the cause of considerable "buck passing". The DRIE could be charged with this responsibility by increasing its mandate.

In summary, most federal departments whose mandates touch on rural issues take one of three approaches (Donnelly, 1990):

(a) the traditional/sector approach, usually through Economic and Regional Development Agreements (ERDAs), e.g., Energy, Mines and Resources (EMR), Department of Fisheries and Oceans (DFO), and the Canadian Forestry Service (CFS, now Forestry Canada); the sector approach has produced fragmented, costly and uncoordinated effort;

(b) the regional approach, which has evolved from DREE to DRIE to the recent creations of the Atlantic Canada Opportunities Agency (ACOA), Western Diversification (WD) and the Department of Industry, Science and

Technology, which is responsible for regional issues in Quebec and Northern Ontario; rural community development is still very low on the agenda of these regional departments; and

(c) the community-based approach, adopted by Employment and Immigration Canada (EIC), the Department of Indian and Northern Affairs, and the Ministry of Northern Development and Mines (MNDM).

SUSTAINABLE DEVELOPMENT

The term "sustainable development" has become a familiar concept to many in the political, academic, environmental and economic domains in Canada. Although the term might appear new, the concept is well established and simply calls for economic viability, social vitality and ecological soundness in any development undertaking. The United Nations World Commission on Environment and Development (1987) defined sustainable development as that which ensures the needs of the present are met, without compromising the ability of future generations to meet their own needs. The definition implies that the concept is about management and control over development and that development is evaluated with the dual and balanced criteria of present and future needs of the community.

Dykeman (1990) characterized sustainable communities as:

Dykeman (1990) characterized sustainable communities as:

> "..those that aggressively manage and control their destiny based on a realistic and well-thought-through vision. Such a community-based management and control approach requires that a process be instituted within the community that effectively uses knowledge and knowledge systems to direct change and determine appropriate courses of action. The process must be comprehensive and address social, physical and environmental concerns in an integrated fashion while maintaining central concern for present and future welfare of individuals and the community."

Application of these principles should result in better and more resilient communities but does not necessarily imply problem-free communities. Single-resource-dependent communities in Canada, as elsewhere, face both external and internal driving forces that present a challenging context for their sustainable development. According to Dykeman (1990), these challenges include: changes in technology, unfavourable government policies, changing demographics, changing markets, and economic restructuring. For development to be sustainable, communities will have to embark on local initiatives and promote local leadership and entrepreneurship.

Senior government policies will have to be focused on improving the well-being of individuals living in single-resource-dependent communities. At present, fragmentation and segmentation dominate the policies for developing many of these communities, e.g., the works of the Department of

Employment and Immigration, to name just a few, could be co-ordinated to avoid duplication of effort and excessive bureaucracy. As Dykeman (1990) noted, many federal and provincial programs are designed to react to crisis; they are rigidly designed and offer little opportunity for flexible application that recognizes the unique circumstances of the local community.

BACKGROUND TO COMMUNITY FORESTRY

WHAT IS COMMUNITY FORESTRY?

The concept of community forestry has been widely applied in many parts of the world, notably in Asia and the Pacific region (RAPA, 1989), in Europe (Lovelace, 1985) and in Africa (Banard and Foley, 1984). With reference to developing countries, Gregersen and Lundgren (1990) suggested that community forestry is synonymous with social forestry, referring to "a broad range of tree- or forest-related activities undertaken by rural landowners and community groups to provide products for their own use and for generating income". In most developing countries, where large proportions of the population live in rural areas as tillers of the soil at subsistence or below-subsistence levels, and where substantial areas of degraded lands await rehabilitation, community forestry has been found to be effective in socio-economic-ecological development.

The most successful documented examples of community forestry projects in developing countries are those in the Philippines, the state of Gujarat in India and the Panchayat forests of Nepal (RAPA, 1989). The CCO (1989) defined a community forest as a forested area of land

actively managed by the local community to provide multiple benefits to the community that might not be possible otherwise. The USDA Forest Service (undated), on the other hand, defined community forestry as lands owned and operated for forestry or allied purposes by the community (village, city, town, school, district, township, or other political sub-division) for the benefit of that community. The following definitions have emerged through discussions with colleagues and associates during the course of this study:

1. Community forestry is community development based on multiple resources in forested ecosystems.

2. Community forestry exists when the community is driving land-use decisions.

3. Community forestry exists when a community is satisfied with its involvement in and benefits from management of the surrounding forest land.

My conception of community forestry in Northern Ontario is: "management of forested lands directly or indirectly by

representatives of local communities for the benefit of the community". Representation of local communities could be achieved through local government or Local Development Organizations (LDOs). Community forestry is not private forestry, as in private woodlots; it is not industrial forestry, as in private enterprise with freehold land or timber leases from provincial governments; and it is not provincial government forestry, as in Crown-land management by OMNR (Duinker et al., 1991).

Community forestry is currently receiving wide attention across Canada. This attention comes at a time when many communities in forested areas, especially single-industry communities dependent on mining, forests or tourism, are searching for ways to diversify their economies. In doing so, they aim to become more resilient to the vagaries of external economic forces; indeed, the aim for some is to survive at all (Duinker et al., 1991).

The CCO (1989) is convinced that many Northern Ontario communities can diversify and stabilize their local economies through careful planning and wise management of the surrounding land base. In particular, an intensive forest management plan can provide employment over the short term in site preparation, planting, thinning, weeding, road construction, fire prevention, and so on. In

the long term, improved and diversified harvests and a reliable, sustained wood supply will encourage more diverse wood-using industries to develop locally. Growing forests can also support tourism and recreation activities, including hunting, fishing, and hiking. Tourism industries can be based on these activities through careful market research, intelligent investment and aggressive marketing techniques.

THE IMPETUS FOR COMMUNITY FORESTRY

The main impetus for the application of community forestry is rooted in the premise that community forestry is likely to involve a higher degree of participation and involvement by community members in forest management decision-making than in industrial forestry or provincial-government forestry. Moreover, it is expected to provide greater opportunity for economic stability among resource-dependent communities in Northern Ontario.

As Duinker et al. (1991) pointed out, community forestry is expected to involve smaller-scale, more environmentally benign forest management practices akin to those used in private woodlots. Perhaps if local people are in charge of managing their own forest environment, their design of forest management interventions would be more sensitive to environmental considerations than the design of interventions in industrial and provincial forestry

(Duinker et al., 1991). In this context, one could assume that community forestry is likely to be less ecologically damaging than industrial and provincial forestry based on harsher, larger-scale technology. However, industrial and provincial forestry has been characterized recently by numerous improvements on behalf of the environment (Duinker et al., 1991). Examples include high-flotation tires on skidders and harvesters, use of safer chemical herbicides, and switches from chemical to biological insecticides. I am not convinced that community forestry in Northern Ontario of necessity means more-environmentally-friendly forestry.

Another driving force behind community forestry is the call for more-intensive forest-management practices (Duinker et al., 1991). Intensive forest management is desirable both from the community and forest industry points of view. From the community point of view, intensive forest management means more job opportunities directly through various silvicultural operations and indirectly through "value added" enterprises and support services. From the forest-industry point of view, intensive forestry can be used to mitigate sawlog and other fibre shortages by making suitable material available sooner. The benefits that can be derived from intensive forest management include (after Reed, 1989):

1. Volume increase

2. Shorter time to forest operability and sawlog diameters

3. Cost reductions

   a. shorten hauling distance
      - by treating land near the mill
   b. produce larger, more uniform logs
      - for logging-cost savings
      - for lower processing costs
   c. protection costs reduced
      - forest is harvested at younger age
      - less natural mortality

4. Value gains

   a. species mix improved
   b. lumber recovery factor raised
   c. grade and dimension mix enhanced

5. Risk reduction

   a. insect and fire losses reduced
   b. less risk of curtailment from timber shortage

Despite plenty of advocacy for increasing the intensity of forest management on industrially and provincially managed forests in Northern Ontario, there is really only modest movement in this direction compared to the technical potentials of intensive forest management. Scarification, planting and control of competing vegetation are implemented on many cutovers, but precommercial and commercial thinning are virtually absent in operational terms (Duinker et al., 1991). A recent survey of seven Canadian provinces found that large forest companies or licensees have little incentive to invest in silviculture

beyond their contractual requirements, and that the silvicultural effort on licensed Crown lands falls significantly short of the effort on similar private lands (Luckert and Haley, 1990).

Increased vulnerability of single-industry communities to corporate policy changes, modernization with associated employee reductions, and community problems associated with new resource development policies, have all given community forestry increased recognition as a possible and viable option for forest-land tenure and management in Northern Ontario. Specifically, community forestry appears to be a viable community economic development tool among forest-sector-dependent communities constantly threatened with economic collapse due to either resource depletion and/or corporate capital withdrawal.

Duinker et al. (1991) noted that, unlike provincial and industrial forestry, community forestry stands a much better chance to link forest-management revenues and forest-management costs, where monies generated directly or indirectly from the managed forests are ploughed back or re-allocated to cover forest-management expenses. The proximity of community forests to the communities also lends such programs more to increased awareness and interest of the public in forest management. Community

forestry programs are likely to have an extension education component such as the proposed demonstration forest in the Geraldton community forest proposal (Dunster, 1989) and the educational component in the North Cowichan Municipal Forest (Duinker et al., 1991).

COMMUNITY FORESTRY IN CANADA

Dunster (1989) gave a lengthy appendix of examples of forestry ventures that have some features associated with community forestry (Table 3), but few of these measure up to my definition of community forestry above. Although in many cases, a few of the examples in Table 3 may go a long way in providing specific communities with the levels of control and benefits they want, they still fall short of a holistic approach and meaning of community forestry.

For instance, a common denominator in all the Ontario examples (Table 3) is the absence of full local control and involvement in the community forestry activities. However, strong experiences in community forestry in Canada are to be found in two municipally run forest estates in British Columbia - the North Cowichan Municipal Forest, and the Mission Tree Farm Licence.

Table 3: Canadian forestry ventures focused on community development (after Dunster, 1989).

Name of Forest	Location	Year Estab.	Management Authority	Purpose
Larose County	Ontario	1921	OMNR	Recreation, Employment, Timber.
Reserve de la Petite Nation	Montebello Quebec	1932	Canadian Pacific	Wildlife, Fishing, Timber.
Ganaraska County	Ontario	1947	OMNR	Water-flow Regulation, Timber.
Mission Tree Farm	Vancouver British Columbia	1956	Municip-ality	Timber, secondary spin-offs.
Petawawa Program	Ontario	1970	Forestry Canada	Educational
Álgonquin Forest Authority	Ontario	1974	Ontario Crown Corp.	Recreation, Timber.
North Cowichan	British Columbia	1981	Municip-ality	Demonstration Forest, Timber, Employment.
Clayoquot Sound	British Columbia	1982	Chamber of Comm., District Council.	Fisheries, Tourism, Timber.
Renfrew County	Ontario	1983	OMNR	Timber.
Mgmt. Unit 17	Portland Hill New-foundland	1983	District Council	Timber, Zinc mine.

Table 3: Canadian forestry ventures focused on community development (continued).

Name of Forest	Location	Year Estab.	Management Authority	Purpose
Forestry Job Corps	Saulte Ste.Marie Ontario	1986	Conserv. Authority, OMNR	Employment, Training, Investment.
CF Program	Victoria B.C.	1986	Municip-ality	Employment, Recreation, Demonstration Forest.
Forestry Group Ventures	Halifax Nova Scotia	1987	Assoc. of Land Owners	Timber.
Madawaska Highlands	Ontario	Proposed 1988	Proposed Regional Trust	Recreation, Wildlife, Timber, Employment.
Geraldton Community	Geraldton Ontario	Proposed 1988	Municip-ality	Recreation, Employment, Wildlife, Tourism, Fishery, Timber, Demontration Forest.

North Cowichan Municipal Forest

The Municipality of North Cowichan, near the town of Duncan north of Victoria, owns some 5,000 ha of forested land that was first clearcut in the decades prior to the 1940s, and then cut again in the 1970s using a diameter-limit approach (Duinker et al., 1991). To improve the municipal revenues

from the forest, to provide some local employment, and to begin a process of revitalizing the degraded forest, the Municipal Council put a new management strategy in place and hired a professional forest manager. Some millions of dollars of provincial and federal government monies were obtained for silvicultural work to improve future timber availability (Duinker et al., 1991). The timber operations are self sustaining, in that revenues from logging cover the costs of operations and administration. Surplus revenues are saved for future years when timber costs might exceed revenues from log sales, or when special expenditures need to be made. The forest is managed primarily for timber, with a growing accommodation for recreational and educational uses (Duinker et al., 1991).

The Mission Tree Farm Licence

The Municipality of Mission has held a provincial tree farm licence since the late 1940s (Sloan, 1957). This licence of roughly 9,000 ha is for the most part no different than any other tree farm licence in British Columbia, except that the others are much bigger and are held by forest-products companies (Duinker et al., 1991). The Mission Forest is also managed primarily for timber with increasing attention to recreational and educational use, and operates under the same self-sufficiency principle as does North Cowichan. A full-time forester is employed by the Municipality to manage the forest.

DETERMINANTS OF SUCCESS IN NORTH COWICHAN COMMUNITY FOREST

The North Cowichan Community Forest Initiative is now just more than a decade old, and so far can be seen to be a community-forestry success story. To identify factors which contributed to that success, Peter Duinker (personal communication) interviewed Don McMullan, now Chief Forester with Fletcher Challenge Canada and former industrial forester living in the North Cowichan area and Chair of the Community Forest Advisory Committee in the early 1980s. The following Figure 1 and notes derive from that conversation on the factors worthy of note in understanding the early success of the North Cowichan Community Forest.

Land base

The Municipality of North Cowichan owns some 5,000 ha of forest land, most of which came into municipal ownership many decades ago as a result of private owners defaulting on tax payments. While the forests were by no means well managed prior to 1980, with a resulting degraded forest by that time, those interested in community forestry at least could begin from a platform of a landbase already freely available and waiting for management attention. The situation would have been quite different if the municipality owned no such land, and had to seek tenure on Crown land or the purchase of private lands (both virtually impossible options at the time).

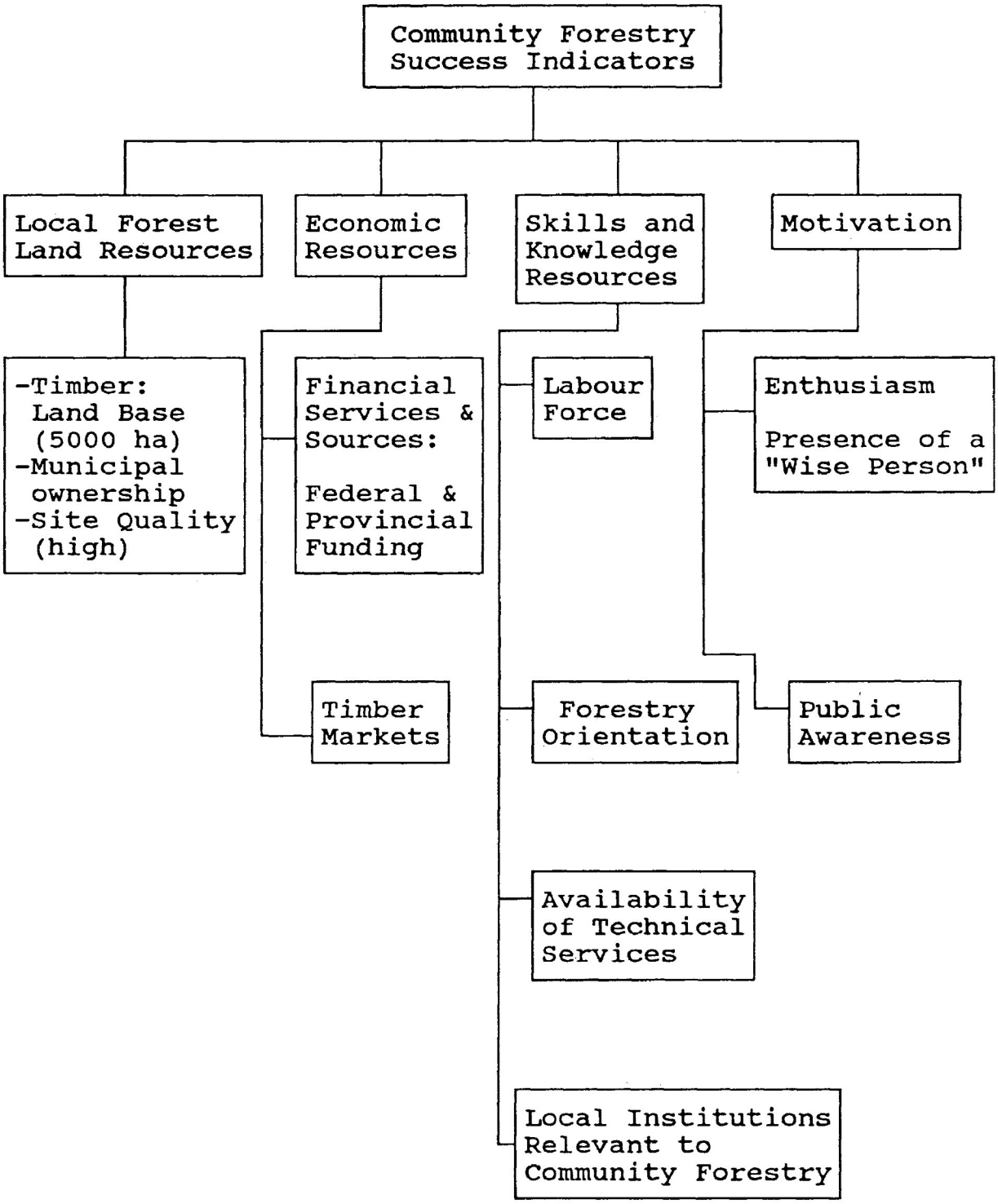


Figure 1. Determinants of success in North Cowichan Community Forest.

In addition to the simple fact that land was available for proceeding with the community-forest initiative, the fact that the land was available without charge is also critical. The community-forest administration does not need to pay land rental or wood stumpage costs, which for business ventures that undertake forest management as a profit centre rather than solely as a cost centre may be a critical feature in financial survival. (Clearly there is no consideration here for opportunity cost in financial terms, as the municipality may be able to earn much more money simply by selling the land today).

Also of importance in making comparisons between community forestry in coastal BC and community forestry elsewhere in Canada is the inherent productivity of forest land. Coastal BC can boast the highest wood growth rates in Canada. The community-forest advisory committee estimated in its forest plan that, with intensive management, the community forest of 5,000 ha could produce a long-term sustainable wood harvest of about 50,000 m^3, which translates into an annual growth rate of about 10 m^3/ha. On the other hand, boreal forests in central Canada can not be expected to produce more than about 1 m^3/ha on average under natural conditions, and perhaps 2-3 m^3/ha under intensive management. High inherent site productivity in a forest managed for timber purposes can be an important

factor in financial success.

Commitment and Competence of Key Individuals

There are two parts to the contribution of committed and competent individuals in the early success of the North Cowichan Community Forest initiative. First, the champion of the whole affair was then mayor Graham Bruce (now MLA for the area), who developed sufficient interest in the community-forestry prospects that he took it on as a special personal and municipal venture. Second, Bruce established a community-forest advisory committee with participation by several local industrial foresters (and chaired by McMullan). As the committee began functioning, its members became more and more excited by the prospect of managing a small forest intensively, and several spent much company and volunteer time planning and overseeing management of the community forest. A key additional commitment came from the employers of the industrial foresters, which allowed the foresters to spend considerable company time on the community-forest venture. In addition to commitment and excitement, the industrial foresters brought strong knowledge of forest management to the committee, and were able to design management themselves rather than having to purchase the services of an impassionate consultant.

Public Awareness

As the community-forest advisory committee began its work, it decided to exploit every opportunity to inform people of the North Cowichan area about the community-forest initiative. When field trips for municipal councillors were arranged, local media were invited along. Members of the committee actively sought personal appearances before the media. As the community forest became firmly established, the administrators began to design and implement a program of public information that contiues today.

The Economic and Social Context

The original community-forest plan drawn up by the advisory committee included modest levels of timber harvest and forest improvement through artificial regeneration and stand pruning and thinning. The early 1980s saw an economic recession set in, and hundreds of North Cowichan people were without employment. The provincial and federal governments established handsomely funded programs for employment creation. Bruce and his community-forest advisory committee pursued these funds and were remarkably successful in getting them. Hundreds of local people got short-term jobs working on forest-improvement projects in the community forest. This was a tremendous boost to the local economy and morale, and led community people to regard the community-forest initiative in a very positive

light. It seems fair to conclude that the occurrence of the recession and the ensuing make-work funding programs were significant factors in the successful launch of the North Cowichan Community Forest.

Multiple Operators and Multiple Buyers

The forest-products industry is a particularly important part of the Vancouver-Island economy, especially outside the Victoria area. In contrast to the forest-industrial scene in Northern Ontario, it is characterized by a relative abundance of independent logging contractors and a somewhat competitive log market. This means that within reasonable distances from the forest, the North Cowichan community forester can shop around for the most reasonably priced logging contractors and also for the highest-paying log buyers. Having such options in contracting out forest work and in finding log buyers is a factor that predisposes a community-forestry venture more for success than a situation without such options.

Summary

Factors contributing to the successful establishment of the North Cowichan Community Forest initiative in the early 1980s include:

(a) a municipally-owned forest landbase of sufficient extent for a forestry business venture and with high

inherent wood-growing capability;

(b) a committed, skilled and visionary cadre of individuals bringing complementary political and technical knowledge to community-forest management;

(c) recognition of the importance of favourable and early public awareness, and vigorous use of media to raise public awareness and support;

(d) a socio-economic context making external monies available for short-term employments in community projects;

(e) a favourable business climate for forest management, including competing forestry contractors and competing log buyers;

(f) the beginnings of public sentiment toward community self-determination and improved stewardship of natural resources and environment.

Clearly, it would be incorrect to assume that community forestry elsewhere would be biased toward failure if all the above factors were not favourably in place. In Ontario, for example, few municipalities own large tracts

of forest land. Application of the above analysis of what made the North Cowichan Community Forest successful, to other situations where community forestry is being contemplated, must be done with considerable prudence.

SOME DIMENSIONS OF COMMUNITY FORESTRY IN NORTHERN ONTARIO

The nature of community forestry projects under Northern Ontario conditions can be described partly along four major dimensions: spatial scale (size of forest areas), range of forest values covered by management objectives, degree of involvement and control by community people, and land tenure arrangements.

Spatial Scale

Woodlot forestry in Ontario takes place at a spatial extent of 10^0 to 10^2 ha whereas industrial and provincial forestry, on the other hand, occurs generally at a spatial extent of 10^5 to 10^6 ha (Duinker et al., 1991). It is expected that community forestry in Northern Ontario will be characterized by relatively large forest areas in the range of 10^3 to 10^4 ha, perhaps in some cases up to 10^5 ha. The North Cowichan Municipal Forest is about 5,000 ha, the Mission Tree Farm Licence is about 9,000 ha, and the proposed Geraldton Community Forest covers roughly 70,000 ha.

If we assume that community forestry in Northern Ontario

must have an element of successful timber business associated with it and the capability to provide a wide array of benefits, then it seems reasonable to think in terms of tens of thousands of hectares, especially with slow-growing boreal forest in mind. However, Duinker et al. (1991) noted that the infrastructure required to manage forest estates of hundreds of thousands of hectares or larger would likely be out of the range of capability of most communities in Northern Ontario.

Range of Forest Values Covered by Management Objectives

It is widely believed that community forestry inherently means multiple-use forest management, i.e., management of forest lands for a wide range of benefits, some main ones of which could be timber, wildlife, recreation, biodiversity, tourism and education. This is often said to be desirable also in the management of any forest land, from small private woodlots to large industrially or provincially managed forests. Successful community forestry in Northern Ontario may not necessarily be tied to multiple-use management; there will be cases where strong multiple-use management is desirable, and also cases where strongly timber-oriented management is appropriate (Duinker et al. 1991). It seems reasonable to expect that most of the forest-management bills would be paid for by sales of timber of one kind or another.

Degree of Community Control and Involvement

A high degree of community control and participation in planning, design and implementation of community forestry programs should be a key feature of community forestry in Northern Ontario. Community involvement will not only enhance a sense of ownership and pride in the management of various land resources by members of the community, but also reflects increased autonomy and responsibility on their part. Current efforts by OMNR to involve the public in timber-management planning processes have in general not led to satisfactory levels of public involvement. On the other hand, full localization of control of forests on provincial Crown land may constitute an imbalance as well. Therefore, the forest sector has been advised to pursue prompt and widespread establishment of agreeable partnerships between local and regional interests, and between public and professional input (Duinker et al., 1991). Community forestry is a promising approach to achieving these balances. Compared to current provincial and industrial forestry in Canada, community forestry means a much stronger degree of forest-management authority and decision control in the hands of people in the local community on their own behalf.

Land Tenure

Forest policy in Canada gives rise to a system based largely on public ownership of resources and private

utilization. The critical relationships between public owners and private users are established through the distinctive forest tenure systems established by provincial governments. Today, the forest-products industry depends mainly on long-term, renewable licences that assign to them not only the right to harvest timber but also extensive responsibilities for developing, protecting and managing public forests. There are 24 principal provincial forest tenures in Canada plus a number of miscellaneous licences and permits (Haley and Luckert, 1990). In Ontario alone there are four (4) such types of licences: Forest Management Agreement, Order-in Council Licence, Miscellaneous Licences, and Crown Timber Salvage Licence. These licences have significant advantages in the Canadian context, but they fail to provide their holders sufficient security to encourage voluntary silviculture, a problem of increasing concern to policy-makers as the industry shifts from the original endowment of natural timber to managed forests (Pearse, 1990). This suggests a need for further development of tenure policy, in particular a need for innovations to provide those who undertake forest improvements with a stronger proprietary interest in the forest crops they manage (Pearse, 1990). Community forestry is a shift from the now traditional forest tenure system in Canada, where public lands are managed and utilized by the private sector.

Therefore, it is suggested that land tenure arrangements for community forestry in Northern Ontario may have to take the form of a "super Forest Management Agreement (FMA)". A super FMA would have the following characteristics:

Comprehensiveness

The tenure agreement should grant exclusive rights to the holder (community) to manage not only for timber but also for such non-timber values as outdoor recreation, wildlife, and fisheries. The argument here is that management for timber alone (in some cases) may not generate adequate revenues to sustain the local economy. Management by the community for other uses may be desirable, especially where market signals and incentives to produce these products exist. A comprehensive tenure agreement will go a long way in helping forest-sector-dependent communities diversify their economies.

Duration

Restrictions on the duration, or term, of a tenure have important implications for the way in which the forest resource is managed (Haley and Luckert, 1990). From an industrial point of view, if forest management expenditures are seen as investments in forest-resource development, then industrial tenure holders will want the longest tenure terms possible. However, to date, practically all forest tenures in Canada are for 25 years or less, a period

considered to be the maximum period required to amortize a manufacturing plant. These terms serve to encourage large forest-products firms to establish processing facilities which are closely integrated and associated with harvesting of mature timber. If the objective is to sustain and stabilize the local economy in the long term and to instill a sense of security and ownership in the community, a duration of 25 to 30 years, renewable every five (5) years, would be the minimum for community forestry in Northern Ontario.

Operational stipulations and controls

Operational stipulations and controls are important components of forest tenure agreements. The more stringent the operational requirements, the less discretionary room tenure holders have to make decisions. However, the less stringent monitoring and enforcement procedures are, the more incentive there is for tenure holders to ignore regulations and risk being penalized (Haley and Luckert, 1990). Therefore, while OMNR will assume more of a final authority role rather than an implementation role, community forestry activities will doubtless be required to operate under forest management guidelines as well as fishery and wildlife guidelines designed by the community in coordination with relevant government agencies and with the help of professionals. The Crown and the community will have to enter into agreements regarding reforestation,

protection (shared costs of control and disposal), and road building.

The proposed characteristics of community forestry under Northern Ontario conditions above should go a long way in assisting the OMNR in its efforts to develop policy on community forestry application. Land tenure arrangements will have to be clear to communities in order to instill a sense of security and ownership in them.

FRAMEWORK FOR GAUGING POTENTIAL SUCCESS OF COMMUNITY FORESTRY PROGRAMS

What is success in community forestry? The most appropriate answer to this question would be: "if the community forestry program met its objective(s)". The objectives of community forestry programs will vary from community to community. Irrespective of the location, community forestry programs are designed to improve the general well-being of the community members. This is the general objective often interpreted into various specific objectives for community forestry by different communities. However, for a community forestry program to be successful, I proposed that there are **primary factors** (predisposing) and **secondary factors** (conributing) that will have to be apparent or developed in a community. The primary factors are: (a) local forest land resources (land uses); (b) administrative resources; (c) economic resources; and (d) skills and knowledge resources (Figure 2a). The secondary factors include: (a) community infrastructure and services; and (b) motivation (Figure 2b). Both sets of factors together form the basis for a general framework for gauging potential success of community forestry programs. The framework, in turn, forms the basis for choice of both socio-economic and biophysical variables used in this study.

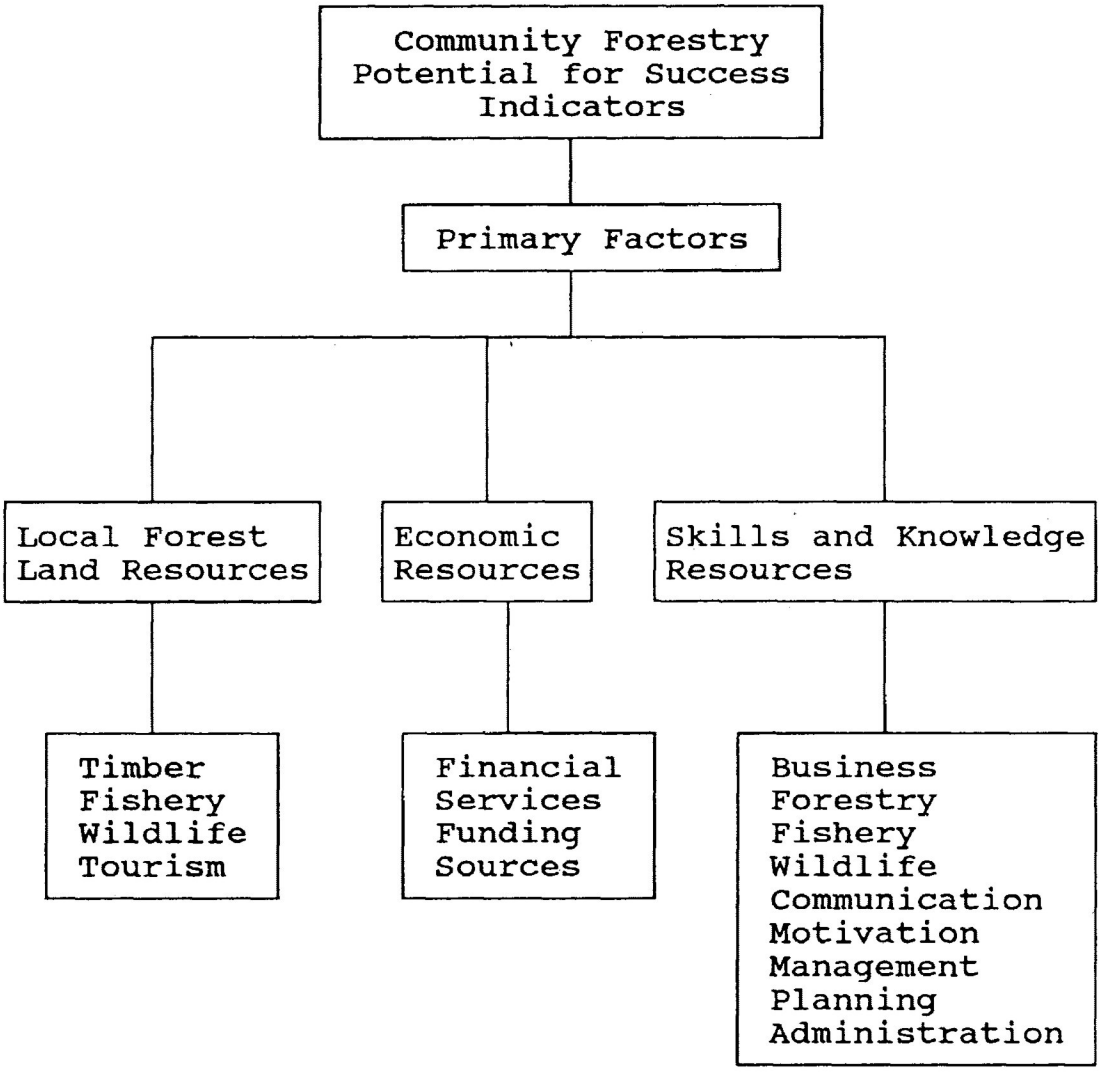


Figure 2a. Primary factors for gauging potential success of community forestry programs.

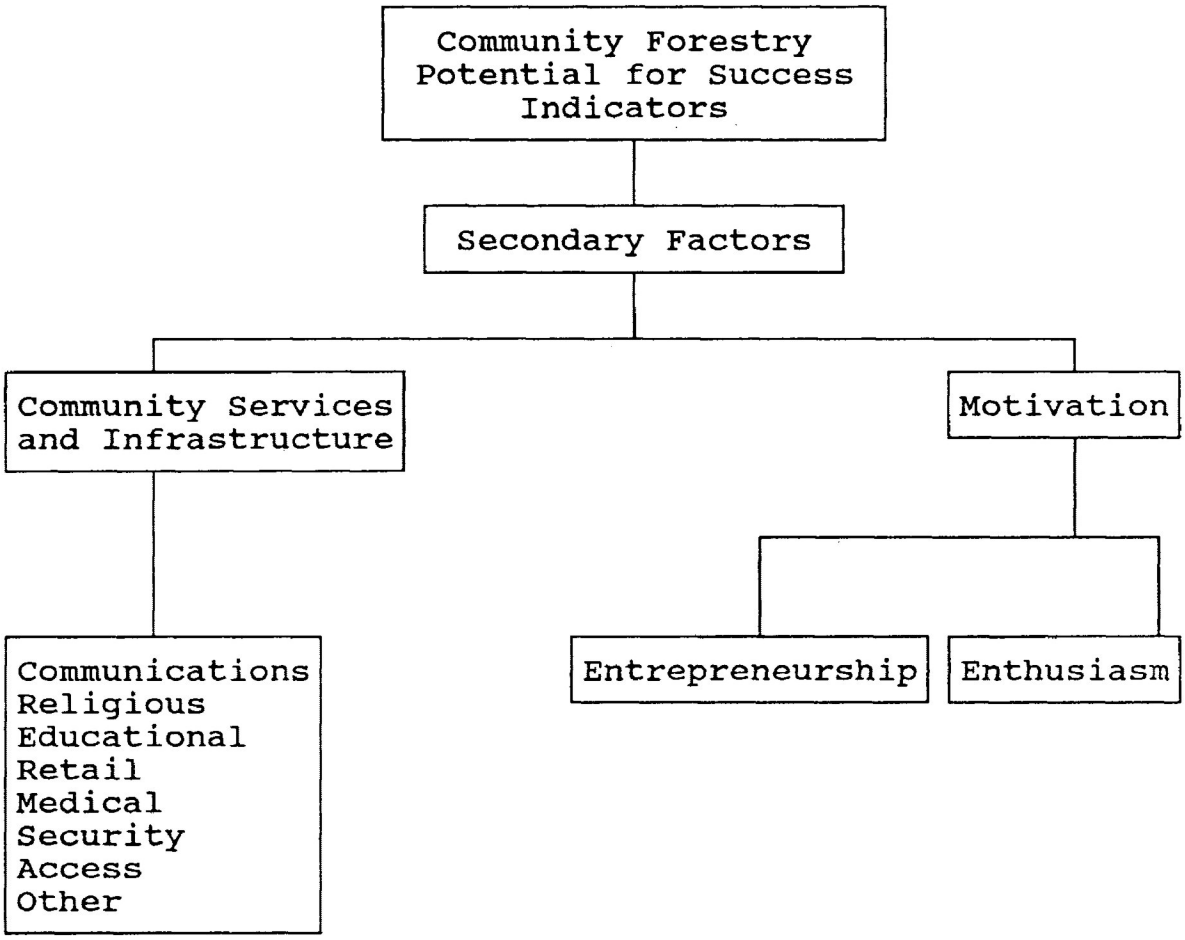


Figure 2b. Secondary factors for gauging potential success of community forestry programs.

SOCIO-ECONOMIC VARIABLES: JUSTIFICATION AND RATIONALE

The socio-economic variables examined include: population distribution and labour force, forestry orientation in the labour force, unemployment levels, local institutions relevant to community forestry, access, land uses, availability of technical services, markets (timber and non-timber), amenities, and enthusiasm of community (Table 4).

Table 4: Socio-economic variables and sources of information.

Variable	Source(s)
1. Population distribution and labour force	Statistics Canada Census Information (1987, 1988).
2. Forestry orientation in the labour force	Statistics Canada Socio-economic Data Base (1986).
3. Unemployment levels	Statistics Canada Socio-economic Data Base (1986), Community Profiles (1989, 1990).
4. Local institutions relevant to community forestry	Community Profiles (1989, 1990).
5. Access	OMNR, Provincial Road Maps.
6. Land uses (Current versus potential)	OMNR, 1983a, 1983b, 1983c, 1983d (DLUGs).
7. Availability of technical services	Community Profiles (1989, 1990).
8. Timber markets (Current versus potential)	Directory, Primary Wood-Using Industries in Ontario (OMNR, 1987).
9. Non-timber markets (Current versus potential)	Community Profiles (1989, 1990), Personal Interviews.
10. Amenities	Community Profiles (1989, 1990).
11. Enthusiasm	Local Administration, Business Community, School Boards, Community members.

Population Distribution and Labour force

- Age distribution
  - Young
  - Middle
  - Old

The successful implementation and continuity of community forestry programs depends on the availability of local skills and knowledge resources (Figure 3). Therefore, a community with large numbers and/or a relatively large proportion of its population in employable age classes will have a high chance of supplying adequate personnel for a community forestry program. A community well endowed with young and middle-aged adults can ensure a sustained labour pool and continuity of community forestry programs, as well as facilitate acceptance of community forestry. Labour force in a community may be measured by the total number of middle-aged adults in the population expressed as a percentage or absolute value (Figure 3). The assumption is that the higher the number of employable people in a community, the greater the chance that the labour required for community forestry can be found locally.

Forestry Orientation in the Labour Force

- Technical orientation in the labour force.

The forestry orientation of the labour force is an important determinant of the potential for successful community forestry ventures. Forestry orientation

indicates the prevailing level of forestry skills that exists in the labour force with little or no training needed.

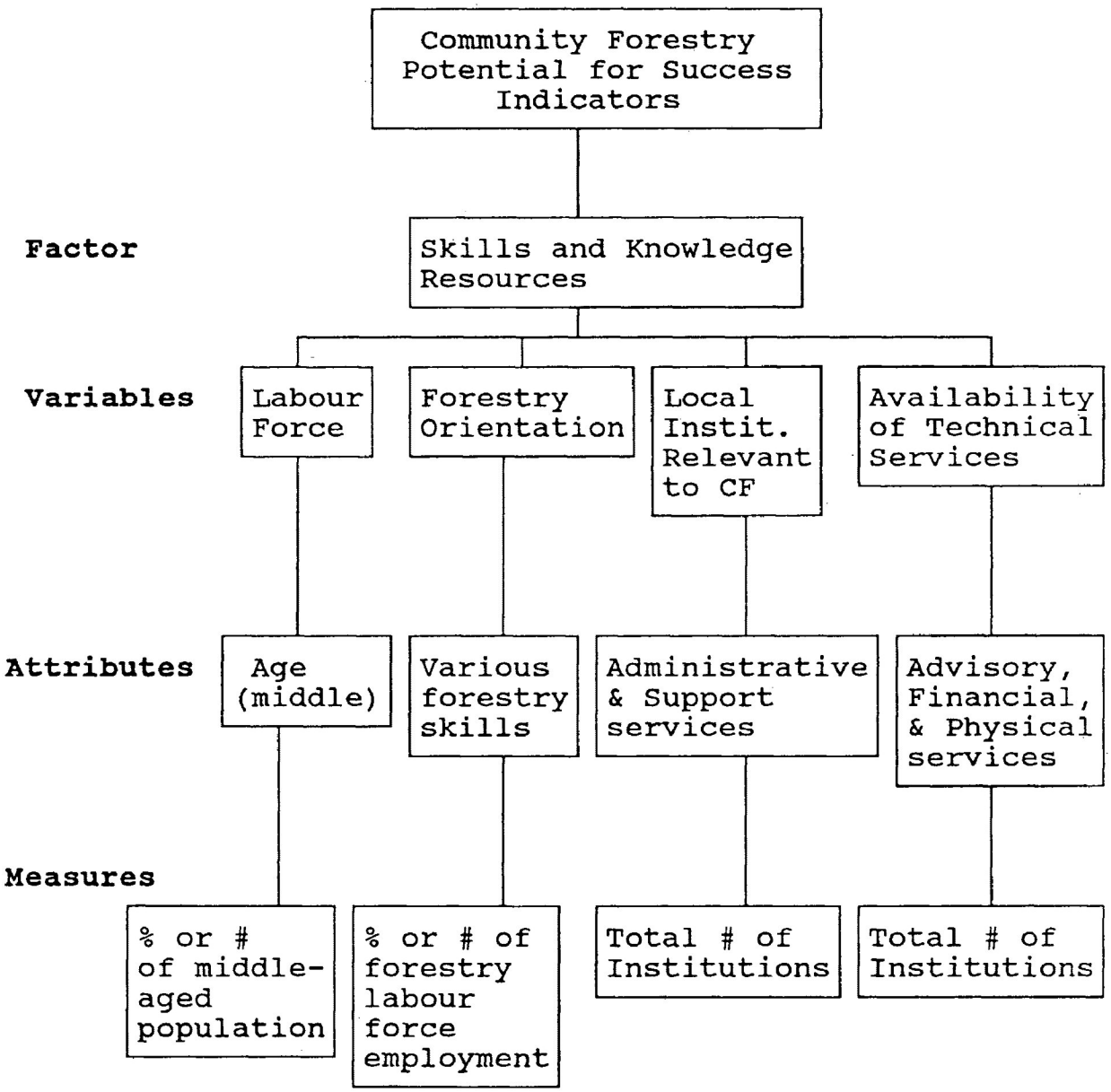


Figure 3. Skills and knowledge resources for gauging potential success of community forestry programs.

To be biased strongly in favour of success in a community forest program, a community should have a tradition of forestry and the necessary skills developed by that tradition. The assumption is that the higher the number of people in the labour force oriented towards forestry, the easier it will be for a community to undertake community forestry.

Forestry orientation in the labour force may be measured as a percentage of the total labour force or as an absolute number of people employed in forest-related primary, manufacturing, construction, and other industries (Figure 3).

Unemployment Levels

- Total numbers and percentages

The forest industry in Northern Ontario is, as in the rest of Canada, a cyclical business vulnerable to the vagaries of the marketplace. Unemployment levels in most Northern Ontario communities are generally higher than the average unemployment rate for Ontario because of the absence of a diversified industrial base, giving rise to lack of employment opportunities.

Unemployment rate is an important determinant of success

potential in community forestry because one of the premises for community forestry is that it should provide stable employment to local community members. Therefore, the more unemployment and/or threats of further unemployment within a community, the more available manpower and incentives for development of a community forest program. Where unemployment is low, there may be no need for community forestry as a generator of emplyment (although there may other good reasons to have community forestry), and vice versa. The assumption is that the higher the number of unemployed people in a community, the more attractive community forestry becomes for that community. This variable may be measured as a percentage or absolute number of people unemployed in a community.

Local Institutions Relevant to Community Forestry

- Cooperatives
- Trusts
- Municipal Administration/Local Services Board
- First Nations Council (where applicable)
- Economic Development Corporations
- Chambers of Commerce
- Mills
- OMNR

Success of a community forestry program is favoured by the existence of institutions that are relevant to community forestry planning and execution (Figure 2a). Therefore,

existence of an established institutional framework will facilitate decision-making and the implementation of community forestry programs. The lack of, or the building of, such institutions from the beginning can prove to be time consuming and costly. Local organizations serve as intermediaries between local citizens and the state and perform a range of inter-organizational tasks such as provision of information about community needs, mobilization of local resources, and delivery of services to the community. This variable may be measured by taking a total count of all institutions relevant to community forestry planning and execution within each community (Figure 3). The relevant institutions should include those that can offer administrative and support services. The total number of institutions per community may then be used to rank communities for bias for success in community forestry.

Access

- major highways
- air
- forest access roads
- rail
- water

The ease of access into communities identified for community forestry programs is vital for communications,

marketing, distribution of goods and/or services and for other administrative purposes. Therefore, a community forestry program is more likely to succeed when various forms of high-quality access exist (Figure 4). The variable could be measured by ascertaining the presence or absence of various means of transportation for each community, such as major highways, air, rail, and water. A community would have to have the majority of the transportation modes above to score highly on the variable.

Land Uses

Degree of current versus potential use

- Fishery
- Wildlife
- Timber
- Tourism

Community stability is best pursued through economic diversification. The best community forestry program is one that seeks to provide a wide array of benefits to the community. Therefore, community forestry should be predicated on various forest land resources where possible (e.g. fishery, wildlife, timber, tourism) (Figure 5). However, where mining or agriculture have been identified as the major activities in a community, community forestry may not have a significant place.

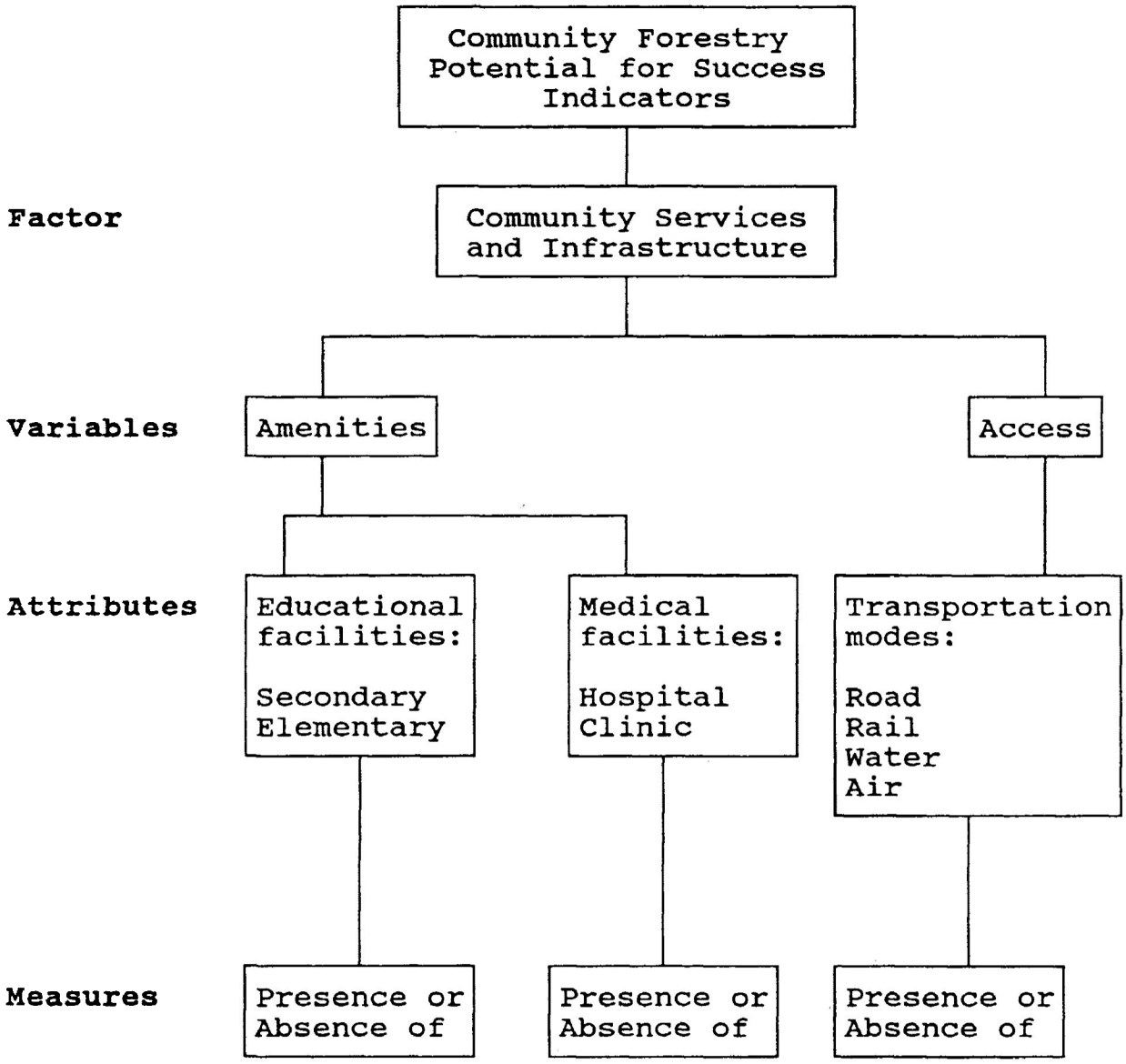


Figure 4. Community services and infrastructure in gauging potential success of community forestry programs.

The examination of degree of current versus potential use of all land resources is an important determinant of success potential in community forestry to ascertain possibilities of economic diversification.

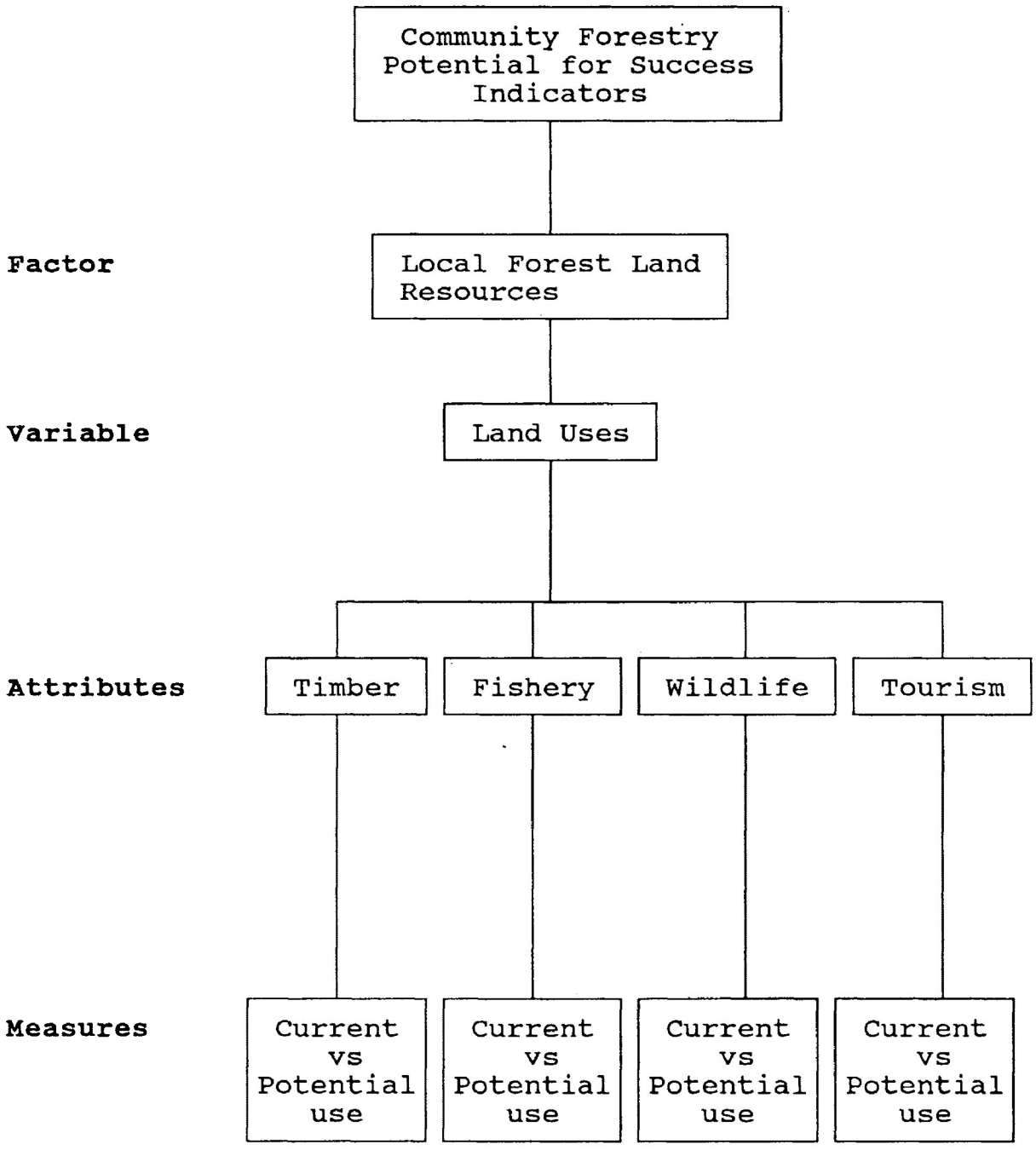


Figure 5. Local forest land resources for gauging potential success of community forestry programs.

For instance, where the potential land use for timber,

fishery, recreation or parks is high, a community forestry program would seem to have high viability. Data on all land uses (i.e. timber, fishery, wildlife, and tourism) could be measured by comparing between current and potential levels of use.

Availability of Technical Services

- Financial Services
- Physical (operations) Services
- Professional and Advisory Services

The presence of established institutions to provide both technical services (knowledge) and operational skills is vital to the success of community forestry projects. For instance, technical knowledge pertaining to forestry, fishery, wildlife and tourism are important determinants of success potential in community forestry ventures (Figure 2a). As well, community forest managers must possess high communication, motivation, management and planning skills (Figure 2a) to make community forestry a success.

Technical services are required, for example, in drawing up management and operational plans (e.g. the current role of OMNR and Forest Management Agreement holders). Existing forest-products companies may form an important link in the development and implementation of community forestry

programs by providing services for physical operations such as scarification, herbicide application, tree planting and nursery management. The role of financial institutions such as commercial banks and community credit unions are also important in providing start-up funding for community forestry programs.

The availability of technical services in each community could be measured by taking a total count of institutions/firms capable of providing advisory, physical and financial services in community forestry ventures (Figure 3). The assumption is that the higher the number of institutions capable of providing technical services, the more bias for success of community forestry in that particular community.

Existing Markets and Customers

- Existing vs Potential Markets
- Timber and Non-Timber Markets

As part of economic resources in a community, markets for both timber and non-timber values are an important determinant of success potential in community forestry programs (Figure 6). An assured supply of potential benefits is of little use for the community if there are not also assured markets for the products and services.

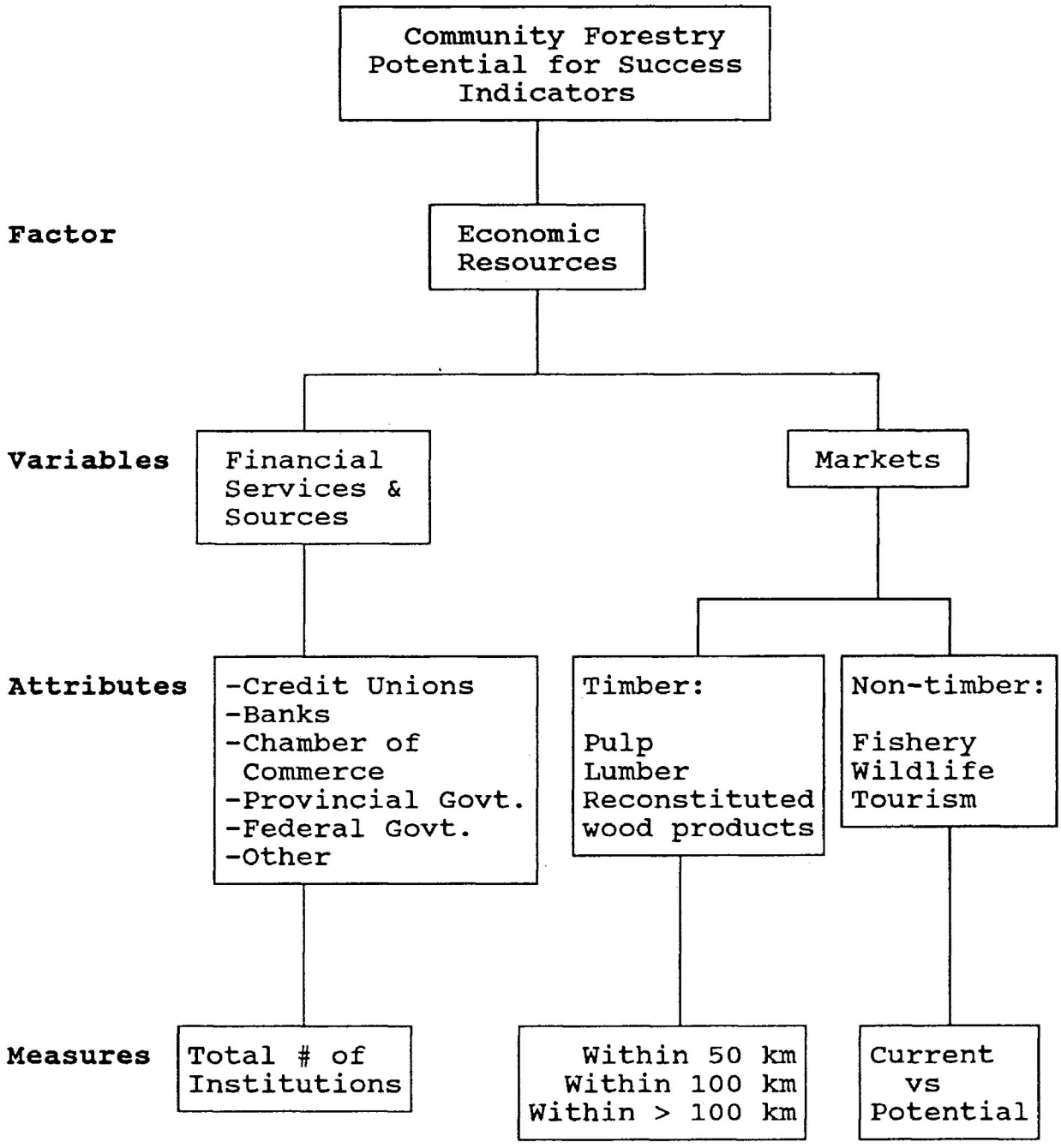


Figure 6. Economic indicators for gauging potential success of community forestry programs.

For instance, timber markets for lumber, pulpwood, and fuelwood should be apparent in a community if continued production of these products is to be justified. On the other hand, existing and potential markets for non-timber values (e.g. for sportfishing, commercial fishing, commercial trapping, skiing, and canoeing) should also be determined. The assumption is that the potential to create or expand markets in non-timber resources should be apparent so community forestry can make diverse contributions to the economic base of a community.

Therefore, there is a need to identify both existing and potential markets in light of the derived products and services from the community forestry activities. The greater the existing markets and the potential for both markets and customers, the greater the chance for community forestry to succeed. The existing and potential markets for timber resources might be measured by taking a total count of mills around each community subject to defined criteria based on distance (Figure 6). The assumption is that increased travel distances and lack of mills within or near a community could seriously affect marketing of forest products and thus hamper the success of community forestry.

Non-timber markets (fishery, wildlife, tourism) for each community might be measured by determining the difference

between current and potential levels. The markets were identified as resident (locals and Ontarians) and non-resident (mostly Americans). The assumption is that, based on the quantities of these resources around each community and the likely management interventions, the existing versus potential levels of markets might increase, decrease or remain stable.

Amenities

- Community Services
- Medical facilities
- Educational facilities

Community infrastructure and services are a contributing factor to the potential success of community forestry programs. Therefore, the availability of a wide range of social amenities such as schools, sports facilities, churches, shops, medical facilities, and communication facilities (Figure 2b) serves as an attracting feature to both labour and prospective business investors. It is assumed that community forestry is more likely to succeed where amenities are adequate and in good shape. Amenities in each community might be measured by taking a total count of relevant institutions or facilities in each community or by ascertaining their presence or absence therein. In assessing the variable, the presence or absence of educational and/or medical facilities will be critical

(Figure 4) since both facilities are quite important in attracting potential business investors to a community. Communities with both adequate medical and educational facilities would score highly on the variable.

Enthusiasm of Community

Motivation to engage in, or willingness to undertake, community forestry has been identified as one of the contributing factors for potential success in such programs (Figure 2b). Therefore, local support, expectations and aspirations of the residents, as well as the prevailing entrepreneurial spirit in a community, should be determined.

Enthusiasm of the community is a major prerequisite to the success of community forestry. Practical experience has shown that where there is a lack of interest, severe problems occur with community programs. Where communities are rigidly stratified along social, economic or religious lines, the barriers to communal action can be particularly difficult to remove. Therefore, community forestry is more likely to succeed where there is (a) recognition in the community that present forestry is problematic, and (b) a willingness within the community to adopt new types of forestry. If there is a lack of entrepreneurial spirit within a community, probably the community is not ready for initiation of a community forestry program. Community

forestry is supposed to be predicated on local decision-making and local actions as well as commitment by individual members to the socio-economic well-being of the whole community. Enthusiasm of a community to undertake community forestry could be ascertained through local interviews and meetings with local leaders and general community members. Through such encounters, one would be able to get some sense of the community's willingness or unwillingness to embrace community forestry. Furthermore, the variable could be measured by ascertaining the presence or absence of a "wise person" (Figure 7), sometimes referred to as the "elite" or "mover and shaker", who has the knowledge and understanding of the community as well as the institutional environment. In short, a wise person is an individual who can get things done. The measure of enthusiasm is largely subjective yet still meaningful and important.

BIOPHYSICAL VARIABLES: JUSTIFICATION AND RATIONALE

Local forest land resources (Figure 2a) are an important primary factor in determining success potential in community forestry. A land base with little resource potential for timber, fishery, wildlife, and tourism is no firm basis for community forestry. Timber resources alone will form the main backbone of success potential in community forestry since most of the funding to pay for the operations is likely to come from sale of timber.

Therefore, it is necessary to determine the amount and quality of timber resources surrounding each community.

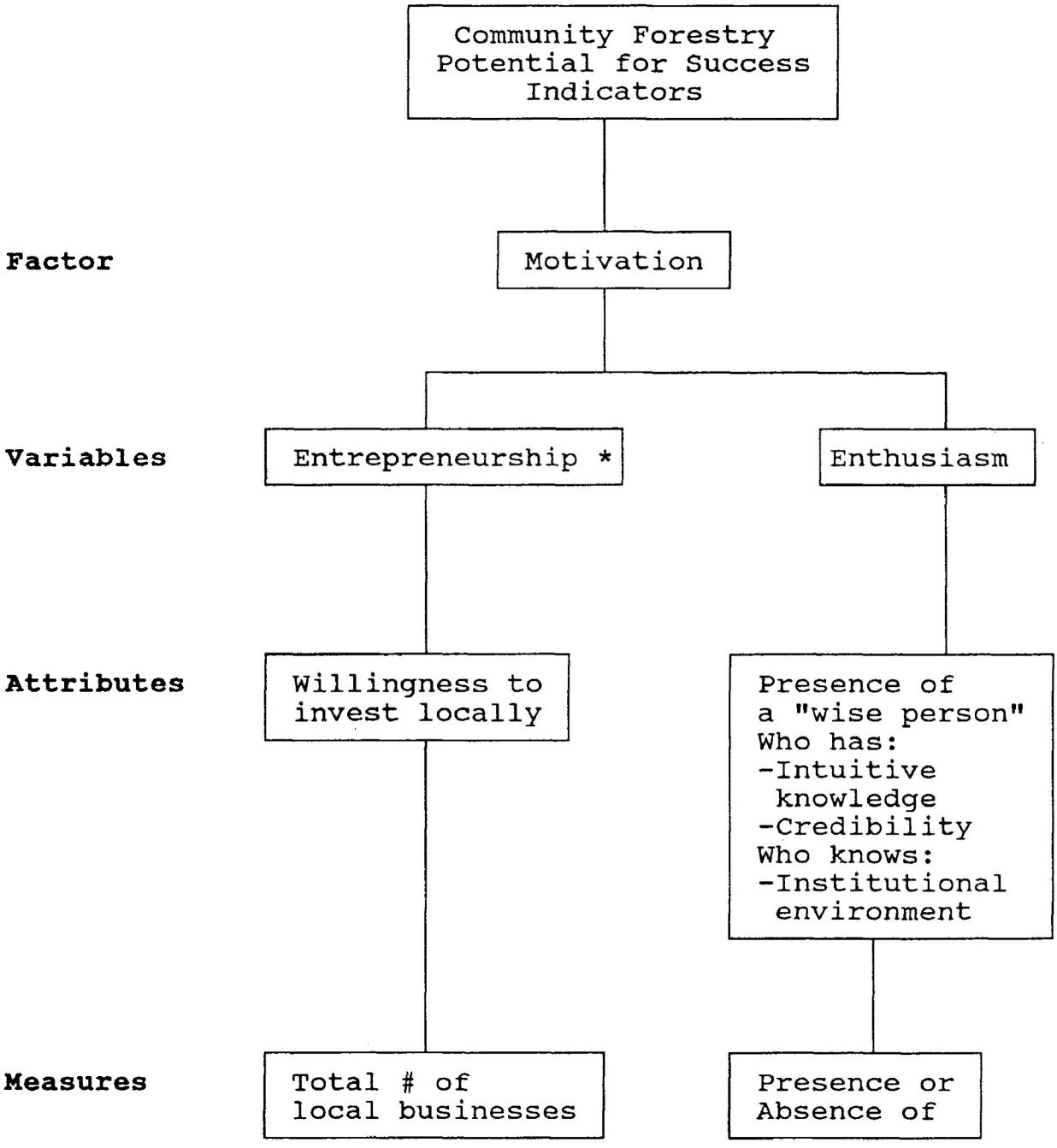


Figure 7. Motivation indicators for gauging potential success of community forestry programs.

* Not measured in this study.

Areas by Age-Class Distribution

Forest Type	Age Class (year)	Area (ha)
Coniferous	0-20	
	21-40	
	41-60	
	61-80	
	81-100	
	101-120	
	121 +	
Non-coniferous	0-20	
	21-40	
	41-60	
	61-80	
	81-100	
	101-120	
	121 +	

Forest age-class distribution will have a major impact on the success of community forestry programs. If the majority of the forest areas occur in the younger age classes, the benefits accruing from such forests (e.g. timber, wildlife, aesthetics) may not be significant in the short term and hence older forests might be preferable. On the other hand, old forests alone might not sustain all the desired benefits since they are more susceptible to harvest removal, diseases, and mortality. The ideal would be a balanced distribution of all age classes across the forest area. Forest areas surrounding each community have been examined with respect to age-class distribution as a measure of bias for success of community forestry in that

particular community. The more balanced the current age-class structure, the more feasible would be a community forestry program.

The variable could be measured by using an index to represent the relative supply of forest area in a critical age class. For example, many Ontario boreal forests are mainly mature and overmature, with a shortage of area in the 21-40 year age class. Thus, one could use the formula:

$$\frac{A_{21\text{-}40}}{A_{all}} \times 100, \text{ where}$$

$A_{21\text{-}40}$ is the area in the age-class 21-40 years and A_{all} is the total forest area. The assumption is that the area associated with an important and often ill-represented age-class forms a reasonable discriminant among communities as an indicator of success potential for community forestry.

Forest Types by Volume

Forest type	Age class (year)	Volume (m^3)
Coniferous	0-20	
	21-40	
	41-60	
	61-80	
	81-100	
	101-120	
	121 +	
Non-coniferous	0-20	
	21-40	
	41-60	
	61-80	
	81-100	
	101-120	
	121 +	

Timber sales are likely to be the main source (in most cases) of revenue necessary to cover forest-management expenses in community forestry ventures. This being the case, it is necessary to determine how much growing stock is available by forest type, expressed in cubic metres, so that an assessment can be made of the amount and value of the various forest products that might be marketed from the forest. If an area has little growing stock, it may be a poor candidate for community forestry. Gross merchantable volumes (m^3) may be calculated and divided by the total area (ha) to indicate land productivity (m^3/ha) in each community.

Site Quality

Site quality describes the inherent capability of forest land to grow trees. Since a community forestry program's financial success will depend to a significant degree on production and sale of timber assortments, highly productive land will contribute much more to potential success than poor quality land. Generally, land with high proportions of site classes X and I will be most suitable for community forestry. For practical purposes, site class X was treated as site class I and site class IV as site class III in this study. The variable may be measured by calculating total areas under site class I (which includes site class X). The calculated areas above could then be used to rank communities.

Land Tenure

Forest Management Agreement (FMA) versus Crown Management Unit (CMU)

- by mapsheet and/or township.

Land tenure is an important attribute in determining potential success of community forestry programs. Community forestry emphasizes the control and management of the forest resources by the local community. Since land is an essential economic resource, the control of land gives the community the ability to direct its own economic-development efforts. Obtaining the necessary land for

forestry is undoubtedly one of the major stumbling blocks in community forestry proposals. Community land is frequently scarce or is being used for a variety of non-forestry purposes. Although it may be relatively easy to allocate part of a CMU (public land) for community forestry purposes, this may prove difficult with FMAs (also public lands) which are under long-term lease to forest-products companies. Private lands may prove even harder to obtain for the same purposes. In practice, control of Crown land is often vested in a variety of agencies and authorities that may be unwilling to surrender their control to local organizations. Therefore, the existing land tenures within a community will indicate whether there is a possibility for allocating land for community forestry.

The variable may be measured by calculating, for each community, total areas under CMUs. The calculated areas above could then be used as a discriminant among communities. The assumption is that lands under FMAs to forest-products companies are likely to be difficult to make available for community forestry purposes. On the other hand, total land area under both FMA and CMU combined for each community may used as a discriminant among communities. The assumption is that lands under both FMAs and CMUs are public lands and can equally be made available for community forestry purposes.

METHODS

GENERAL APPROACH TO THE STUDY

The phases of the study included (Figure 8): (a) choice of communities to examine; (b) choice of factors to consider; (c) choice of comparison criteria (measures); (d) data collection; (e) transformation of data into rankings/ratings; and (f) evaluation of communities for success potential in community forestry.

STUDY AREA

The study area encompasses sections of OMNR's former Northern, North Central and Northeastern Regions of Ontario (Figure 9a and 9b), covering a territory north of Lake Superior and bounded on the west and east by lines running roughly north of Thunder Bay and Sault Ste. Marie. Application of these boundaries for the study area captures a wide range of types of communities, e.g., three major pulp-mill communities, two mining communities, six sawmill communities and four Native reserve communities. Within the study area, 22 communities were identified (Table 5) as suitable candidates for study. Of these, 16 were identified by Pharand (1988) as single-resource-dependent communities. I added six (6) more communities that have been identified by Statistics Canada (1986) as being highly dependent on the forest sector.

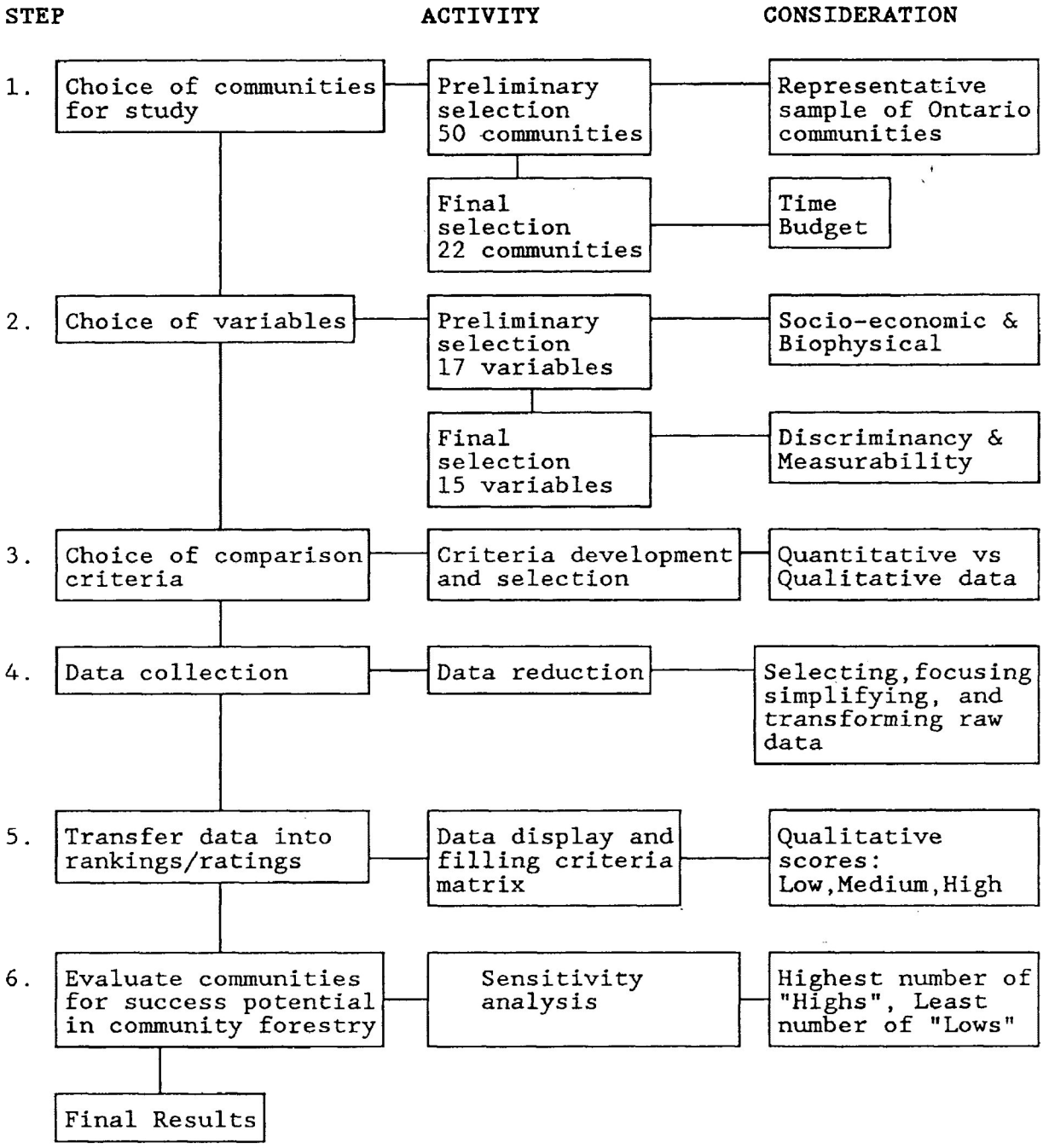
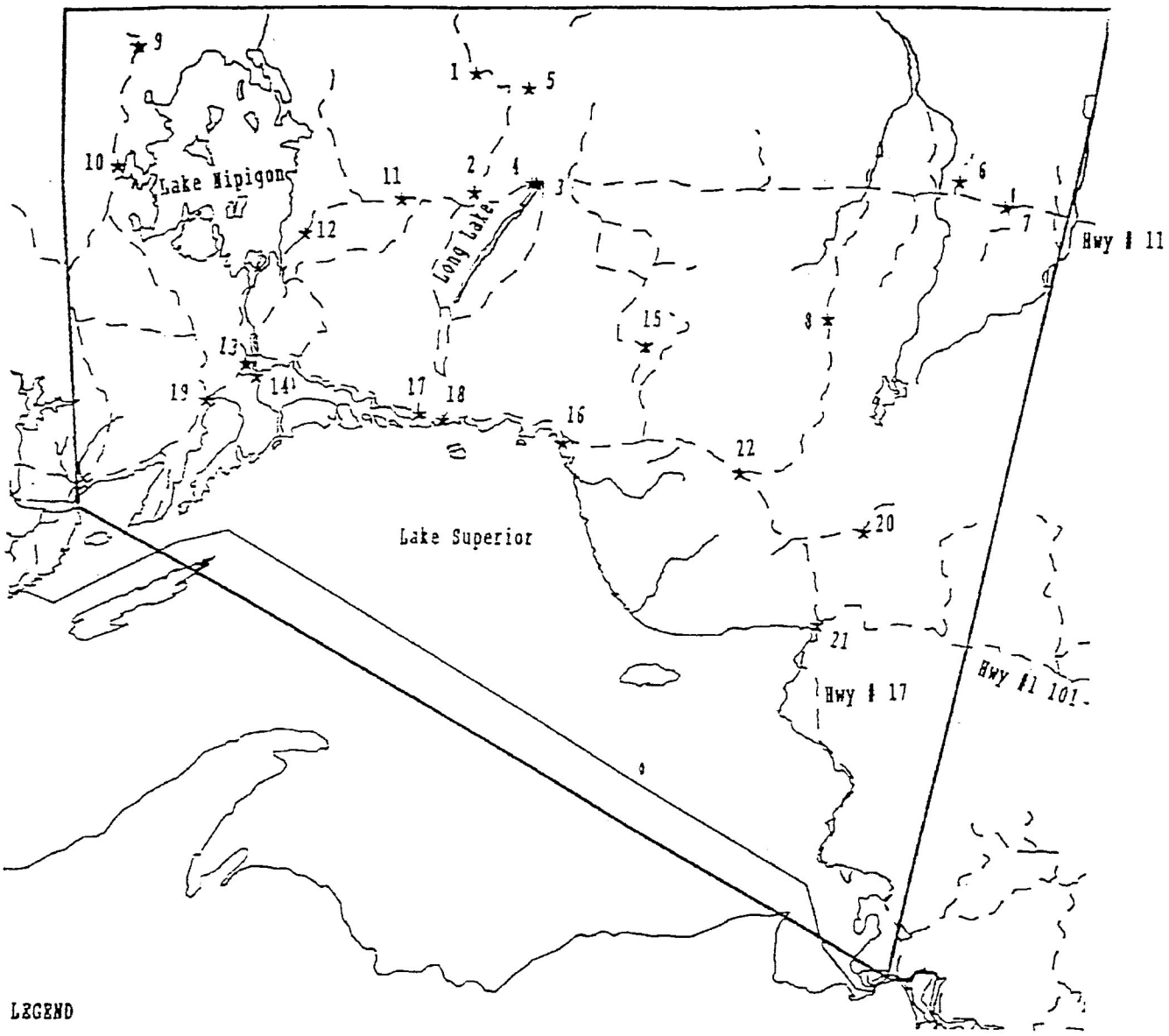


Figure 8. General approach to the study.



LEGEND

Study Area

1 = Aroland
2 = Geraldton
3 = Longlac
4 = Long Lake 58
5 = Nakina
6 = Constance Lake
7 = Hearst
8 = Hornepayne
9 = Armstrong
10 = Gull Bay
11 = Jellicoe
12 = Beardmore
13 = Nipigon
14 = Red Rock
15 = Manitouwadge
16 = Marathon
17 = Schreiber
18 = Terrace Bay
19 = Dorion
20 = Dubreuilville
21 = Wawa
22 = White River

Figure 9b. Map of study area showing selected communities.

Table 5: Northern Ontario communities examined in this pre-feasibility study of community forestry.

OMNR District	Community Name	Type
Geraldton	Aroland	R
	Geraldton	TP
	Longlac	TP
	Long Lake 58	R
	Nakina	TP
Hearst	Constance Lake	R
	Hearst	T
	Hornepayne	TP
Nipigon	Armstrong	TP
	Gull Bay	R
	Jellicoe	TP
	Beardmore	TP
	Nipigon	TP
	Red Rock	TP
Terrace Bay	Manitouwadge	TP
	Marathon	TP
	Schreiber	TP
	Terrace Bay	T
Thunder Bay	Dorion	TP
Wawa	Dubreuilville	TP
	Wawa	TP
	White River	TP

R = Indian Reserve TP = Township T = Town

DATA COLLECTION AND INTERPRETATION

I visited each of the 22 communities personally and, where applicable, personal interviews were conducted with the relevant individuals to update published information. Primary and secondary data sources were utilized. Published and unpublished records and documents were augmented by published literature on the socio-economic and biophysical attributes of each community.

Socio-economic Variables

Data on the socio-economic aspects of each community were collected and compiled from various sources (Table 4).

Population distribution and labour force

The total population of each community was divided into three age cohorts of young (0-14 years), middle (15-54 years), and old (55 years and older) (Appendix I). The middle age cohort was used to represent the potential labour force for each community. Both percentage and absolute values of the potential labour force for each community were calculated (Appendix IIa, IIb). The absolute values were used to rate communities because they reflected the actual size of the potential labour force. Based on the data results at hand, the following score ranges were assigned:

0 - 358 = Low;

678 - 1141 = Medium; and

1474 + = High.

Forestry orientation in the labour force

Forestry orientation in the labour force for each community was measured both as a percentage and absolute value (Appendix IIIa, IIIb). Statistics Canada (1986) gave three categories of forestry orientation among communities:

40% + of labour force employment;
15.0-39.9% of labour force employment; and
2.0-14.9% of labour force employment.

To facilitate measurement of the variable, the lower point of the first range and mid-points of the last two ranges were applied (i.e., 40%, 27.45%, and 8.45%, respectively). Absolute values of forestry orientation in each community were calculated using the three percentages above multiplied by the total number of labour force. Absolute values were used to rank communities to reflect the actual number of people oriented towards forestry in each community. Based on the distribution of the results at hand, the following score ranges were used:

0 - 97 = Low;

189 - 364 = Medium; and

437 + = High.

Unemployment levels

Both absolute values and percentages of unemployment for each community were determined (Appendix IVa, IVb). Unemployment rates have been given by Statistics Canada (1987, 1988) and in respective community profiles. Absolute values for unemployment were calculated by multiplying the unemployment rate with the potential labour force of each community. The calculated absolute values of unemployment were used to rank communities to reflect the actual number of people unemployed in each community. Three score ranges that seemed reasonable given the data set were assigned to rank communities:

0 - 45 = Low;

63 - 85 = Medium; and

109 + = High.

Local institutions relevant to community forestry

Six (6) categories of local institutions were used to assess the variable. The institutional categories are:

Municipality/Local Services Board/Band Administration;

Ministry of Natural Resources;

Local School Boards;

Forestry (mills);

Support Services (federal and provincial

offices); and

Local Development Support Agencies (local associations and non-timber commercial ventures).

The total number of relevant institutions per community based on the above categories was calculated and used to rank the communities for bias for success in community forestry. The presence or absence of MNR and/or a mill was also considered critical in assessing the variable (Appendix V). Therefore, in applying the variable to rank communities, the following criteria were used:

5 or fewer institutions with or without MNR and/or Mill = Low;

6 - 9 institutions with or without MNR and/or Mill = Medium; and

10 or more institutions with MNR + Mill = High.

Access

The variable was measured by gauging the various transportation modes available or absent in each community (Appendix VI). This information was obtained from OMNR and provincial road maps (Table 4). A community had to have the majority of the transportation modes above to score highly on the variable. The communities were ranked according to the following criteria of transportation options:

End Highway + Rail or Water or Air or Through Highway only = Low;

End Highway + Rail + Water or Air or Through Highway + Rail or air or water = Medium; and

Through Highway + Rail + Water or Air = High.

Land uses

Land uses (forestry, fishery, wildlife, tourism) were measured by recording a unit difference between the current and potential levels of use (Appendix VII). For instance, if the current use of wildlife resources in a community was low and the potential level of use was high, a unit difference of plus two (+2) was recorded. Similarly, the unit differences between current and potential levels of use for all other resources were compiled and summed. For instance, if the same community also recorded a plus two (+2) under forestry, a minus one (-1) under fishery, and a zero (0) under tourism, the assessed total score would be:

$$[(+2) + (+2) + (-1) + (0)] = +3$$

Communities were ranked based on the combined total score for the four sectors (forestry, fishery, wildlife, tourism) according to the following criteria:

0 - 2 = Low;

3 = Medium; and

4 - 5 = High.

Availability of technical services

Information on the type and number of institutions available in each community was obtained from the respective community profiles. A community with a high number of technical institutions scored highly on the variable. A listing of all institutions capable of providing technical services in a community forestry venture was generated for each community. Three categories of technical services were considered (Figure 3): physical services (forest-products companies, transportation, fuels, equipment sales and repair, building contractors), financial services (banks, accounting firms, tax firms, credit unions), and advisory services (consultants, forest-products companies, legal services, OMNR, MNDM). These were added together to give a total number of institutions, for each community, capable of providing technical services for community forestry (Appendix VIII). The results were used to rank communities for bias for success in community forestry by applying three scores:

0 - 12 = Low;

13 - 24 = Medium; and

25 + = High.

Markets (existing versus potential)

Markets were divided into timber and non-timber markets. The degree to which each community was constrained by timber markets was determined (Appendix IXa). Three distance classes were applied to measure the degree of market constraint for each community: markets within community and 50 km; markets within 100 km; and markets further than 100 km away. Finally, timber markets for each community were scored based on the following criteria:

(i) serious market constraint due to long distance (greater than 100km) and lack of markets in town = Low;
(ii) modest market constraint due to few mills within 100 km and/or small or no mills in town = Medium; and
(iii) no market constraint due to presence of mills in town or within 50 km = High.

Distances of 50 km and 100 km were chosen rather arbitrarily as qualitative market opportunities for timber. Information on timber markets for each community based on the above criteria was obtained from OMNR's (1987) directory for primary wood-using industries in Ontario.

"Non-timber markets (fishery, wildlife, tourism) were measured by recording a unit difference between the current

and potential markets for each community (Appendix IXb). For instance, if the current value of markets for fishery was high and the potential medium, a unit difference of minus one (-1) was recorded. Similarly, the unit differences between current and potential levels of markets for wildlife and tourism were also calculated. For instance, if the community also recorded a plus two (+2) and a plus one (+1) for wildlife and tourism markets respectively, the overall assessment for non-timber markets for that particular community would be:

$$[(-1) + (+2) + (+1)] = +2$$

Finally, communities were ranked based on the combined total scores for the three sectors (fishery, wildlife, tourism) according to the following criteria:

1 - 2 = Low;

3 = Medium; and

4 = High.

Amenities

A listing of all social amenities available in each community with respect to communication, religious, educational, retail, medical, security, and other services was compiled. After exhaustive scrutiny of all listings

from the 22 communities, I determined that the educational and medical services should be used to discriminate among communities. Therefore, the elements considered were the presence or absence of, for each community, elementary schools, high schools, clinics and/or hospitals (Appendix X). The following criteria were used to score communities:

Clinic only or elementary school only or none = Low;
Clinic + elementary school with or without high school = Medium; and
Hospital + schools (both elementary and secondary) = High.

Enthusiasm of community

Enthusiasm of the community to undertake community forestry was measured through personal interviews and discussions with:

(i) the Municipal Council/Local Service Board/Band Adminstration officials (at least one or two interviews/discussions);
(ii) representatives from the local Chamber of Commerce/Economic Development Corporation/Economic Development Committee (at least one or two interviews/discussions); and
(iii) any members of the community drawn from the

educational, general business, forestry and tourist sectors (wherever available).

Depending on the overall sense of feeling that I got at the end of all these meetings, I scored the communities' enthusiasm based on three scores of low, medium, and high (Appendix XI). I admit, however, that the measurement of this variable was limited and subjective. One improvement could have been an attempt to canvas opinions of labour unions.

Biophysical Variables

Considering the slow growth rate of the boreal forest in Northern Ontario, and assuming that community forestry must have a successful timber business associated with it, it seems reasonable to assume that a land base in the range of 10^4 to 10^5 ha would be ideal for community forestry. To ensure examination of a reasonably sized forest estate, I used a 50 km radius around each of the 22 communities. A radius of 50 km gives a total area of about 7,854 km^2 or 785,400 ha around each community. FRI information associated with each mapsheet/township within the 50 km circle for each community was obtained from OMNR regional offices in Sudbury and Thunder Bay and the Hearst District Office. The following FRI data were retrieved:

Management Unit number;
Mapsheet/Township number;
Stand number;

Working Group;

Area (ha);

Origin (year of);

Stocking;

Site Class; and

Species Composition.

The communities of Longlac and Long Lake 58 had identical FRI information due to their proximity to each other. The forestry variables examined include: areas by age-class distribution, forest types by volume, site quality by area, and existing land tenures by area.

Areas by age-class distribution

Communities with a balanced current age-class structure in their forest are biased for success in community forestry. Forest stands in each community were classified into 20-year age-classes, represented by the midpoints of the classes as follows:

1 - 20 = age-class 10;

21 - 40 = age-class 30;

41 - 60 = age-class 50;

61 - 80 = age-class 70;

81 - 100 = age-class 90;

101 - 120 = age-class 110; and

121 + = age-class 130.

Total areas associated with each age-class were compiled by community (Appendix XIIa). After close examination, it was found that all age classes were well represented across the 22 communities except age classes 1-20 and 21-40 years. Therefore, areas associated with age classes 1-20 and 1-40 combined were used as a discriminant in ranking communities for bias for success in community forestry, according to the following formula:

$$\frac{ha_{1\text{-}40\ yrs}}{ha_{1\text{-}121\ yrs\ +}} \times 100$$

Based on the results (Appendix XIIb), communities were rated according to the following criteria:

0 - 5 % = Low;

6 - 20 % = Medium; and

21 + % = High.

Forest types by volume

Gross merchantable volumes for both softwoods (coniferous species) and hardwoods (non-coniferous species) were calculated for all the stands in each community (Appendix XIIIa) using VOLGEN (Koppikar, 1989), a computer programme based on Plonski's Yield Tables (Plonski, 1960). VOLGEN works with the following carveats:

(a) site class X is treated as site class I;

(b) site class IV is treated as site class III;

(c) volumes may be calculated for the following 10 species only:

White pine (Pinus strobus L. - Pw), red pine (Pinus resinosa Ait. - Pr), jack pine (Pinus banksiana Lamb.- Pj), white spruce (Picea glauca (Moench.) Voss - Sw), black spruce (Picea mariana (Mill.) B.S.P. - Sb), balsam fir (Abies balsamea (L.) Mill. - B), Cedar (Thuja occidentalis L. - Ce), Larch (Larix laricina (Du Roi) K. Koch - L), Poplar (Populus tremuloides Michx. - Po), and white birch (Betula papyrifera Marsh. - Bw).

(d) volumes for Sw, B, Ce, and L are based on the formula for Sb; and

(e) calculated volumes are for the current year (in this case, 1990).

In assessing the variable, the total volume (both coniferous and non-coniferous combined) per unit forest area (m^3/ha) was used to rate communities (Appendix XIIIb) according to the following criteria:

0 - 62 = Low;

90 - 130 = Medium; and

138 + = High.

Site quality by area

Site quality information was compiled by area (ha) for each community. Site class X was combined with site class I and site class IV with site class III. Therefore, only information from three site classes (I, II, III) was compiled by community (Appendix XIVa). Since high-quality forest lands are likely to bias more for the success of community forestry than low-quality lands, areas associated with site classes X and I combined were used to rank communities (Appendix XIVb) according to the following criteria:

0 - 70,000 ha = Low;

90,000 - 142,000 ha = Medium; and

183,000 ha + = High.

Land tenure

The study area encompasses a total of 23 Management Units (Appendix XVa) of which 12 are Forest Management Agreements (FMAs), seven (7) are Company Management Units (Co.MUs), and four (4) are Crown Management Units (CMUs). FMAs and Co.MUs are long-term licences granted by the provincial government to forest-products companies (usually for a period not less than 20 years) for timber exploitation. CMUs are areas where short-term licences are granted by the provincial government to small businesses for the same purpose and usually for a relatively short duration.

Since land under FMAs and Co.MUs may be difficult to acquire for community forestry purposes, only areas (ha) under CMUs were used rank communities (Appendix XVb) according to the following criteria:

0 ha = Low;

6,000 - 62,000 ha = Medium; and

125,000 ha + = High.

COMBINING INFORMATION FROM ALL VARIABLES FOR OVERALL ASSESSMENT

Three scores of low, medium, and high were used to rate communities on each variable. A total of 14 variables were examined in the study (ten (10) socio-economic and four (4) biophysical). The combination of all variables for overall assessment provided the general evaluation framework (Table 6) for community forestry feasibility and success potential in each community. Although there are 14 variables studied, data analysis was conducted on 15 variables. This is so because the variable "markets" was further classified into timber and non-timber markets. In analyzing the data, a community that recorded the highest number of highs was considered the most favourable candidate for community forestry.

Table 6: General evaluation framework combining all variables.

Community	Variables															Totals		
*	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	L	M	H *
Armstrong																		
Aroland																		
Beardmore																		
Constance Lake																		
Dorion																		
Dubreuilville																		
Geraldton																		
Gull Bay																		
Hearst																		
Hornepayne																		
Jellicoe																		
Long Lake 58																		
Longlac																		
Manitouwadge																		
Marathon																		
Nakina																		
Nipigon																		
Red Rock																		
Schreiber																		
Terrace Bay																		
Wawa																		
White River																		

* * explained below:

Variable # 1 = Population distribution and labour force;

2 = Forestry orientation in the labour force;

3 = Unemployment levels;

4 = Local institutions relevant to community forestry;

5 = Access;

6 = Land Uses (current versus potential use);

7 = Availability of technical services;

8 = Timber Markets (current versus potential);

9 = Non-timber markets (current versus potential);

10 = Amenities;

11 = Enthusiasm;

12 = Forest areas (ha) by age-class distribution;

13 = Forest types by volume (m^3);

14 = Site quality by area (ha); and

15 = Land tenure (ownership) by area (ha).

Total Scores: L = Low, M = Medium, and H = High.

RESULTS

ALL VARIABLES

I used all fifteen variables to judge the potential of individual communities to succeed in a community forestry venture. Based on the number of "high" scores across all variables, I believe that the communities of Nipigon, Geraldton, Hearst, Wawa, and Marathon have the highest inherent orientation for successful community forestry ventures (Table 7). Thus, I believe that these communities would be ideal candidates for pilot projects, or at least in-depth feasibility studies, on community forestry. Since there is no independent measure of the truth, the results of this study are based on personal opinion.

SENSITIVITY ANALYSIS

A sensitivity analysis was conducted to determine the effects of four sets of variables and two amalgamation approaches on the outcome of ranking communities for successful potential for community forestry. The four sets of variables are: all variables; primary variables; socio-economic variables; and biophysical variables. The two amalgamation approaches are: total number of highs; and least number of lows.

For a community to score the least number of lows, it would have to score a significant number of highs and/or mediums. Whichever might be the case, that community would certainly

be more oriented to successful community forestry than one scoring mostly lows and few highs or mediums.

Table 7: Community ratings (low, medium, high) against fifteen variables considered important in determining potential for success in community forestry.

Community	Variables															Totals		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	L	M	H
Armstrong	L	L	L	H	L	M	M	L	L	M	M	L	L	M	L	9	5	1
Aroland	L	L	L	L	L	H	L	M	L	L	H	M	L	M	L	10	3	2
Beardmore	L	L	L	M	L	H	L	M	M	M	H	H	L	H	M	6	5	4
Const. Lake	L	L	H	L	L	H	L	H	H	L	H	M	L	M	L	8	2	5
Dorion	L	L	L	L	H	M	L	H	M	L	M	M	L	H	H	7	4	4
Dubreuilv.	M	M	L	M	L	M	M	H	M	M	H	L	H	M	L	4	8	3
Geraldton	H	H	H	H	H	H	M	H	H	H	H	M	L	M	L	2	3	10
Gull Bay	L	L	M	L	L	H	L	L	M	M	H	H	L	M	M	7	5	3
Hearst	H	H	H	H	H	M	H	H	M	H	H	M	L	H	L	2	3	10
Hornepayne	M	L	L	M	L	M	M	H	M	H	L	L	M	M	L	6	7	2
Jellicoe	L	L	L	L	M	M	L	M	M	L	H	H	L	H	M	7	5	3
Longlac	H	H	H	H	M	L	M	H	M	M	H	M	L	M	L	3	6	6
Long Lake	L	L	M	L	M	M	L	H	M	L	H	M	L	M	L	7	6	2
Manitouwa.	H	H	L	H	M	M	H	M	L	H	H	M	L	M	M	3	6	6
Marathon	H	H	L	H	H	M	H	H	M	H	H	L	L	M	H	3	3	9
Nakina	L	L	L	M	M	H	L	M	M	M	H	M	L	M	L	6	7	2
Nipigon	H	H	H	H	H	M	H	H	H	H	M	M	L	H	H	1	3	11
Red Rock	M	M	L	M	H	H	L	H	H	M	H	M	L	H	H	3	5	7
Schreiber	M	M	M	L	H	H	M	H	M	M	H	M	L	L	M	3	8	4
Terrace Bay	H	H	M	H	H	L	H	H	M	H	H	L	L	M	H	3	3	9
Wawa	H	M	H	H	H	M	H	M	H	H	H	L	H	L	M	2	4	9
White River	M	M	M	M	M	H	M	H	H	M	H	L	H	M	L	2	8	5

L = Low M = Medium H = High

All Variables

Based on all variables and the least number of lows, the communities of Nipigon, Geraldton, Hearst, Wawa, and White River came on top (Tables 7 and 8). Nipigon is unique in first position while Geraldton, Hearst, Wawa, and White River are all tied up for second position.

Primary Variables

Using primary variables [i.e. population distribution and labour force, forestry orientation in labour force, local institutions relevant to community forestry, land uses, availability of technical services, markets (timber and non-timber), forest areas by age-class distribution, forest types by volume, site quality by area, and land tenure (ownership) by area] and the total number of highs, Nipigon was again unique in first place while Geraldton, Hearst, Marathon, and Terrace Bay all came second (Tables 8 and 9). Primary variables are the most critical in evaluating community bias for success in community forestry.

The results indicate that Nipigon seems well ahead of all other communities with respect to factors that predispose a community to high success potential in community forestry ventures. Similar results are repeated when primary variables and the least number of lows are considered (Tables 8 and 9), except for Terrace Bay which drops out.

Table 8: Results of sensitivity analysis based on four sets of variables and two amalgamation approaches.

Amalgamation Approach	Variables Used			
	All	Primary	Socio-economic	Biophysical
Total # of Highs	Nipigon Geraldton* Hearst* Wawa** Marathon** Ter. Bay**	Nipigon Geraldton* Hearst* Marathon* Ter. Bay*	Geraldton Nipigon* Hearst* Wawa Marathon** Ter. Bay**	Beardmore* Dorion* Jellicoe* Nipigon* Red Rock
Least # of Lows	Nipigon Geraldton* Hearst* Wawa* W/River*	Nipigon Geraldton* Hearst* Dubreuil.* Manitouw.* Marathon* Red Rock* Wawa* W/River*	Geraldton* Hearst* Nipigon* Wawa* W/River*	Beardmore* Dorion* Gull Bay* Jellicoe* Manitouw.* Nipigon* Red Rock*

* and ** = ties in score.

Total frequency:

Nipigon = 8
Geraldton = 6
Hearst = 6
Wawa = 5
Marathon = 4
Terrace Bay = 3
White River = 3
Red Rock = 3
Manitouwadge = 2
Jellicoe = 2
Beardmore = 2
Dorion = 2
Dubreuil. = 1
Gull Bay = 1

Table 9: Community ratings (low, medium, high) against primary variables considered important in determining potential for success in community forestry.

Community	Total Scores		
	Low	Medium	High
Armstrong	7	3	1
Aroland	7	3	1
Beardmore	4	4	3
Constance Lake	6	2	3
Dorion	5	3	3
Dubreuilville	2	7	2
Geraldton	2	3	6
Gull Bay	6	3	2
Hearst	2	3	6
Hornepayne	3	7	1
Jellicoe	5	4	2
Longlac	3	4	4
Long Lake 58	6	4	1
Manitouwadge	2	5	4
Marathon	2	3	6
Nakina	5	5	1
Nipigon	1	2	8
Red Rock	2	4	5
Schreiber	3	6	2
Terrace Bay	3	2	6
Wawa	2	4	5
White River	2	5	4

This further consolidates the finding that the communities of Nipigon, Geraldton, Hearst, and Marathon are favourably disposed to successful community forestry programs. In addition to the four communities above, these results suggest that Dubreuilville, Manitouwadge, Red Rock, Wawa, and White River may be oriented for success in community forestry.

Socio-economic Variables

Based on socio-economic variables [i.e. population distribution and labour force, forestry orientation in labour force, unemployment levels, local institutions relevant to community forestry, access, land uses, availability of technical services, markets (timber and non-timber), amenities, and enthusiasm] and the total number of highs, Geraldton comes first, followed by Nipigon and Hearst in second place, Wawa in third place and, Marathon and Terrace Bay in fourth place (Tables 8 and 10). The results above suggest that the socio-economic conditions in Geraldton are more favourable for success in community forestry than anywhere else. Interestingly, when the same set of variables is considered with the least number of lows, the communities of Marathon and Terrace Bay drop out and Geraldton, Hearst, Nipigon, Wawa, and White River (a newcomer) all tie up in first place (Tables 8 and 10). This seems to suggest that the socio-economic conditions in the five communities above are not only less

different from each other but are also generally good for initiation of community forestry.

Table 10: Community ratings (low, medium, high) against socio-economic variables considered important in determining potential for success in community forestry.

Community	Total Scores		
	Low	Medium	High
Armstrong	6	4	1
Aroland	8	1	2
Beardmore	5	4	2
Constance Lake	6	0	5
Dorion	6	3	2
Dubreuilville	2	7	2
Geraldton	0	1	10
Gull Bay	6	3	2
Hearst	0	2	9
Hornepayne	4	5	2
Jellicoe	6	4	1
Longlac	1	4	6
Long Lake 58	5	4	2
Manitouwadge	2	3	6
Marathon	1	2	8
Nakina	4	5	2
Nipigon	0	2	9
Red Rock	2	4	5
Schreiber	1	6	4
Terrace Bay	1	2	8
Wawa	0	3	8
White River	0	7	4

Biophysical Variables

The results based on biophysical variables [i.e. forest areas by age-class distribution, forest types by volume, site quality by area, and land tenure (ownership) by area] and the total number of highs show that the communities of Beardmore, Dorion, Jellicoe, Nipigon, and Red Rock are equally endowed with the best set of timber resources around them (Tables 8 and 11). Using the same variables and the least number of lows, the results show that in addition to the above five communities, Gull Bay (an Indian Reserve) and Manitouwadge (a mining town) also have significant timber resources around them.

Table 11: Community ratings (low, medium, high) against biophysical variables considered important in determining potential for success in community forestry.

Community	Total Scores		
	Low	Medium	High
Armstrong	3	1	0
Aroland	2	2	0
Beardmore	1	1	2
Constance Lake	2	2	0
Dorion	1	1	2
Dubreuilville	2	1	1
Geraldton	2	2	0
Gull Bay	1	2	1
Hearst	2	1	1
Hornepayne	2	2	0
Jellicoe	1	1	2
Longlac	2	2	0
Long Lake 58	2	2	0
Manitouwadge	1	3	0
Marathon	2	1	1
Nakina	2	2	0
Nipigon	1	1	2
Red Rock	1	1	2
Schreiber	2	2	0
Terrace Bay	2	1	1
Wawa	2	1	1
White River	2	1	1

DISCUSSION

INTERPRETATION OF RESULTS

This study does not have an independent objective of the truth and thus, interpretation of results is based on personal opinion. However, the methods used in the study have been consistent and systematic. The results of this study suggest that, of the communities examined, community forestry may have the highest chance of succeeding in Nipigon, Geraldton, Hearst, Wawa, and Marathon. The results further suggest that the above five may be the best candidates, among the 22 communities studied, for pilot projects or in-depth feasibility studies on community forestry. However, this is not to say that the remaining 17 out of 22 communities are unsuitable candidates for community forestry. Nonetheless, their inherent potential for success in community forestry appears to be lower than that of the five communities above.

The choice of number of highest-ranking communities to be considered for community forestry (i.e. five) in this study was made arbitrarily. Therefore, depending on the number of communities that the Government of Ontario might want to consider for community forestry programs, the number could go up or down. What is most significant about the results of this study is that the 22 communities have been

classified according to their apparent bias for success in community forestry given the socio-economic and biophysical conditions in each community.

Sensitivity Analysis

The results based on combination of all variables and total number of highs (Table 7) showed that Nipigon was unique in first position. Results of the sensitivity analysis have confirmed this outcome in that Nipigon is the only community appearing in each group evaluated (Table 8). This may suggest that Nipigon is in better shape than all the other communities, from both the socio-economic and biophysical standpoints, to initiate a community forestry program.

I counted the number of times that each community occurred in each set of sensitivity analysis results (Table 8). In this case, total frequency indicates how a community scored given four different groupings of the variables and two amalgamation approaches. The results based on total frequency also showed that the communities of Nipigon, Geraldton, Hearst, Wawa, and Marathon were at the top. This result tends to confirm that the above communities would be the best candidates for pilot projects on community forestry within the study area. Despite their scoring well on biophysical variables, the communities of Beardmore, Dorion, and Jellicoe did not fair well on socio-

economic variables.

EVALUATION FRAMEWORK

Four factors (i.e. local forest land resources, economic resources, skills and knowledge resources, and motivation) (Figure 1) have been attributed to the success of the North Cowichan Community Forest. In addition to the above factors, community services and infrastructure, as a factor, has been proposed in this study (Figure 2b). Although the foregoing factor may not have been succinct in the discussion about factors responsible for the success of North Cowichan Community Forest, it could be assumed that social amenities in North Cowichan community were sufficient at the time the community forest was established. North Cowichan includes the town of Duncan north of Victoria. Thus, North Cowichan's community services and infrastructure can be assumed to be of relatively high quality. If that is the case, the proposed evaluation framework in this study is a meaningful approach to ascertaining applicability of community forestry among single-resource-dependent communities in Northern Ontario.

The need for both biophysical and socio-economic information in successful implementation of community forestry programs has been demonstrated in both the North Cowichan case and in this study. Local forest land resources (i.e. timber, fisheries, wildlife, and tourism)

in each community have been proposed as primary factors in determining potential success of community forestry programs (Figure 2a). However, in the North Cowichan example, timber was the main resource upon which the community forestry program was initiated. As a way of enhancing diversified economies in single-resource-dependent communities, it has been further suggested in this study that, wherever applicable, community forestry should be predicated on a wide array of land uses such as timber, fisheries, wildlife, and tourism.

It is clear from the North Cowichan example and the proposed evaluation framework in this study that the existence of a "wise person", is a necessary condition for ultimate success of community forestry programs. This is an individual with professional or quasi-professional understanding and intuitive knowledge about the situation, and knows the institutional environment well enough to see the community forestry program through to establishment. There is no doubt that communities will require such skilled individuals if they are to be successful in lobbying senior governments for funding for community forestry programs.

Existence of a "wise person" may have been captured in part in the measure of community enthusiasm. The community of

Hornepayne scored low on the variable (Table 7, variable # 11) because I detected a lack of willingness to embrace the concept of community forestry among the individuals interviewed.

In the case of Armstrong, community forestry perhaps could be considered antagonistic to the Armstrong Resource Development Corporation (ARDC). ARDC is a third-party community timber-harvesting outfit on Crown land licensed to a large forest-products company. Locals perceive that ARDC is engaged in community forestry in its own way, although not in the way that I have proposed in this study. Although both Hornepayne and Armstrong may yet have the presence of a "wise person", general community enthusiasm for community forestry, as I define it, seems to be lacking.

Applications of the Framework

The proposed framework described herein has potential application beyond this study. For example, it could be applied by the Ontario government to all 50 communities identified by Pharand (1988) as forest-sector-dependent communities in Ontario to assess their inherent bias for success in community forestry. However, among all these communities, some will be more ready and willing than others to adopt community forestry, as is the case with Geraldton (Dunster, 1989). It is my opinion that such

communities be given first priority for pre-feasibility studies on community forestry according to the proposed evaluation framework in this study owing to their high enthusiasm, awareness, and innovation.

It will require political will as well as financial commitment from the Ontario government to assist suitable communities in establishing community forestry programs. On the other hand, communities will have to re-examine both the socio-economic and biophysical conditions around them as per proposed framework in this study, to ascertain their potential success in community forestry.

The proposed framework in this study may not include all the factors that are in reality necessary for making a community forestry program a success. However, as a first step the framework is detailed enough to lead to meaningful interpretations and conclusions. Further developments and improvements are welcome, especially as policy-makers and researchers include other variables in the framework or even exclude some variables from it, given the prevailing local conditions.

POTENTIAL WEAKNESSES OF THE FRAMEWORK

Quantitative versus Qualitative Data

Qualitative data, in the form of words rather than numbers,

have always been the staple of social sciences such as anthropology, sociology, psychology, and political science. Today, more and more researchers in fields with a traditional quantitative emphasis such as public administration, urban planning, educational research, and policy analysis have shifted to a more qualitative paradigm (Miles and Huberman, 1984). Forestry is no exception. This study has demonstrated the need for both qualitative and quantitative data in addressing the question of applicability of community forestry in Northern Ontario. More than 70% of the data used in the study were qualitative and only about 30% of the data were quantitative.

Qualitative data are a source of well-grounded, rich descriptions and explanations of processes occurring in local contexts. The qualitative data employed in this study, though subjective, have led to new findings and theoretical integrations. However, the most serious and central difficulty that I encountered in analyzing qualitative data is that methods of analysis are not well formulated and are highly subjective. For quantitative data there are clear conventions the researcher can use. The sources of subjectivity in this study mainly stem from variable selection, variable measurement, variable interpretation with reference to community forestry success

potential, and amalgamation of variables/outcomes in evaluation. For instance, in assigning scores of low, medium, and high to evaluate communities on all variables (Table 7), I know the relationships among low, medium and high according to defined variable criteria but I cannot say how much difference exists among communities based on the above three scores. Generally, however, the methods used in this study have been explicit and systematic, and can be used to draw relevant and meaningful conclusions.

Other Variables

Other factors that might arguably be important in determining bias for success in community forestry include:

1. Level of local subsistence use of the forest (very important among Native communities);
2. Level of local recreational use;
3. Education levels;
4. Income (as income earned by the community members); and
5. Public awareness.

Local subsistence and recreational use of a forest are important because the more local people use the surrounding forest for these purposes, the higher the need to sustain those benefits, and thus the more attractive becomes community forestry if industrial or provincial forestry does not cater well to such uses. It is also true that the

more local people use the surrounding forest, the higher their knowledge about the surrounding forest land base.

The level of local subsistence use has been determined indirectly through the measure of "potential versus current land uses" in the community, but does this really constitute local use? A relevant question would be: " what percentage of the community's fuel and food consumption is derived from the surrounding forest land base?" The answer to the above question can only be ascertained by asking further questions to the communities. The questions would be:

(a) to what degree are people's needs for wood products (fibre), food and pelts met from the local forest?;

(b) is the reliance of the people on the local forest for provision of these products likely to increase?; and

(c) do current industrial and provincial forest management practices threaten the continued provision of these goods?

There is a direct relationship between high level of local recreational use of the local forest and success in community forestry. Thus, the higher the level of local

recreational use of the surrounding forest by the community members, the more likely a community forestry venture is going to succeed. I postulate this relationship because high recreational use results in high knowledge of the surrounding forest land base by the community. The measure of level of local recreational use may have been indirectly captured in the measure of "tourism potential" in this study.

Education levels are certainly important because the more educated community people are, the more skills relevant to community forestry there would be in that community and perhaps the easier for the community members to embrace the concept of community forestry. This variable has been determined indirectly through the examination of skills and knowledge resources in each community (i.e. labour force, forestry orientation in the labour force, availability of technical services).

Income may be represented by the total income within a community from employment. Total income for a community could be expressed as:

(a) income from employment; and
(b) income from government grants.

One would argue that the higher the employment income, the more local capital available for a community forestry program, assuming that the local people would be willing to make investments in community forestry. At the same time, if income from government grants is relatively high, that probably indicates a fair number of people in the community depending on social welfare (related to the needs of the community), and that there is a need to generate local income through employment programs that might be provided through community forestry.

Public awareness will contribute significantly to the success of a community forestry program by enhancing informed decision-making. Such was the case in the North Cowichan Community Forest initiative. However, the difference is that in the North Cowichan case, work on community forestry had already begun before the advisory committee sought media attention. In this study, none of the communities, except Geraldton, have yet sought much media attention. I believe that public awareness is critical in the continued success of a community forestry program, but not so critical in its successful initiation.

The foregoing arguments are not to say that the five variables mentioned above could not have been measured separately. However, qualitative variables are often

difficult to measure due to a lack of clear conventions and thus, where one variable suffices to capture another, the better.

Native Communities

One of the assumptions made in this study is a relative homogeneity of socio-economic conditions among all 22 communities. However, it is common knowledge that socio-economic conditions among Native communities in Northern Ontario are lower compared to the non-Native communities in the region. Therefore, it is not surprising that the performance of the four Native communities included in this study (Aroland, Constance Lake, Gull Bay, and Long Lake 58) on socio-economic variables was lower. One might argue that Native communities should be evaluated in their own group for potential success in community forestry. If that were the case, the results of the study would show that Constance Lake and Gull Bay would be the better candidates for community forestry programs. However, given the variables used in this study and their assumed importance in determining feasibility of community forestry in any community, Native communities would still score low on the variables. Perhaps a different evaluation framework would have to be developed for Native communities.

CONCLUSIONS

GENERAL

Increased economic activity among single-resource-dependent communities, arising from community forestry activities, may provide an opportunity for communities to achieve balanced economic growth in which all residents, workers and interest groups can participate. Therefore, to introduce fiscal or policy measures that will prevent community forestry from happening, or to do nothing, at a time when many communities in Northern Ontario seem willing to experiment with the concept, would be foolish. What is required of the Ontario government now is to engage in a vigorous experimentation phase of community forestry as well as strong policy development.

This study has provided a framework for the study of community forestry among single-resource-dependent communities in Northern Ontario. The degree to which community forestry may be a viable option for forest land tenure and management in Northern Ontario has been illustrated by the results of this study. Thus, if the results reflect reality, some communities may be ideal candidates for community forestry programs based on both socio-economic and biophysical attributes in these communities.

While the Ontario government should encourage and support suitable candidate communities to adopt community forestry, its role should be that of advisor and supporter rather than decision-maker. Thus, the onus should be on the communities themselves to take on forest-management responsibilities and to ensure long-term self-sufficiency of community forestry programs. Community forestry programs need not be a drain on the federal and/or provincial budgets as they will involve a simple shift of resources from existing programs directly to the communities. However, subsidies from senior governments may be necessary in the initial stages of the programs.

In developing policy on community forestry, attention should be addressed to the questions of land tenure, size of forest land base, potential outputs (multiple) from the land base, and degree as well as mechanisms of community involvement and participation. The foregoing factors are a key to the overall success of community forestry programs.

NEEDED ACTION, INITIATIVES AND POLICY

It is clear from this study that some communities in the study area seem well oriented toward community-controlled forest land tenure and management. What is required now is for the Ontario government to engage in a process of "adaptive muddling". According to De Young and Kaplan (1988), adaptive muddling is an experimentation framework

involving three distinct facets of the decision-making process: exploration, stability, and distributed leadership. Adaptive muddling calls for support and encouragement for explorations by governments and for utilization of the results. Stability can occur by creating the support structure that permits a variety of explorations to take place (De Young and Kaplan, 1988). In so doing, it is possible to experience errors without endangering the entire system. Therefore, explorations on community forestry with a few communities will provide tested solutions that can be considered for implementation in the larger context. Rather than a single experiment, adaptive muddling supports simultaneous test cases to allow for a diversity of solutions and involves broadly-based input to the solution (distributed leadership).

De Young and Kaplan (1988) concluded that, for adaptive muddling to work, it requires clear policy to the effect that (a) outcomes matter; (b) these outcomes cannot be known without exploration; (c) this exploration is best done at a small scale; and (d) in order to find solutions in a timely fashion, many such experiments must go on simultaneously. Therefore, I believe that Ontario needs to muddle adaptively to discover the socio-economic potential and applicability of community forestry as a viable option for forest land tenure and management among single-

resource-dependent communities in the province.

If the ultimate goal is to try to stabilize the economies of single-resource-dependent communities, a policy of integrating forestry into overall development strategies of the frontier regions of Ontario is likely to require appropriate legislation relating to land tenure. A land tenure duration of 25-30 years has been proposed as a minimum for community forestry in this study. It will also be imperative that the views and aspirations of community residents be reflected in the policy. It is essential that the involvement and participation of local community members in the policy formulation process and implementation of community forestry programs be secured from the very outset.

Community forestry development needs to be a process which emanates from the "bottom up" and not something imposed from the "top down". This local action approach is credited with ushering in a new era of partnership wherein each partner is dedicated to the goal of creating a more balanced community economy through locally-driven development. Local responsibility can only be mobilized if communities will be allowed to assume some power. If community forestry is to succeed, the devolution of power and decision-making from the broadly-based authorities to

the community should not only involve the federal and provincial governments but also financial institutions and forest-products corporations. The process will, no doubt, encounter stiff opposition from the entrenched bureaucracies. But without this sharing of power, success of community forestry programs will likely be difficult to achieve.

Finally, a financial commitment from senior government levels will be required, especially in the initial stages, to ensure success of community forestry programs. In pursuance of the overall objective of community stability and self-reliance, communities ought to be encouraged to mobilize their own resources for their community forestry programs. To achieve this, communities will need to be prepared to meet new challenges and assume responsibilities if power is shifted from senior government levels to them. The role of government should be that of getting the process started and of supporting program continuity.

FUTURE RESEARCH AND DEVELOPMENT IN COMMUNITY FORESTRY

A broad range of unanswered questions exist with respect to the practical application of community forestry in Northern Ontario. As a result, both basic and applied research in community forestry is needed. The development of explicit theories and hypotheses will stimulate the advancement of research on community forestry. Some areas where I believe

research in community forestry may be needed are listed below.

Research

1. Validation of this framework

The assumptions made in this study with respect to factors that predispose a community to success in community forestry have yet to be tested. There is a need to examine the validity of this proposed framework in reality. Thus, a success-factors investigation on the four (4) pilot programs proposed by OMNR (OMNR, 1991) is necessary.

2. Policy development

Many communities across Northern Ontario are anxious to experiment with community forestry. Since the concept of community forestry, as elaborated in this study, is relatively new to Ontario, there is a need for government to develop policy on application of the concept. Key questions for future policy research are: (a) what land tenure arrangements need to be developed for community forestry; (b) what are the organizational, institutional, and legal frameworks required to facilitate implementation of community forestry; (c) what is the minimum size of forest land base required for community forestry; and (d) who pays

and for community forestry prorams and how much.

3. Planning of community forestry programs

How to plan for community forestry is important for communities ready to engage in community forestry ventures. Essential for this type of research are:

- an interdisciplinary overview of problem areas that hamper sustainable rural development, and of their relationships with community forestry;

- qualitative insight into the problem areas above rather than in descriptive facts and figures only: directions, strategies and implications of change, and linkages with other problems;

- awareness of different perceptions, capacities, and conflicting interests of the parties to be involved in the planning process; and

- awareness of possible impacts and limitations of community forestry programs.

4. Economic Analysis

Economic analysis of community forestry programs is vital for investment decisions. In this regard, economic models capable of measuring net benefits

(priced and unpriced) accruing from the community forestry program are desirable. Traditional Faustmann economics do not recognize non-timber benefits which are important and often over-riding (Reed and Baskerville, 1990). Faustmann economics are incapable of measuring social or unpriced benefits and thus, should be avoided.

Development

1. Extension Education

The model of technology transfer in which researchers supply the answers to operators who simply use the answers has proven inadequate. Forest extension is a process of assembling and integrating theoretical and practical knowledge, and presenting it so that it can be applied readily to forest management. Since community forestry is likely to require a strong education component, there is a need to develop a community forestry extension program to fit the information needs of communities and other key players. Such a program should reflect the roles and relationships between communities and industry, and between communities and senior governments. The program should also focus on appropriate methods for dissemination of information. It should also specify the means for enhancing broad public participation and

involvement in community forestry activities.

2. Curriculum development

Community forestry may be here to stay. If so, there is a required new orientation in the forestry profession. Generally, current forestry curricula in Ontario are inadequate in social forestry. Training facilities to cover this new orientation in forestry are insufficient. Thus, in response to the growing need for community foresters and for comprehensive approaches in designing community forestry programs, it is important that forestry curricula be re-designed to include community forestry. The curricula should address key issues such as: (a) problem analysis and program objectives related to community forestry; (b) planning of community forestry programs; (c) design of community forestry programs; (d) evaluation of community forestry programs; and (e) extension methods in community forestry.

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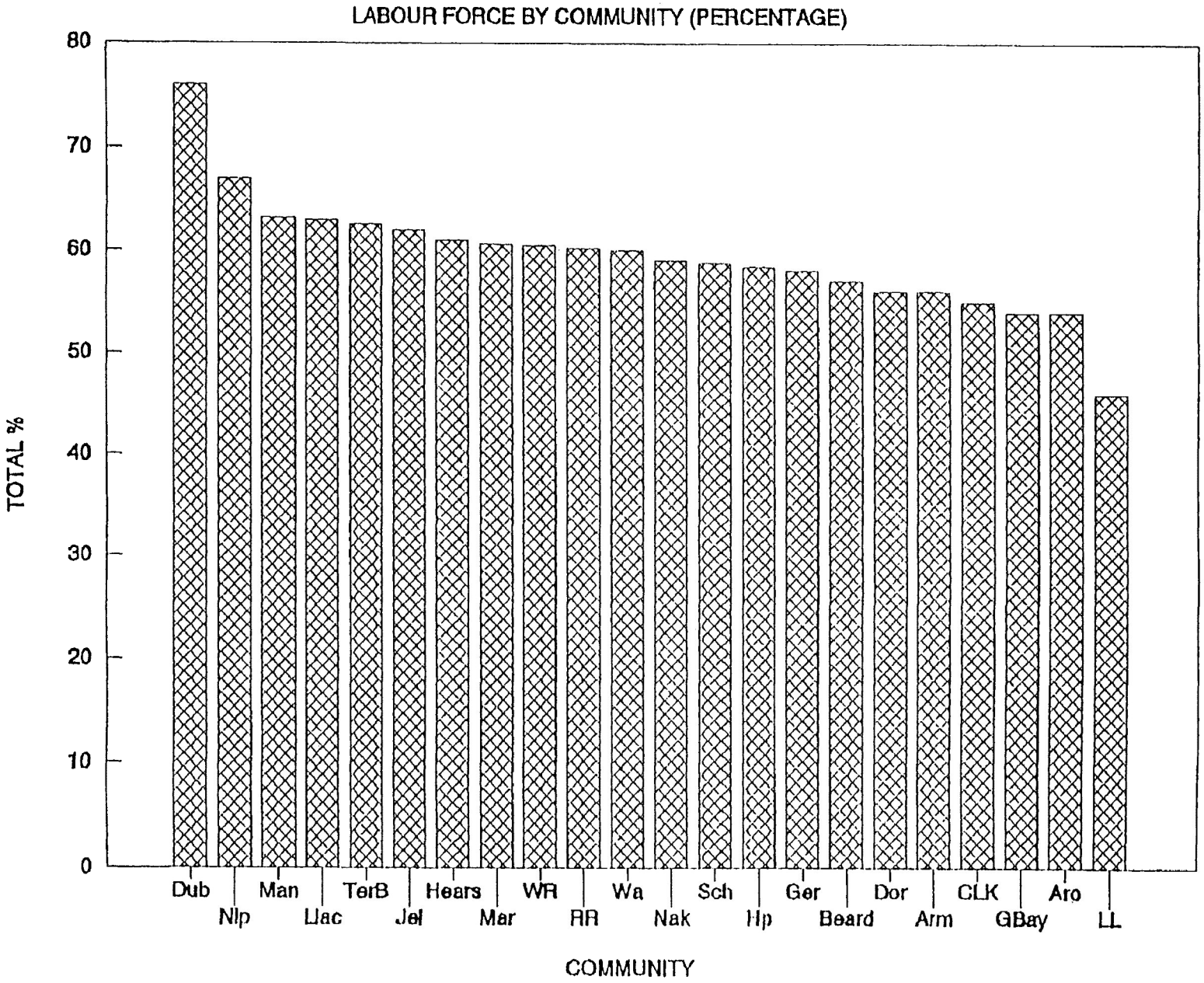
APPENDICES

APPENDIX I
POPULATION AGE DISTRIBUTION BY COMMUNITY

Community	Age Class (years)						Total Number
	0-14		15-54		55 +		
	(%)	(#)	(%)	(#)	(%)	(#)	
Dubreuilville	21.0	201	76.0	730	3.0	29	960
Nipigon	22.0	523	67.0	1591	11.0	261	2375
Manitouwadge	28.4	1000	63.2	2225	8.4	295	3521
Longlac	29.0	679	63.0	1474	8.0	187	2340
Terrace Bay	24.9	670	62.6	1684	12.5	336	2690
Jellicoe	24.0	40	62.0	102	14.0	23	165
Hearst	23.0	1279	61.0	3392	16.0	889	5560
Marathon	30.9	1854	60.6	3636	8.5	510	6000
White River	27.1	307	60.5	687	12.4	141	1135
Red Rock	23.5	355	60.2	909	16.3	246	1510
Wawa	25.0	1150	60.0	2760	15.0	690	4600
Nakina	31.0	186	59.0	354	10.0	60	600
Schreiber	23.2	450	58.8	1141	18.0	349	1940
Hornepayne	25.0	403	58.4	942	16.6	268	1613
Geraldton	24.0	695	58.0	1679	18.0	521	2895
Beardmore	22.9	120	57.1	300	20.0	105	525
Armstrong	28.0	109	56.0	218	16.0	62	389
Dorion	27.0	139	56.0	288	17.0	88	515
Constance Lake	38.0	247	55.0	358	7.0	45	650
Aroland	37.0	120	54.0	176	9.0	29	325
Gull Bay	36.0	104	54.0	157	10.0	29	290
Long Lake 58	47.0	167	46.0	164	7.0	25	356

APPENDIX IIa



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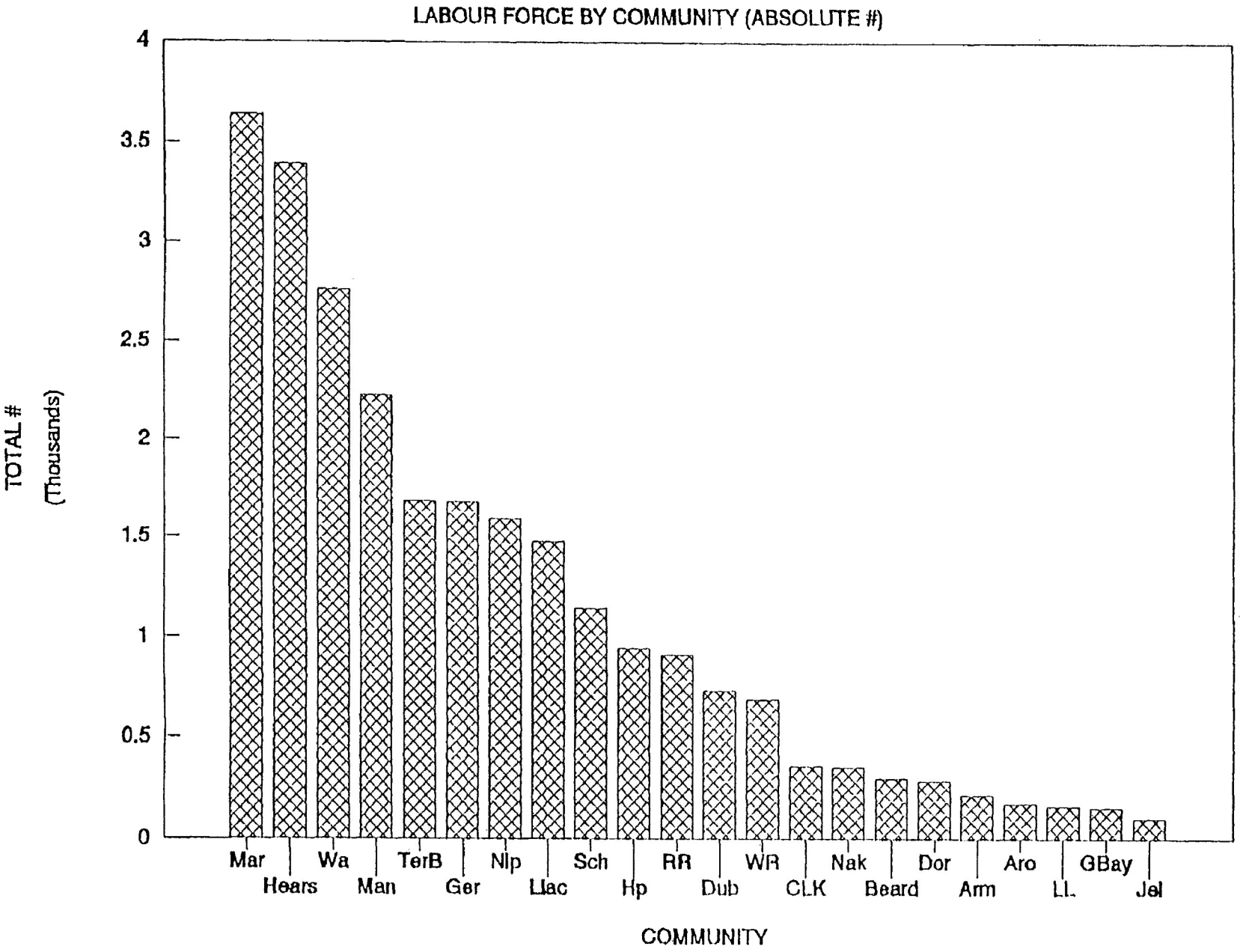

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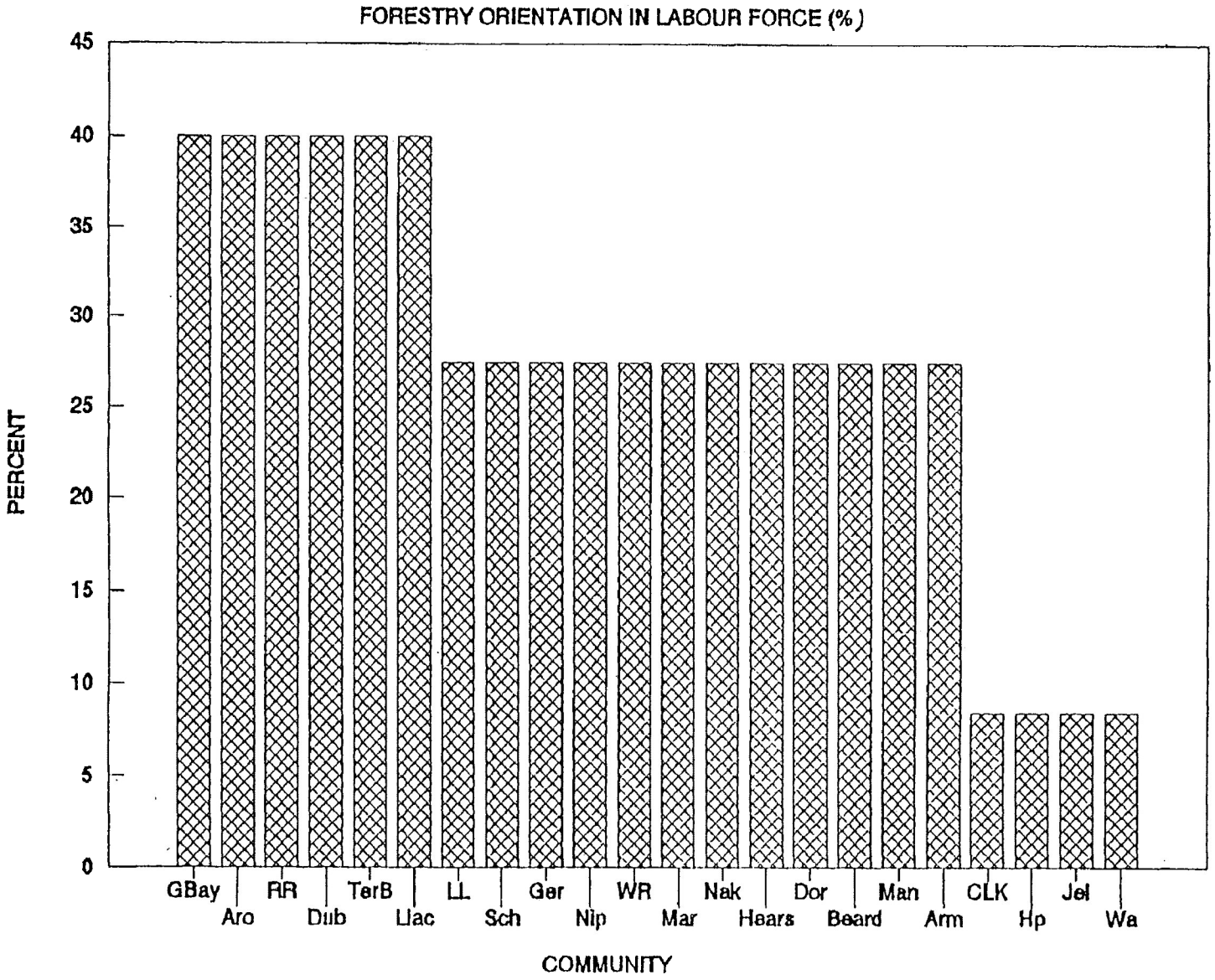

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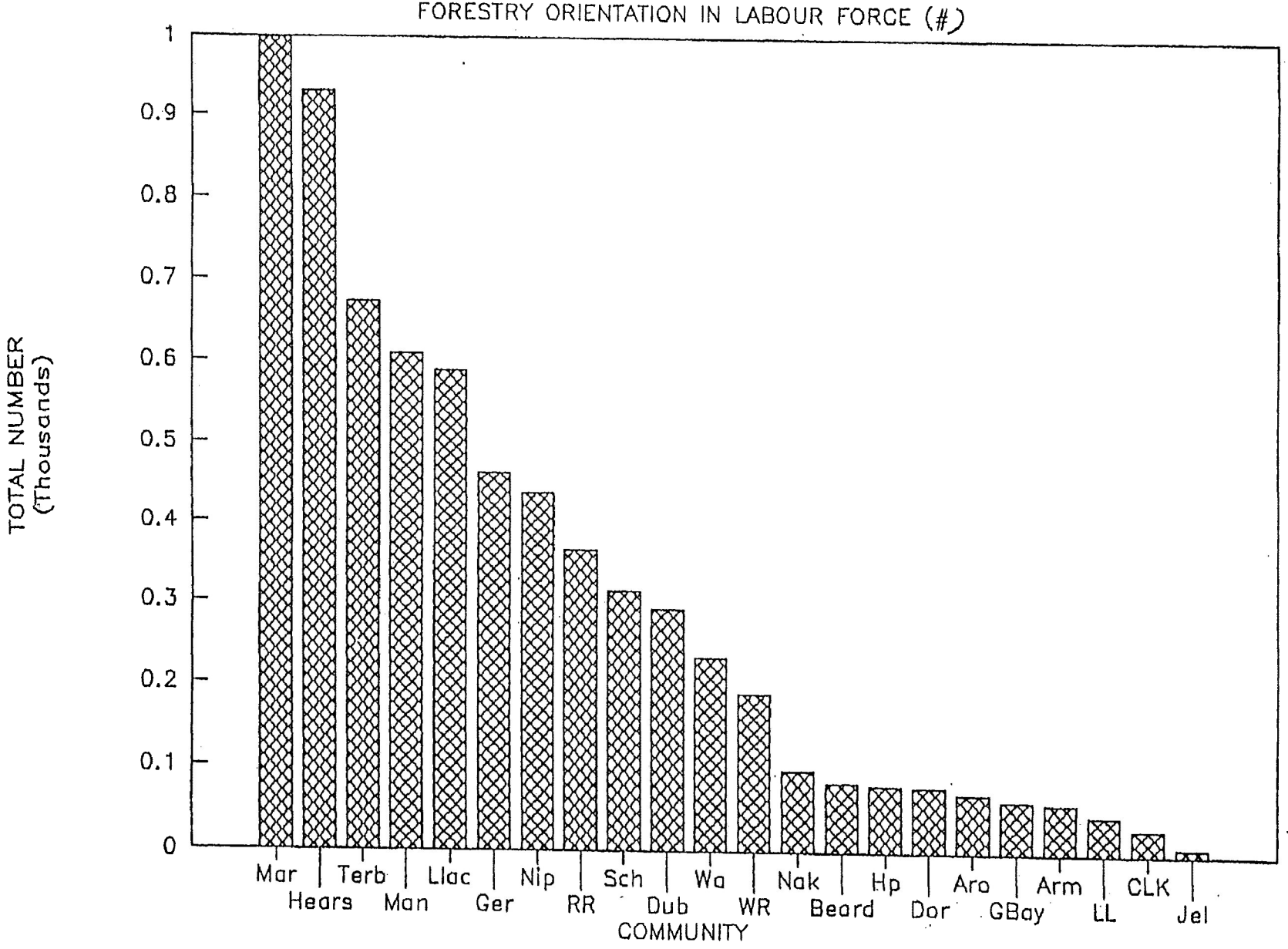
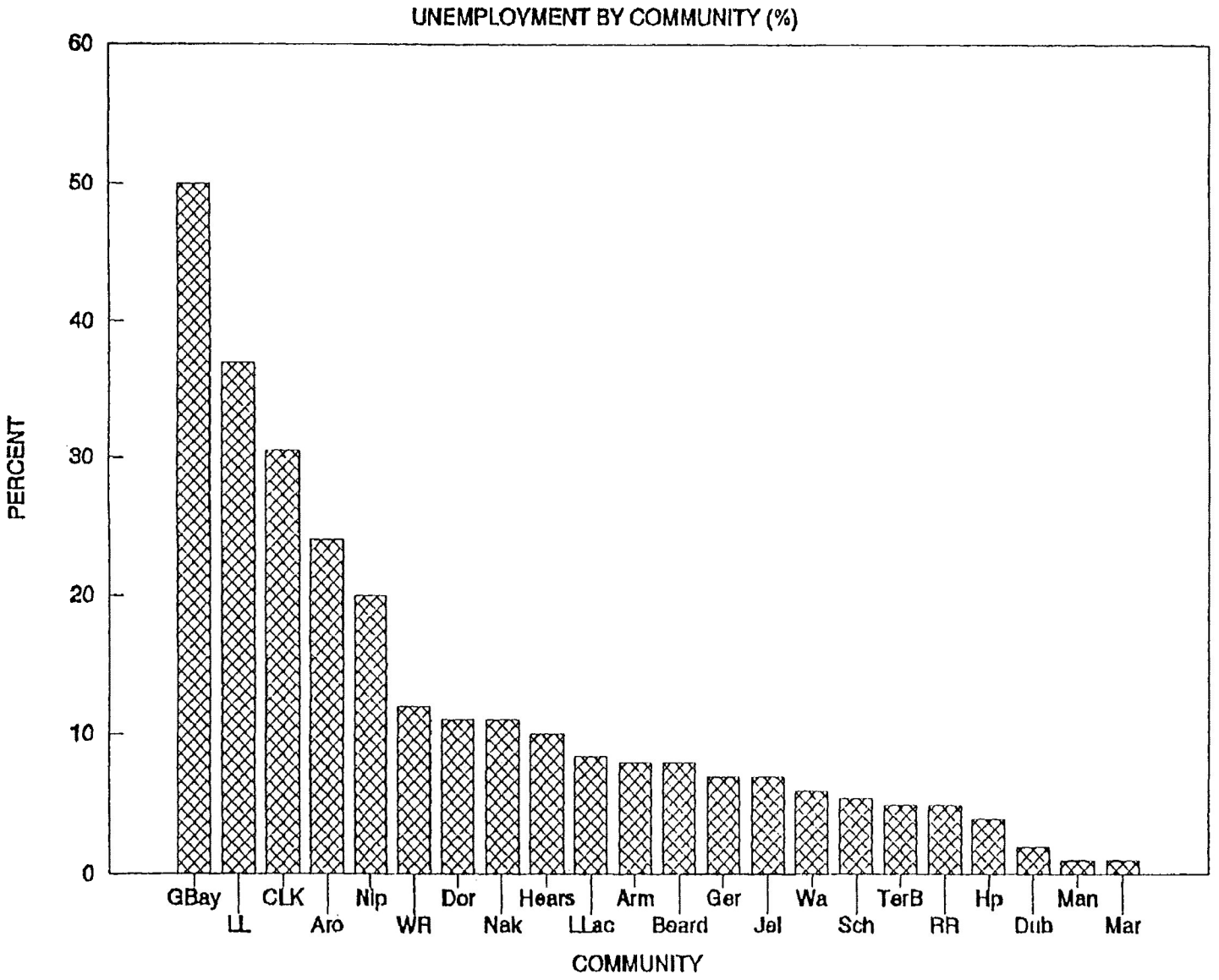


APPENDIX IVa



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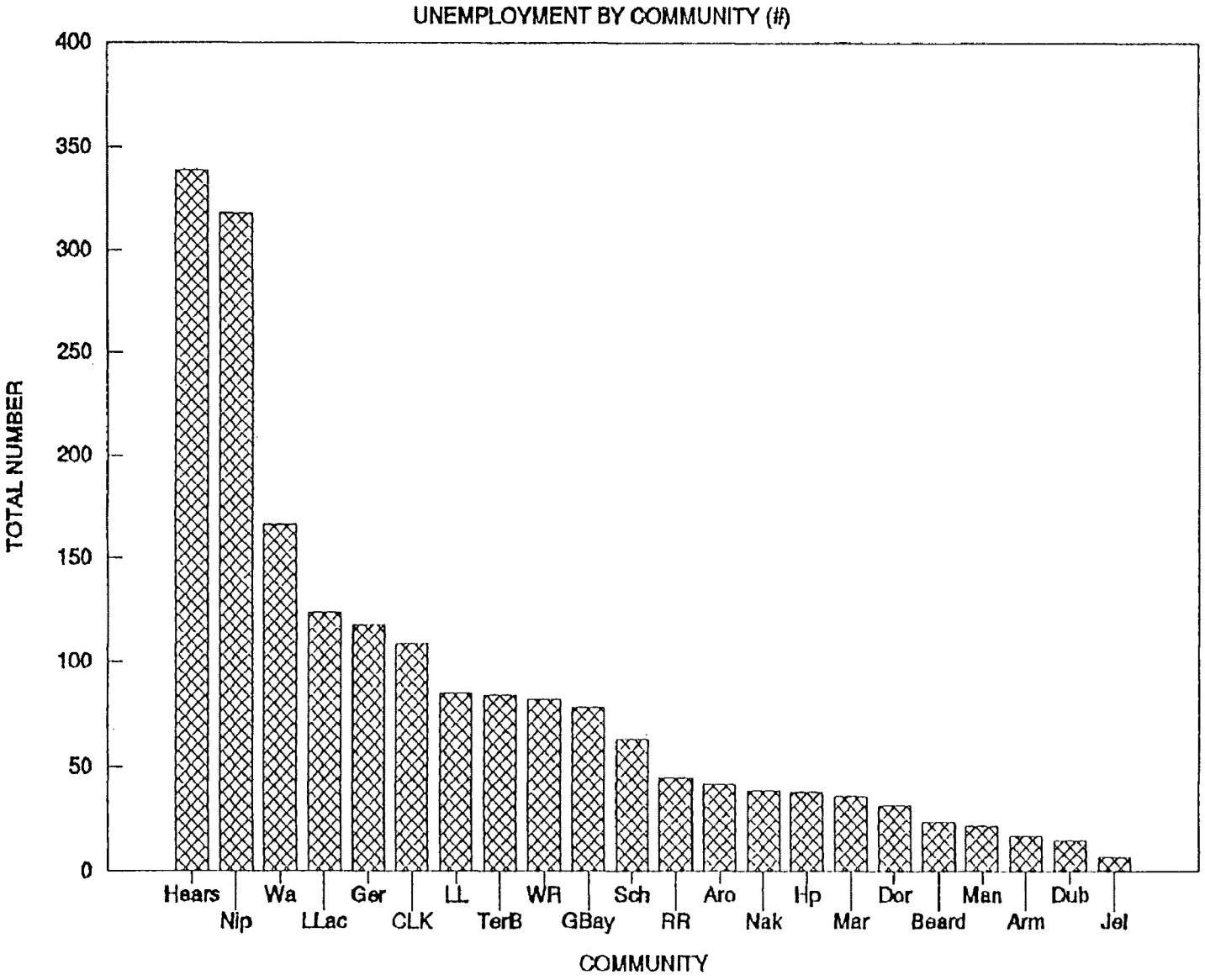


APPENDIX V
NUMBER OF INSTITUTIONS RELEVANT TO COMMUNITY FORESTRY BY COMMUNITY

Community	Presence of		Total # of Institutions
	MNR	Mill	
Armstrong	Yes	No	10
Aroland	No	Yes	1
Beardmore	No	No	6
Constance Lake	No	Yes	5
Dorion	No	Yes	5
Dubreuilville	No	Yes	7
Geraldtonm	Yes	Yes	10
Gull Bay	No	Yes	3
Hearst	Yes	Yes	17
Hornepayne	No	Yes	8
Jellicoe	No	No	3
Longlac	No	Yes	10
Long Lake 58	No	Yes	3
Manitouwadge	Yes	Yes	12
Marathon	Yes	Yes	11
Nakina	No	No	7
Nipigon	Yes	Yes	10
Red Rock	No	Yes	9
Schreiber	No	No	5
Terrace Bay	Yes	Yes	11
Wawa	Yes	No	10
White River	Yes	Yes	8

APPENDIX VI
ACCESS BY COMMUNITY

Community	Mode of Transportation				
	Highway		Rail	Air	Lake Superior
	End	Through			
Armstrong	Yes	No	Yes	Yes	No
Aroland	Yes	No	Yes	No	No
Beardmore	No	Yes	No	No	No
Constance Lake	Yes	No	No	No	No
Dorion	No	Yes	Yes	No	Yes
Dubreuilville	Yes	No	Yes	No	No
Geraldton	No	Yes	Yes	Yes	No
Gull Bay	Yes	No	Yes	No	No
Hearst	No	Yes	Yes	Yes	No
Hornepayne	Yes	No	Yes	No	No
Jellicoe	No	Yes	No	Yes	No
Longlac	No	Yes	Yes	No	No
Long Lake	No	Yes	Yes	No	No
Manitouwadge	Yes	No	Yes	Yes	No
Marathon	No	Yes	Yes	Yes	Yes
Nakina	Yes	No	Yes	Yes	No
Nipigon	No	Yes	Yes	No	Yes
Red Rock	No	Yes	Yes	No	Yes
Schreiber	No	Yes	Yes	No	Yes
Terrace Bay	No	Yes	Yes	Yes	Yes
Wawa	No	Yes	Yes	Yes	Yes
White River	No	Yes	Yes	No	No

APPENDIX VII
LAND USES (CURRENT VERSUS POTENTIAL USE) BY COMMUNITY

Community	Land Use											
	Forestry			Fishery			Wildlife			Tourism		
	C	P	dif.	C	P	dif.	C	P	dif.	C	P	dif.
Armstrong	h	h	0	m	m	0	m	h	+1	l	h	+2
Aroland	m	h	+1	m	h	+1	m	h	+1	l	m	+1
Beardmore	m	h	+1	l	m	+1	m	h	+1	l	m	+1
Cons. Lake	m	h	+1	m	h	+1	m	h	+1	l	h	+2
Dorion	h	h	0	m	h	+1	m	h	+1	l	m	+1
Dubreuil.	h	h	0	m	h	+1	m	h	+1	l	m	+1
Geraldton	h	h	0	m	h	+1	m	h	+1	l	h	+2
Gull Bay	m	h	+1	m	h	+1	m	h	+1	l	m	+1
Hearst	h	h	0	m	h	+1	h	h	0	l	h	+2
Hornepayne	h	h	0	m	h	+1	m	h	+1	l	m	+1
Jellicoe	m	m	0	m	h	+1	m	h	+1	l	m	+1
Longlac	h	h	0	m	m	0	m	h	+1	m	h	+1
Long Lake	l	h	+2	m	h	+1	h	m	-1	l	m	+1
Manitouwadge	h	h	0	l	m	+1	l	m	+1	l	m	+1
Marathon	h	h	0	m	h	+1	m	h	+1	m	h	+1
Nakina	m	h	+1	h	h	0	m	h	+1	l	h	+2
Nipigon	h	h	0	m	h	+1	m	h	+1	m	h	+1
Red Rock	h	h	0	m	h	+1	m	h	+1	l	h	+2
Schreiber	m	h	+1	l	m	+1	l	m	+1	l	m	+1
Terrace Bay	h	h	0	h	h	0	m	h	+1	m	h	+1
Wawa	m	h	+1	m	h	+1	m	h	+1	h	h	0
White River	h	h	0	m	h	+1	m	h	+1	l	h	+2

C = Current **P** = Potential **dif.** = Difference
l = low m = medium h = high

APPENDIX VIII
AVAILABILITY OF TECHNICAL SERVICES BY COMMUNITY

Community	Type of Service			Total # of firms
	Financial	Physical	Advisory	
Hearst	13	28	9	50
Marathon	8	26	8	42
Terrace Bay	7	23	8	38
Manitouwadge	3	20	6	29
Wawa	8	13	6	27
Nipigon	7	11	7	25
Geraldton	6	10	6	22
Schreiber	5	14	2	21
Longlac	3	14	3	20
Dubreuilville	2	10	3	15
White River	3	9	3	15
Hornepayne	3	8	3	14
Armstrong	0	10	3	13
Red Rock	2	7	3	12
Beardmore	1	9	1	11
Dorion	1	7	2	10
Jellicoe	0	7	2	9
Nakina	1	5	2	8
Constance Lake	0	3	2	5
Gull Bay	0	4	1	5
Aroland	0	1	1	2
Long Lake 58	0	1	0	1

APPENDIX IXa
TIMBER MARKETS BY COMMUNITY

Community	Degree of Constraint		
	Serious	Modest	None
Armstrong	*		
Aroland		*	
Beardmore		*	
Constance Lake			*
Dorion			*
Dubreuilville			*
Geraldton			*
Gull Bay	*		
Hearst			*
Hornepayne			*
Jellicoe		*	
Longlac			*
Long Lake			*
Manitouwadge		*	
Marathon			*
Nakina		*	
Nipigon			*
Red Rock			*
Schreiber			*
Terrace Bay			*
Wawa		*	
White River			*

APPENDIX IXb
NON-TIMBER MARKETS BY COMMUNITY

Community	Markets								
	Fishery			Wildlife			Tourism		
	C	**P**	**dif.**	**C**	**P**	**dif.**	**C**	**P**	**dif.**
Armstrong	h	m	-1	m	h	+1	l	h	+2
Aroland	h	h	0	h	h	0	l	m	+1
Beardmore	l	m	+1	m	h	+1	l	m	+1
Cons. Lake	m	h	+1	m	h	+1	l	h	+2
Dorion	m	h	+1	m	h	+1	l	m	+1
Dubreuil.	m	h	+1	m	h	+1	l	m	+1
Geraldton	m	h	+1	m	h	+1	l	h	+2
Gull Bay	m	h	+1	m	h	+1	l	m	+1
Hearst	m	h	+1	h	h	0	l	h	+2
Hornepayne	m	h	+1	m	h	+1	l	m	+1
Jellicoe	m	m	0	m	h	+1	l	h	+2
Longlac	m	h	+1	m	h	+1	m	h	+1
Long Lake	m	h	+1	m	h	+1	l	m	+1
Manitouwadge	m	h	+1	m	m	0	l	m	+1
Marathon	m	h	+1	m	h	+1	m	h	+1
Nakina	h	h	0	m	h	+1	l	h	+2
Nipigon	m	h	+1	m	h	+1	l	h	+2
Red Rock	m	h	+1	m	h	+1	l	h	+2
Schreiber	l	m	+1	l	m	+1	l	m	+1
Terrace Bay	m	h	+1	m	h	+1	m	h	+1
Wawa	l	h	+2	m	h	+1	m	h	+1
White River	m	h	+1	m	h	+1	l	h	+2

C = Current **P** = Potential **dif.** = Difference l = low
m = medium h = high

APPENDIX X
SOCIAL AMENITIES (EDUCATIONAL AND MEDICAL) BY COMMUNITY

Community	Type of Amenity			
	Educational		Medical	
	Elementary School	High School	Clinic	Hospital
Armstrong	*	-	*	-
Aroland	-	-	-	-
Beardmore	*	-	*	-
Constance Lake	*	-	-	-
Dorion	*	-	-	-
Dubreuilville	*	-	*	-
Geraldton	*	*	*	*
Gull Bay	*	-	*	-
Hearst	*	*	*	*
Hornepayne	*	*	*	*
Jellicoe	*	-	-	-
Longlac	*	-	*	-
Long Lake	-	-	*	-
Manitouwadge	*	*	*	*
Marathon	*	*	*	*
Nakina	*	-	*	-
Nipigon	*	*	*	*
Red Rock	*	*	*	-
Schreiber	*	*	*	-
Terrace Bay	*	*	*	*
Wawa	*	*	*	*
White River	*	-	*	-

* = Present - = Absent

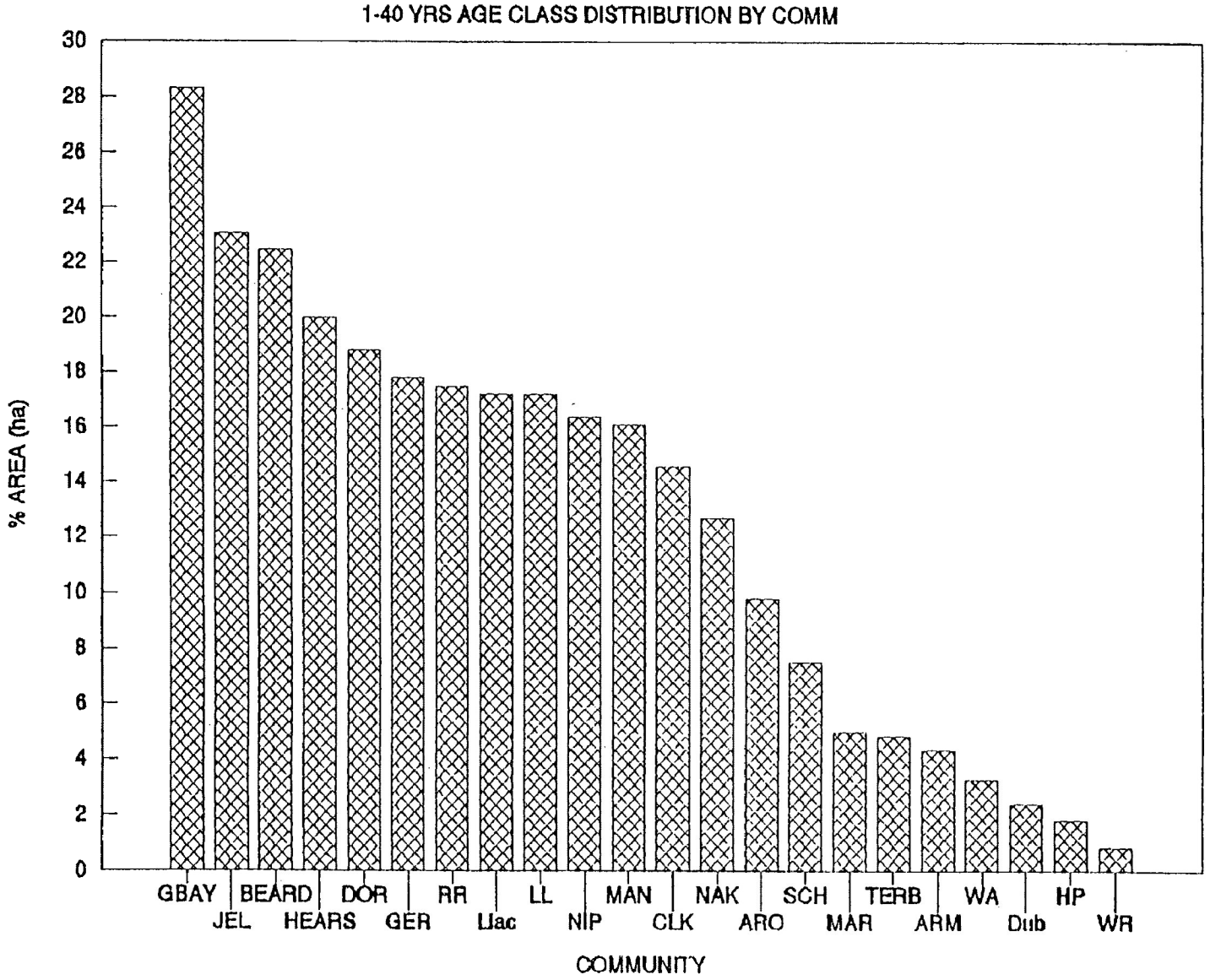
APPENDIX XI
ENTHUSIASM OF COMMUNITY

Community	Degree of Enthusiasm		
	Low	Medium	High
Armstrong		*	
Aroland			*
Beardmore			*
Constance Lake			*
Dorion		*	
Dubreuilville			*
Geraldton			*
Gull Bay			*
Hearst			*
Hornepayne	*		
Jellicoe			*
Longlac			*
Long Lake			*
Manitouwadge			*
Marathon			*
Nakina			*
Nipigon		*	
Red Rock			*
Schreiber		*	
Terrace Bay			*
Wawa			*
White River			*

APPENDIX XIIa
SUMMARY OF FORESTED AREA BY AGE-CLASS DISTRIBUTION

Community	Age Class							Total Area
	10	30	50	70	90	110	130+	(ha)
Armstrong	10248	11079	80011	162285	91707	44222	91861	491413
Aroland	51923	11531	40713	81981	140470	148718	170772	646108
Beardmore	78653	36599	98077	44890	39977	82422	132635	513253
Constance Lake	22114	40654	27766	37357	55409	72928	174681	430909
Dorion	41586	48216	135406	88243	86471	42580	34688	477190
Dubreuilville	5343	3818	41468	79633	118325	66705	59837	375129
Geraldton	91485	12834	59410	65197	63222	135790	157321	585259
Gull Bay	81581	39843	113036	66559	41452	30604	55658	428733
Hearst	23924	47841	31458	41060	36685	47540	132328	359037
Hornepayne	0	7311	9103	69422	96636	115912	96164	394548
Jellicoe	111548	36491	95127	66644	53555	117845	160746	641956
Long Lake 58	83915	15337	49089	53600	82110	135374	157276	576701
Longlac	83915	15337	49089	53600	82110	135374	157276	576701
Manitouwadge	65526	22411	83897	93453	89235	68418	122935	545875
Marathon	14480	6182	73605	96031	101532	50523	72119	414472
Nakina	61812	12518	37169	62175	91988	129045	190764	585471
Nipigon	34590	42778	133523	67492	69864	61754	61821	471822
Red Rock	31091	39040	116972	51311	53157	54679	54644	400894
Schreiber	17868	2388	27594	39757	107617	41094	33087	268505
Terrace Bay	13355	3144	39494	54911	163846	33723	33014	341487
Wawa	1891	2145	9989	25451	34296	24229	24847	122848
White River	0	2518	36528	53506	90430	60092	49682	292756

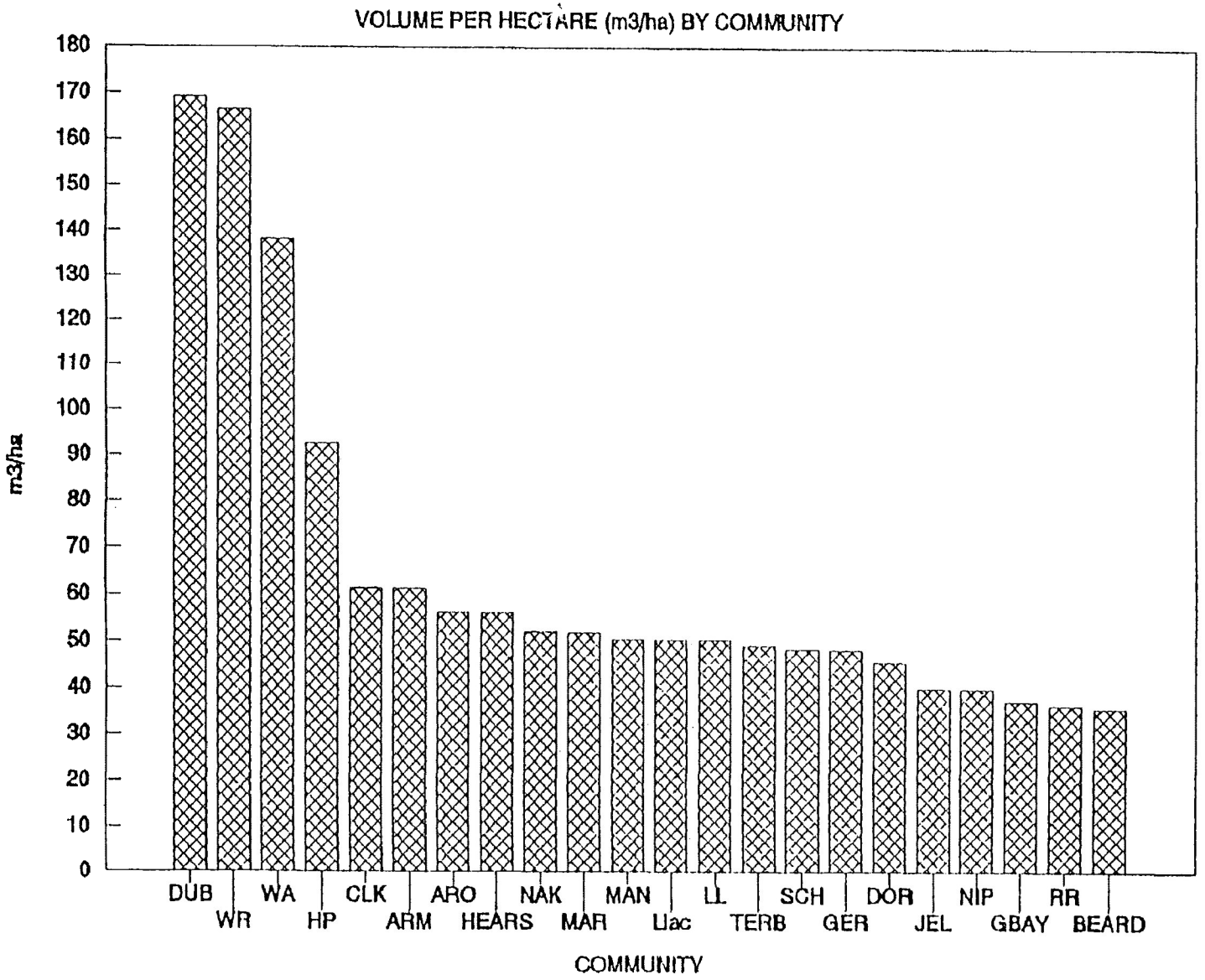
APPENDIX XIIb



APPENDIX XIIIa
COMMUNITY GROSS MERCHANTABLE VOLUME (M^3) BY FOREST TYPE

Community	Forest Type		Total Volume	Volume/ Hectare
	Softwood (m^3)	Hardwwod (m^3)	(m^3)	(m^3/ha)
Armstrong	18592175	11619383	30211558	61
Aroland	25304240	11134845	36439085	56
Beardmore	10480184	7974153	18454337	36
Constance Lake	19607155	6884954	26492109	61
Dorion	6210526	15641958	21852484	46
Dubreuilville	30344422	33157289	63501661	169
Geraldton	19613391	8710557	28323948	48
Gull Bay	8461232	7591137	16052369	37
Hearst	15266939	4925537	20192476	56
Hornepayne	21365055	15200240	36565295	93
Jellicoe	15948228	9913556	25861784	40
Long Lake 58	20139492	9029368	29168860	51
Longlac	20139492	9029368	29168860	51
Manitouwadge	15434603	12192440	27627043	51
Marathon	10562478	11026492	21588970	52
Nakina	21926303	8692718	30619021	52
Nipigon	6590161	12291646	18881807	40
Red Rock	5609649	9059473	14669122	37
Schreiber	6483798	6594255	13078053	49
Terrace Bay	6847022	9962471	16809493	49
Wawa	6818157	10169399	16987556	138
White River	28840981	19927263	48768244	167

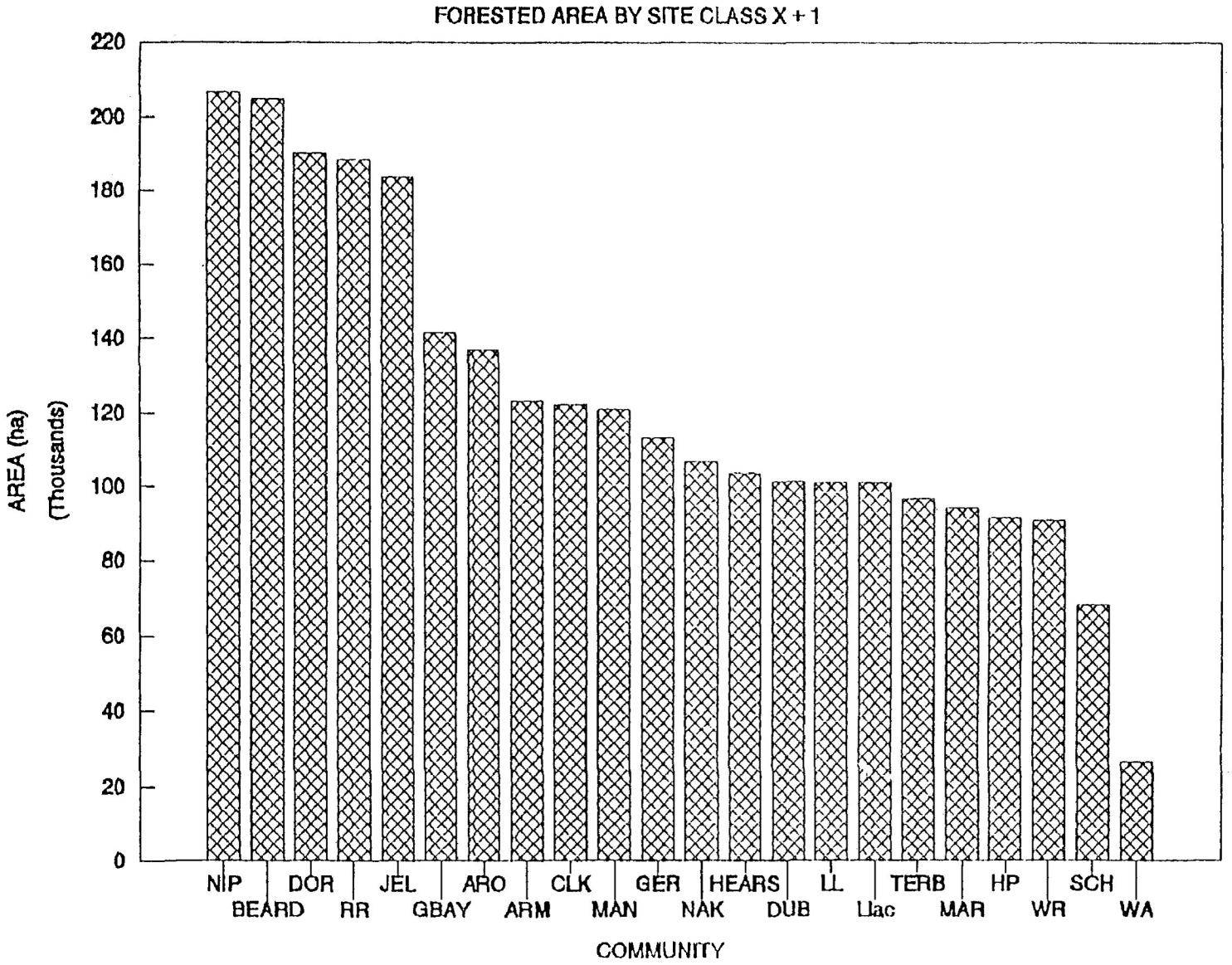
APPENDIX XIIIb



APPENDIX XIVa
SUMMARY OF FORESTED AREA BY SITE CLASS

COMMUNITY	SITE CLASS AREA (Ha)		
	X + 1	2	3 + 4
ARMSTRONG	123206	254300	113907
AROLAND	136933	378316	130718
BEARDMORE	205046	207342	100850
CONSTANCE LAKE	122425	214209	94275
DORION	190300	154745	132145
DUBREUILVILLE	101348	194231	79550
GERALDTON	113313	346467	125479
GULL BAY	141379	219978	67376
HEARST	103736	180271	75030
HORNEPAYNE	91521	224550	78477
JELLICOE	183737	321389	136830
LONG LAKE 58	101094	359538	116056
LONGLAC	101094	359538	116056
MANITOUWADGE	121002	319106	105752
MARATHON	94284	205972	114201
NAKINA	106778	342238	136314
NIPIGON	206817	163482	101508
RED ROCK	188507	138832	73540
SCHREIBER	68621	144832	55052
TERRACE BAY	96767	165688	79032
WAWA	26872	55526	40450
WHITE RIVER	90920	148659	53177

APPENDIX XIVb



APPENDIX XVa
FOREST MANAGEMENT UNITS COVERED BY THE STUDY AREA

Management Unit	Management Unit Code	OMNR District Office	Type
Abitibi-Auden	020	Nipigon	3
Big Pic	067	Terrace Bay	3
Black Sturgeon	178	Thunder Bay	1
Black River	370	Terrace Bay	1
Caribou East	172	Nipigon	3
Domtar-Armstrong	447	Nipigon	3
Geraldton	243	Geraldton	3
Gravel River	595	Terrace Bay	0
Hearst	601	Hearst	1
Kiashke	651	Nipigon	3
Lake Nipigon	445	Nipigon	1
Longlac	244	Geraldton	1
Magpie	565	Wawa	1
Nagagami	390	Hearst	1
Nakina	242	Geraldton	1
Nipigon	625	Nipigon	0
Ogoki	241	Nipigon	3
Port Arthur	803	Thunder Bay	0
Spruce River	030	Thunder Bay	1
Steel River	380	Terrace Bay	1
Superior	080	Chapleau	1
Wawa	945	Wawa	0
White River	060	Wawa	1

0 = CMU 1 = FMA 3 = Co.MU

APPENDIX XVb