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Assessing the Feasibility of Applying the Co-operative Model to First Nations Community Based Development Initiatives: A Case Study of the Xaxl'ep and a Native Plant Nursery

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The British Columbia Institute for Co-operative Studies will periodically publish research papers on co-operative subjects, particularly those concerned with the co-operative movement in British Columbia. The papers will be by both scholars within the academy and interested members of the public. The Institute hopes these papers will increase understanding of, and discussion about, the co-operative movement and ideas, past, present and future.

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Preface

The British Columbia Institute for Co-operative Studies, among its various activities, is engaged in the preparation of studies into existing and new co-operatives of use to the people of British Columbia. Whenever possible, it seeks to help students and faculty interested in expanding their research interests to include consideration of the application of the co-operative model within the province.

The Institute, therefore is very pleased to have been able to assist Kimberlee Chambers in undertaking research into the formation of a native plant nursery by the Xaxl'ep People along co-operative principles. The paper is partly the result of work already undertaken by Ms. Chambers as part of her graduate studies within the School of Environmental Studies under the supervision of Dr. Nancy Turner. We are greatful to Dr. Turner and her colleagues in Environmental Studies for their contributions to the development of the research on which this study has been built.

Dr. Ian MacPherson,
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Director, British Columbia Institute for Co-operative Studies

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Foreword

Co-operative Arrangements in Non-Timber Forest Product Harvesting, Marketing and Regulations

Timber harvesting in British Columbia has been reduced, resulting in fewer jobs in the conventional forest industry. Other resource-based industries such as fishing and mining are also declining. As a consequence, many rural communities, both Aboriginal and non-Aboriginal, are searching for ways to to diversify and stabilise their economic bases. Harvesting and marketing Non-Timber Forest Products has been identified as a major alternative or complement to timber harvesting and other resource industries. Over 200 identified Non-Timber Forest Products are known to be harvested commercially in British Columbia, bringing in an estimated $80 million or more from products such as salal greens, wild mushrooms, and forest medicinal and culinary plants.

In 1996, Forest Renewal BC sponsored a two-year study to investigate the potential for harvesting and marketing wild berries as a Non-Timber Forest Product in British Columbia (Carr et al., 1997; Mitchell and Turner, 1998). Among its recommendations, this study identified the potential advantages of co-operative arrangements if wild-berry marketing initiatives were to proceed. Since wild-berry production is highly variable from year to year and from region to region, an approach that provides flexibility and spreads the risk of low production in a given year and at a given locality by multiplying the opportunities for accessing berries was seen to be desirable.

Because wild berries are ripe and available for only a relatively short duration mostly over the summer and early fall, wild-berry picking as a single economic activity has definite seasonal limitations. Berry harvesting, however, would fit well into a broader harvesting regime for Non-Timber Forest Products and Special Forest Products, including wild greens for the floral industry (available all seasons), specialty wood products, such as shakes and shingles, and firewood (year-round), seeds and cuttings for ornamental and nursery trade (summer, fall), wild mushrooms (late summer, fall, and early spring, depending upon species harvested, latitude and elevation), wild medicinal and neutriceutical products (mostly spring through fall), and wild boughs, trees and other greens for the winter/Christmas market (fall to pre-Christmas season). Pickers, buyers, and marketers of all of these products, under a co-ordinated co-operative system encompassing a range of products harvested over a broad, diversified landbase, could develop complementary harvesting and marketing plans that could yield a predictable, reasonably stable income for many people. Related to the harvesting of wild plant resources is a range of activities that could best be described as ecological agriculture or agroforestry, in which native species are propagated and grown in semi-natural conditions to enhance their availability and productivity. Products of ecoagriculture would also fit in well to the co-operative model of Non-timber Forest Product harvesting and marketing.

At the same time, there is an absolute requirement for careful conservation of forest products and wildlife and their associated lands, and for the recognition of intellectual property rights of Indigenous and local peoples. Various harvesting activities and their cumulative impacts could best be tracked, assessed and regulated through co-operative arrangements, with some type of specific land entitlement or licensing that would assist monitoring and adaptive management. This would facilitate conservation of the products, and ensure that those people in local communities, especially First Nations communities which have a long tradition of sustainable use of many such products, would have the benefit of participation in planning and decision-making. Their views would count and they would receive positive returns from their contributions. As well, with many, diverse participants within a co-operative, there would be a wider knowledge base to support wiser, more informed decision-making.

Harvesting benefits in co-operative ventures would accrue not to some outside controller or company, but to

local communities. Co-operatives are community-oriented, and they give people a sense of identity, of working together, and of positive shared experience. Members of co-operatives can help each other, can educate each other, and can help to bring mutual appreciation and understanding to issues of equity and sustainability. The whole system, with shared contributions, shared input, and shared understandings, would be more equitable, and would be more focused on long-term environmental health and quality of life in communities, not on quick, short-term profits. Co-operatives are social, not just financial, institutions. Cultural values rather than quick profits motivate most co-operative members. Environmental values, too, including the well-being of other lifeforms needing to use the lands and their resources, would be expected to take precedence over the "profits-now" imperative.

Co-operatives and the networks they sustain would also facilitate research, training and education in matters such as ecoforestry, agroforestry, sustainable harvesting techniques, plant propagation and enhancement, marketing and product development, and quality control of products. They would also assist participants in obtaining certification for their products, as well as in advertising and marketing. Other, related activities, including culturally appropriate interpretive workshops and ecotourism ventures could also be organised through a co-operative structure.

For all these reasons, co-operatives would seem to be an optimal arrangement for the sustainable and equitable harvesting and marketing of Non-Timber Forest Products. Furthermore, there are good reasons why such co-operative services should be controlled in large part by First Peoples. As well as having proprietorship over Reserve lands throughout the province, British Columbia First Peoples are in the process of regaining some control and management authority over an extensive land base through Treaty negotiations. Thus they may well have jurisdiction over and use of a very broad landbase encompassing more of their traditional territories. Many First Nations may wish to practice ecoforestry or alternative forestry as opposed to large-scale clear-cutting as the forest management method of choice. Such management systems work well in conjunction with harvesting Non-timber Forest Products and Special Forest Products, as well as selective timber harvesting. As the original users of a wide range of forest products, many First Peoples also have considerable knowledge and experience in the use, harvesting and management of NTFPs. They would also then be the ones to choose what types of traditional knowledge they may wish to share with others.

These ideas have been discussed at several major conferences on Non-Timber Forest Products, including those held at Alert Bay, B.C. ("Non-Timber Forest Products: A Workshop." Inner Coast Natural Resource Center, April 1998; Ambers et al., 1998); at Kenora, Ontario ("Forest Communities in the Third Millenium; Linking Research, Business and Policy towards a Sustainable Non-Timber Forest Product Sector", October 1-4, 1999) and Creston, B.C. ("Non-Timber Forest Products Workshop", Ktunaxa Kinbasket Treaty Council, Yaqan Nukiy, May, 2000). Interest has been expressed in developing such co-operatives in a number of First Nations communities. The ***Wilp Sa Maa'y*** Wild Harvesting Co-operative, based in Smithers, B.C. is an example of a regional co-operative with substantive participation by First Nations people, working together with non-First Nations in a successful collaborative venture.

Admittedly, an arrangement as complex and far-reaching as a harvesting and marketing co-operative, for example, the ***Wilp Sa Maa'y*** Wild Harvesting Co-op (see Burton, 1999), is potentially more complicated to develop and administer than a hierarchically organised company with a CEO to make all the decisions. Still, the benefits, in my view, far outweigh the difficulties.

The paper presented here by Kimberlee Chambers illustrates through a case study with the Xaxl'ep People, how combining ethnobotanical knowledge and the co-operative model, can provide a viable method of sustainable community economic development. Her well-researched and thoughtful paper is one of three linked case studies that discuss the potential benefits of co-operative arrangements, with special reference to First Nations (see also Cocksedge, 2001; Lantz, 2001).

I am hopeful that these examples will form the seeds of an idea that will grow and benefit both the peoples and the forests of British Columbia.

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January 31, 2001

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Introduction, Context for the Case Study and Objectives of this Report

It is the purpose of this report to provide a case study of one method of applying ethnobotanical knowledge, combined with the co-operative model, for sustainable community economic development. Given current economic trends, in particular the movement away from large-scale resource extraction based industry in British Columbia, it is becoming increasingly important to research alternative trades and development models to support communities.

This project builds on a considerable body of previous research conducted by Dr Nancy J. Turner. Turner, along w0ith linguists and Stl'atl'imx Elders (S. Mitchell, M. LaRochelle, E. O'Donaghey, B. Edwards, D. Peters, Sr), has spent three decades documenting details of botanical plant uses for the Xaxl'ep People (Turner, 1974; 1987; 1989; 1998). In 1997, Turner and the Xaxl'ep began collaboration to determine and assess the potential applications of Xaxl'ep culturally important plants to community economic development and restoration of environments damaged through industrial forestry, overgrazing, and other unsustainable activities (Turner, 1997a). Specific areas of application which the Xaxl'ep and Turner are investigating include: harvesting and production of native plants for traditional foods, cosmetics and possibly medicines; habitat enhancement and restoration; plant propagation and nursery production; ecolandscaping; and, seed production for forestry, restoration, and gardening.

The Xaxl'ep (a band which is part of the Stl'atl'imx, or Fraser River Lillooet Nation) are members of the Interior Salish language family, who trace their ancestry to coyote, the most prominent figure in their oral traditions (Hayden, 1997). Turner (1974) writes, "Lillooet peoples are categorized into two dialectic groups -Lower Lillooet and Upper Lillooet" (p. 11). The Xaxl'ep People are on the northeast edge of the Stl'atl'imx Territory, thus Upper Lillooet.

The Stl'atl'imx People share cultural traits similar to those of other Interior Salish. Turner (1974) writes,

> General features of this unit (Plateau Culture Area) include a loosely structured social organization, without emphasis on

> rank or class; the use of semi-subterranean winter dwellings, called pithouses, for extended family groups; and a hunting-gathering economy, with emphasis on fishing anadronomous salmon. (p. 11)

Turner's research has focused on the significance that plants have played for the existence of West Coast Peoples. Until recently the importance of plant resources were largely overlooked. The Xaxl'ep People, like indigenous people all over the world, have a strong affinity to their land. Knowledge of the land includes a detailed understanding of plants and animals and their habitats, lifecycles and interactions. A number of different plant communities were important for the Stl'atl'imx;

> The most important communities were those of the high mountain slopes and valleys where large quantities of 'Indian potatoes' (*Claytonia lanceolata*, and *Erythronium grandiflorum*) were dug annually, and the dry river terraces, where several types of berries (such as *Amelanchier alnifolia, Crataegus douglasii*, and *Prunus virginiana*) and 'roots' (e.g. *Balsamorhiza sagitata*) were gathered. (Turner, 1974, p. 12)

Xaxl'ep territory overlaps the dry Interior and the moist Coastal Mountains, including the Fraser River, and Fountain Valley, which cradles a number of streams and three lakes. The Stl'atl'imx People moved seasonally from the Fraser River Valley to the alpine meadows to harvest large quantities of plant species for food, medicine and technological use. It is the goal of applied ethnobotany to incorporate this ecological wisdom into contemporary commercial ventures.

Turner and Xaxl'ep Band members have frequently expressed to me their strong interest in developing a native plant nursery. In this paper, I outline the reasons why a native plant nursery may be a desirable economic initiative and why the co-operative model is appropriate for the creation of such a nursery. I will argue that co-operatives are a particularly well-suited form of empowerment and that the organisational form of a co-operative is compatible with the Xaxl'ep developmental framework. I will also address the role that co-operatives can play in First Nations sustainable development.

To begin, I will illustrate the trend towards gardening with native plants and the ecological value of this practice. Next, I will outline the reasons why the Xaxl'ep People are in a good position to develop a native plant nursery. Following, I will analyse the applicability of the co-operative model, the concerns with creating a native plant nursery, and issues relating to First Nations economic development initiatives. To conclude, I will provide and discuss a number of recommendations for Xaxl'ep development and for potential co-operative associations input as well as the steps for creating a native plant nursery.

It is important to note at the outset that what relates to one group of indigenous people can not be assumed for all. In a report by the International Co-operative Alliance, United Nations Department for Policy Coordination and Sustainable Development (2000), it was estimated that there were 300,000,000 indigenous people in the world, in more than 70 countries. Literature on ethnobotany and anthropology frequently addresses the complexity of the diversity of indigenous peoples. In *Rain Forests of Home*, Turner (1997a) writes:

> Indigenous peoples cannot be assumed to be a single entity - in contrast to industrial or post industrial society - and not all individuals or segments within an indigenous society share identical world views or follow the same philosophies. Each culture, each group is different. Each has its own traditions, its own environments, its own institutions and strategies for sustenance and its own history. (p. 276)

Thus the information that follows may be applicable for many indigenous groups in part or whole; however, the intention of this paper is to address the Xaxl'ep situation specifically.

Applying Traditional Ecological Knowledge to Community Economic Development

Throughout British Columbia there is a movement to document Indigenous Peoples' knowledge and to map their uses of the landscape and its resources. In the context of government policy, the documentation of such knowledge is termed a Traditional Use Study or TUS. A critical question is, "what can be done with this information?" In *Ethnobotany Principles and Applications*, Cotton (1997) writes, "interest in the potential application of ethnobotanical research has, in recent years, shown a marked resurgence" (p. 313). Ethnobotanical applications pertaining to ecology can be placed into two major categories: economic development, and resource conservation. Projects, which find new contexts for the practice of traditional knowledge, may contribute more towards ecosystem resilience. The greatest underlying values of applied ethnobotany are self-sufficiency, continued connection with the land, and search and construction of local identities. Many communities are in the process of re-constructing their identity on the basis of their cultural and ecological knowledge. Any development involving these communities should maintain a strong cultural context. Today there are perhaps more opportunities than ever before to apply such traditional botanical knowledge in community economic development (Turner, 1997a).

'Many communities are in the process of re-constructing their identity on the basis of their cultural and ecological knowledge.'

A native plant nursery is one utilisation of ethnobotanical knowledge that has the potential to meet both objectives of economic development and environmental conservation. A co-operative based on the local knowledge of plants can help to recontextualise traditional botanical knowledge. Plants grown in a Xaxl'ep nursery could be used for horticulture, restoration, education, value added products, food, medicine and cultural restoration. The Xaxl'ep Ethnobotany (Turner, 1998) contains a number of plants valuable for these uses. A native plant nursery would allow for the application of traditional ethnobotanical knowledge through the cultivation of plants that are of cultural and ecological significance, and could result in a continuation of past resource management techniques.

Ethnobotany is sometimes narrowly viewed as encompassing just

past or traditional botanical knowledge and practices. The Xaxl'ep did not traditionally develop horticultural varieties of plants, thus, a native plant nursery may not seem to be an appropriate means of applying ethnobotanical knowledge to community development. Indigenous people everywhere, however, have survived because of their ability to adapt to changing conditions. Adaptation frequently involves combining traditional knowledge with 'modern' technology to perpetuate indigenous culture. Turner (1997b) illustrates this point:

> Another aspect of sustainable resource use is the ability to adapt to changing circumstances. Indeed the ability to adapt and assume new knowledge, new resources, and new technologies is an important feature of traditional knowledge systems. Certainly the aboriginal peoples of the Northwest Coast have faced fundamental changes to their lives in recent history, most of them highly disruptive. Yet many individuals and communities have retained the essential elements of their worldviews and lifestyles, a testament to the strengths of these philosophies. Adaptation of metal tools, for example allowed the woodworking artistry of the Northwest Coast people to flourish. (p. 287)

The term used by academics to refer to indigenous peoples' ability to absorb external technologies and influences and use them for their own benefit is "syncretism". Wright (1992) defines syncretism as "the growing together of new beliefs and old...a way of encoding the values of a conquered culture within a dominant culture" (p. 150). Furthermore, Atleo (1999) argues that the combination of science and traditional knowledge can assist in the restoration of the landscape:

> The applications of science and technology that magnificently express human cognition can complement the human spirit. The two working together can create ecosystems that are not only sustainable but also beautiful, bountiful and glorious, as it was in the beginning. (p. 11)

It is through the selection of some aspects of European culture and technology

and the dismissal of others that indigenous people have been able to maintain their "worldviews and lifestyles" (Turner, 1997, p. 287). A native plant nursery, although not exactly based on traditional practices, can combine Western technology and values with traditional knowledge to benefit not only the Xaxl'ep but the landscape as well.

Plants and the landscape and habitats that they grow in have always been of fundamental importance to the health and well being of the Xaxl'ep People (Turner 1997a). First Nations People have managed the plant and animal communities of the interior of British Columbia for thousands of years. In an article for *Business Farmer*, Turner (1999) emphasises the relationship between First Nations people and the management of native plants:

> Aboriginal peoples in British Columbia have had a long-standing relationship with native plants, extending back thousands of years. ...Aboriginal peoples...have carefully managed their plant resources to maintain their abundance and productivity. (p. 6)

Plant harvesting techniques such as tilling, selective harvesting and pruning have resulted in an enhancement of many species. Fire was also used as a means of encouraging growth of herbaceous plants and berry species and reducing brush in forests. Fire has played a critical role in the development of plant communities in the Interior of British Columbia. Working with native plants is a part of both the past and present for indigenous peoples; thus a native plant nursery would be a culturally appropriate and sustainable business venture. Many so-called hunter and gatherer communities are guided by the same dynamics as those of horticultural and agricultural peoples (Peacock & Turner 2000); thus growing cultural plants in a nursery setting is not very different from the Xaxl'ep peoples traditional management of native species. Development of a native plant nursery flows out of past and ongoing customary practices.

Why a native plant nursery?

'Throughout the world, native plants are being considered for domestication and commercialisation to improve the livlihood of rural peoples. Such improvements could be in production systems, income generating opportunities and nutrional well-being. The starting point is the knowledge that indigenous peoples already possess.'

The role of bringing native plants into production is important to conservation and ecological restoration and also has the potential to assist in sustainable community development. Establishing a native plant nursery could provide people in the community with access to plants and medicines resulting in cultural as well as ecological restoration projects. Throughout the world, native plants are being considered for domestication and commercialisation to improve the livelihood of rural peoples (Mwamba et al., 2000). Such improvements could be in production systems, income-generating opportunities and nutritional well-being. The starting point is the knowledge that indigenous peoples already possess.

In British Columbia one of the main markets for native plants is for horticulture. In 1982, in the preface to his informative book, *Gardening with Native Plants*, A.R. Kruckeberg wrote that a general fascination with plants is experiencing a 'rebirth,' as illustrated by the increase in the number of field guides available and the 'profusion' of plants being grown indoors and out. Most importantly, Kruckeberg notes that, "the urge to grow native plants in one's own garden or at the summer cabin is very much on the upswing" (preface). A result of the upswing in a desire to garden with native plants is an increasing market for native species.

In northwestern North America, interest in native plants for horticulture lags behind that of New England and the southern United States, but as mentioned above, this interest is increasing. *Hortus West*, a magazine focused on the native plant industry, states that "native plants are becoming increasingly popular additions to residential landscapes and backyards" (1999). Recently *Hortus West* authors, Clement Hamilton, Midori Murai and Cynthia Gilbert, analysed the trend of increasing numbers of native plant nurseries by comparing the number of nurseries and their species lists in the first issue of *Hortus Northwest* (now *Hortus West*) with those of 1998. The ten-year trend indicated a marked increase in the number of these nurseries and in the number of plant species they carry. Hamilton, Murai and Gilbert (1998) conclude:

We live in a dynamic, exciting time in the evolution of the

> nursery industry, as ecological and horticultural perspectives are blended to create (shall we say it?) a new paradigm of landscaping. The past ten years have seen a phenomenal growth in the many uses of Pacific Northwest native plants. (p. 100)

'Gardening with native plants can assist with the conservation of water...and the preservation of the plants themselves and it can provide habitats for a variety of animals.'

The use of native plants for horticulture does not appear to be as common in British Columbia as it is in the United States (primarily determined through a review of nurseries in British Columbia). However, analysis conducted by *Hortus West* indicates that there will most likely be an increase in the demand for native plants in Canada.

The Southern Interior of British Columbia is one of the fastest growing parts of Canada in terms of human population and urbanisation (Cannings, Schmiddem, Holm & Guppy, 1997). The increase in population, combined with a growing awareness of our natural ecosystems and the necessity for water conservation, indicate a potential increase in demand for native plants in the Interior of British Columbia. Since cities in British Columbia are concentrated along the coastal river valleys, it follows that "these areas of exceptional biological richness are seriously threatened by urban sprawl and encroachment" (Naturescape, 1999). Gardening with native plants could help to alleviate the pressure of reduced habitat.

For the homeowner, "the use of native plants as living ornaments in our built environment (cities, suburbia, rural communities) is a logical extension of our concern for preserving some of the Northwest's natural features" (Kruckeberg 1982, preface). Naturescape, a component of the Habitat Conservation Trust Fund, has initiated a vigorous campaign to "promote caring for wildlife habitat at home" (Cannings et al. 1997, p. 2). The interest in native plant gardens extends beyond the aesthetic of the plants. "Xeriscape (ZEER-i-scape), the application of water conservation to create landscapes compatible with local conditions," (Canning et al., 1997, p. 14) is increasingly being applied to home and corporate gardens.

Awareness is growing amongst communities and teachers that children need aesthetically pleasing and stimulating environments in which to learn. Native plants, food plants and horticultural varieties are being used in the

'greening' of school grounds. Native plants are also being used in parks, museums and at First Nations Band Council Offices to develop ethnobotanical gardens. Greening of schools and ethnobotanical gardens enhances cultural awareness and adds to a growing sense of community pride while creating attractive landscapes.

Native plants are adapted to the climatic conditions of their given landscape. Gardening with native plants can assist with the conservation of water (thus reducing utility bills in many urban environments) and the preservation of the plants themselves and it can provide habitats for a variety of animals. Home gardeners are also interested in attracting butterflies and birds to their gardens. Planting native species provides ideal food and shelter for the birds and butterflies indigenous to the area and enhances people's appreciation of their local natural landscape and ecosystems. The increase in an ecological conservation mind ethic has also lead to an increase in the demand for native plants. Whether it is a result of the beauty of the native plants, conservation concerns, an interest in birds and butterflies, a desire to save money and water or to lessen our impact on the earth, gardening with native plants is increasing. Logically gardeners require a source of plants and seed.

The garden business is growing, with nurseries appearing on the edges of supermarkets and even drugstores. In order to be successful in this increasingly competitive market a new business venture needs to be unique. A native plant nursery owned and operated by First Nations people on their own lands would appeal to a variety of people for many different reasons. Environmental concerns, the beauty of the native plants, attracting butterfly and birds, conservation of water, ecological restoration, and growing edible or medicinal plants are all potential markets for the native plant industry. The unique location of the Xaxl'ep people, in the dry region of British Columbia close to a rapidly expanding market, are ideal conditions for creating a native plant nursery.

Naturescape focuses on urbanisation but this is just one of many areas where there is a market for native plants and seed. Beyond gardening with native plants, restoration of natural ecosystems requires a source of native plants in order to reestablish damaged natural ecosystems. "Re-introducing

native plants to degraded land is an integral consideration in ecosystem restoration" (Burton, 1998, p. 8). The recent surge in restoration activities has also contributed to the increase in demand for native plants.

'An increasingly important focus in restoration is providing plants from local sources for local use.'

The need for restoration is the result of habitat destruction, impact of invasive species, and pollution (Given, 1994). Negative impacts on ecosystems that are becoming increasingly common in the Interior of British Columbia include, herbicide spraying and other agricultural practices that lead to soil compaction, erosion and lowering of the water table, wetland drainage, dam construction, logging, mining, industrial development, competition from introduced exotics, commercial collection of plant materials, and disappearance of symbionts (pollinators, dispersers) (Given, 1994). In an article written for *Menziesia*, the newsletter for the Native Plant Society of British Columbia, Burton and Burton (1997) argue that:

> It has become necessary to revegetate large areas of land in British Columbia, due to extensive logging, mining, road construction, and other industrial activities. Plants are needed for aesthetic and functional purposes: for 'visual green-up', to control erosion, to restore soil structure and productivity, to grow more timber, and to provide suitable habitat for animal life. (p. 8)

Within the Xaxl'ep traditional territory the landscape and native plant communities have been altered by private and corporate logging practices, hydroelectric lines and overgrazing. The Xaxl'ep have expressed an interest in restoring these areas to benefit wildlife and water quantity and quality and to allow for sustainable harvesting of traditional foods, medicines and plants used for technology. The use of native plants is often a legally required component of environmental restoration projects such as wetland mitigation and ecological restoration. For this reason, native plants and seeds are in high demand (Hortus West, 1999; Rose, Caryn, Chachulski & Haase, 1998).

Much of native plant marketing and initial propagation experimentation are related to restoration. The only book that specifically focuses on propagation of interior plants, *Propagation of Interior British Columbia Native Plants from Seed*, was funded by the Ministry of Forests, "The initial

seed work involved seed collection, stratification and the growing of planting stock for revegetation projects along the Salmon River near Salmon Arm" (Hudson 1998, *iii*). Personal correspondence with proprietors of native plant nurseries indicates that the main market for native plants is still from restoration projects.

An increasingly important focus in restoration is providing plants from local sources for local use. Seeds collected and plants grown in an area similar to where they will be planted have a greater possibility of survival than plants from different regions, and also have a closely matched genetic makeup. If the Xaxl'ep people were to grow their own plants for restoration, this would not only decrease the cost of purchasing these plants but would reflect their concern for the integrity of the ecosystem.

Thus far, I have argued that by creating a native plant nursery the Xaxl'ep can provide plants for horticultural and restoration purposes. Increasingly, native plants are also being grown for medicine and food to be used not just by indigenous peoples but also by consumers in general. Many of the foundations for today's medicines are derived from native plants. Progressively, people are turning their attention to the wisdom of First Nations peoples and the medicinal properties of native plants. For many important medicinal plants, 'wildcrafting', in which plants are harvested from the wild, has gone beyond the point of sustainability. Overharvesting has had a detrimental impact on a number of native plant species. Ginseng (*Panax quinquefolius)*, Goldenseal (*Hydrastis canadensis*), Echinacea (*Echinacea purpurea*), and Cascara (*Rhamnus purshiana*) have been greatly reduced in numbers, to near extinction in some localities, by over harvesting for medicinal purposes (Cech, 1999; Crawford, 1999; Dreyfuss, 1999). Wildcrafting can be sustainable if "every act of taking is coordinated with an act of planting" (Cech, 1999, p. 1). Unfortunately, a demand that exceeds the available product frequently overruns sustainable harvesting. Cech (1999) writes:

> This lesson is nowhere more apparent than in the case of large scale silviculture in the Pacific Northwest, where re-forestation is used as a justification for cutting of old-growth forests. There is a lot of difference between digging a thirty-

> year old Ginseng and pushing a ripe Ginseng seed (or twelve of them, for that matter) into the ground. (p. 1)

The use of herbal medicine is widespread and growing, with as many as three in ten Americans using botanical remedies in a given year (Barrett, Keefer & Rabago, 1999). The end of 1998 marked three consecutive years in which echinacea was the most popular medicinal herb worldwide (Li, 1998). Echinacea is used to enhance the body's own resistance to infection, and can be useful in the prevention of colds and flu. Some botanists have observed and expressed concerns over dramatic declines in wild populations of *Echinacea angustifolia* (as well as other species) because of current international demand. In Montana, the practice of wild-harvesting echinacea is increasingly referred to as strip-mining. Tools have been designed to make digging more efficient. Hundreds of holes can be seen in the hills where plants have been removed, resulting in the degradation of prairie lands. In an attempt to preserve the remaining wild populations of Echinacea, the state of Montana recently enacted legislation, effective April 20, 1999, which imposes a $1000 per day fine for collecting echinacea roots from state lands (Klein, 1990). Fortunately, echinacea is now widely cultivated in a cropping system in order to meet market demands.

Over-harvesting is not limited to medicinal plants. In Montana the removal of large amounts of huckleberries is impacting the bear population. Grizzly and black bears require large quantities of berries at the end of the summer months to prepare for winter hibernation. Commercial harvesters are traveling further into national forests and taking more berries thus leaving fewer for the bears. Further controversies are erupting between groups of mushroom harvesters in US national forests (Smith, 2000). Mushrooms can be extremely profitable and people will go to great lengths to keep a mushroom patch for themselves.

Growth of mediculture (cultivation of medicinal and aromatic plants) to meet increasing demand in food, pharmaceutical, perfume, flavour, and cosmetic industries are occurring worldwide. The pursuit of new medicines derived from plants growing in tropical areas is a high interest area of research, but the medicinal properties of plants used by North American natives has

'...there are many plants, traditionally used and still valued by the Xaxl'ep community, considered to be of ecological and cultural significance.'

not received such attention. A study in 1992, by McCutcheon, Ellis, Hancock & Towers, marks the first performance of large-scale antibiotic screening of British Columbia's native plants. Cultivation and processing of medicinal and aromatic plants has shown an annual growth rate of five to ten percent internationally, resulting in more than US $50 billion globally per year (Singh & Kumar, 1998). With the development of suitable agrotechnologies, many of the medicinal plants that are still collected from wild sources may soon be cultivated which will maintain the regular supply of raw material of desired quality. Pre-determined cultivation techniques for medicinal plants in British Columbia may help to prevent the destruction of the natural environment as public demand for herbal remedies from local native plants increases.

Wild harvesting is not necessarily an unsustainable activity. Indigenous peoples' traditional harvesting techniques, however, are an art that depends upon the cultivation of a sustainable crop by selective picking and pruning. The management of natural resources by First Nations has been overlooked by the general public, who wish to profit from the forests. It is also possible that demand exceeds the forests' ability to supply the quantities of berries, mushrooms and medicinal plants that are currently available.

Whether it is for medicinal purposes, sources of food, re-vegetation of logging roads, stream stewardship, wetland restructuring or mine reclamation, just to name a few, the "demands for planting stock are increasing each year" (Hudson 1998, *iv*). Propagation of medicinal and edible plants in their natural ecosystems would allow the continued benefit from the use of these native plants while reducing the impact on the wild populations. "Commercial horticulture and the nursery trade have an important role in conservation; providing there are adequate safeguards to avoid unacceptable exploitation, the nursery trade can be regarded as a potential major ally for plant conservation" (Given, 1994, p. 135). It is vital that we preserve plant diversity for the health of human populations. Beyond plants comprising a major component of the foods that we eat, they frequently are the basis for our medicines and important components of our material goods. Furthermore, plants are a vital component of the earth's ecosystems and their complexity and potential has yet to be fully realised.

Native plants not only have economic and scientific value but they have strong cultural and symbolic significance. Listed in the Xaxl'ep Ethnobotany (Turner et al., 1998b) there are many plants, traditionally used and still valued by the Xaxl'ep community, considered to be of ecological and cultural significance. Arrow-leaved balsamroot, *Balsamorhiza sagittata* (Pursh) Nutt. (Asteraceae) is considered by Turner (1997c) to be "ranked among the most versatile food plants used by the peoples of the southern interior" (p. 93). A dominant forb (a non-grasslike herbaceous plant) in semi-arid grasslands, Arrow-leaved balsamroot is of cultural and ecological significance and its use by indigenous peoples has been documented throughout its growing region. Roots, leaves, bud stalks, and seeds are all used by First Nations Peoples. Roots can be pit-cooked overnight and then peeled and eaten or dried for storage. The main carbohydrate in the roots is a long-chain sugar called inulin, which is difficult for humans to digest. However, pit-cooking and storage helps to chemically break down inulin into fructose, which is digestible and sweet-tasting. Young flower stalks are eaten raw in the spring. Young leaves were also eaten raw, steamed or smoked as a tobacco (Angove & Bancroft, 1983; Fischer & Holifield, 1987; Parish, Coupe & Lloyd, 1996; Turner, 1997b; 1998). Arrow-leaved balsamroot seeds, similar to sunflower seeds, were used as flour (Parish et al., 1996). The pitch from the bark of *B. sagittata* root was used traditionally, and continues to be used by Interior Peoples to make a salve for skin infections (Bannister & Peacock, 1998). Arrow-leaved balsamroot was one of the 100 plants screened by McCutcheon et. al. (1992) for antibiotic activity against eleven bacterial strains. Analysis indicated that the plant has significant antibiotic properties. *B. sagittata* has a variety of potential economic and ecological applications: as an ornamental, as an inulin source (processed crop), for herbal medicines (antimicrobial properties), for use in restoration (slope stabilisation and mine reclamation) and as a vegetable. Plants like Arrow-leaved balsamroot have enormous potential for growing in a native plant nursery as well as being produced in a cropping system.

Developing a source of Interior British Columbia native plants for the variety of uses mentioned above could provide a rekindling of First Nations

trade links by distribution of these plants to neighboring indigenous communities. An interest in restoration, as well as a return to traditional medicines and foods, is building not only within the Xaxl'ep community but also with other indigenous groups in the Interior.

A native plant nursery would also benefit many unemployed and underemployed members of the community. Specifically, the Xaxl'ep have shown a strong interest in reestablishing connections to their traditional botanical resources. A large number of Xaxl'ep women are already avid gardeners and plant specialists. Many recently participated in a course on horticulture. The Xaxl'ep have both the desire and the skills; thus they have a good foundation to undertake such a project the development of a native plant nursery.

'The co-operative model provides a unique alternative to standard market-driven approaches to economic growth.... A native plant nursery would mesh well with Xaxl'ep values and those that form the foundation of the co-operative model.'

The Xaxl'ep focus on community development has a broader perspective than just economic growth. They are concerned with improving the quality of life of their people and restoring their natural ecosystems while maintaining their heritage. The empowerment of the Xaxl'ep to affect the course of social and economic change in their community is best approached from a strategy that is both ecologically and culturally sustainable. Local peoples' needs, priorities, and preferences should be considered when identifying plants to be cultivated. Many plants may not have market potential but are important culturally and growing them may result in a continuation of heritage.

The co-operative model provides a unique alternative to standard market-driven approaches to economic growth. At the heart of the co-operative model are the concepts of sustainability, democracy and community driven initiatives. A native plant nursery would mesh well with Xaxl'ep values and those that form the foundation of the co-operative model. A native plant nursery, created for the reasons already mentioned, is an example of an ecologically sustainable economic initiative that could be undertaken by the Xaxl'ep. The appropriateness of the co-operative model to the development of a nursery will be discussed shortly. First it is beneficial to outline a few other components of the Xaxl'ep community that predispose them to such an economic initiative.

The Xaxl'ep have a unique and unprecedented working relationship with a number of academics, researchers, environmentalists, local leaders and government officials. Research and sustainable development initiatives are being conducted by Randy Bouchard, a linguist, and Dorothy Kennedy, an anthropologist who have spent three decades documenting Xaxl'ep knowledge. Dr. Martin Weinstein, a fisheries biologist, assists the Xaxl'ep with their traditional use study and is active in pursuing applications for this knowledge. Archaeologists Dr. Brian Hayden and Dr. Arnoud Stryd have also worked with the Xaxl'ep in researching past land use and in the excavation of spectacular archaeological sites, specifically at Keatley Creek. Researchers and the Xaxl'ep agree that Keatley Creek is worthy of World Heritage Site recognition and there is a movement to have the area protected and developed as a point of historical interest. Renowned eco-forester Herb Hammond is also working with the Xaxl'ep to protect their land from non-sustainable forestry practices and to develop value added wood products for Xaxl'ep community economic development. As indicated above, Dr Nancy Turner also continues to work with the Xaxl'ep, a relationship which began 30 years ago. Furthermore, the Xaxl'ep are united with the Pavilion and Bonaparte Bands (Secwepemc language groups east of Xaxl'ep Territory) in the management of their overlapping, or "shared" lands. The three bands have a co-operative tenure system to guide decisions relating to resource management and are presently creating an eco-system based management plan for their shared territory. Agriculture and Agri-Food Canada have shown an interest in developing sustainable productive systems of agriculture and working with indigenous peoples on traditional food and medicinal plants. Increasingly Agriculture Canada is concerned with land stewardship, particularly plant ecology (Bowen, personal communication, 1999). It believes that plants, such as Arrow-leaved balsamroot, have the potential for cash-cropping systems that are environmentally and economically sustainable.

The multidisciplinary nature of the research and the diversity of initiatives that are being undertaken by and on behalf of the Xaxl'ep people combined with Agriculture Canada's interest in agricultural stewardship practices and the Xaxl'ep's close working relationship with neighbouring

indigenous groups makes this a highly interdisciplinary co-operative environment. Because of the long history of a positive working relationship with the people mentioned above, the Xaxl'ep are in a position to secure the best support, both advisory and financial, in creating and perpetuating community-based development initiatives.

'...the Xaxl'ep have a dedication to eliminating negative impacts on the landscape and restoring the areas that have been degraded, as well as an interest in working collaboratively with their neighbouring groups.'

Applicability of the Co-operative Model to Xaxl'ep Community Development

An example of an economic initiative, which would mesh with Xaxl'ep values, the case study of a native plant nursery, has been provided. The task now is to outline the reasons that the co-operative model, or a co-operative organisation, would be beneficial in the development of a Xaxl'ep native plant nursery.

Co-operatives provide a form of business enterprise that encompasses both economic and social principles in a jointly-owned, democratically controlled system. Co-operatives are based on the values of self-help, self-responsibility, democracy, equality, equity and solidarity (ICA, 1996). Co-operatives operate under the guidance of the principles adopted by the International Co-operative Alliance. The principles are summarised as:

1. Voluntary and Open Membership
2. Democratic Member Control
3. Member Economic Participation
4. Autonomy and Independence
5. Education, Training and Information
6. Co-operation among Co-operatives
7. Concern for Community - sustainable development of community through policies accepted by members.

From the perspective of an outsider, these principles are already ingrained in Xaxl'ep planning and decision making strategies. To these I would add that the Xaxl'ep have a dedication to eliminating negative impacts on the landscape

and restoring the areas that have been degraded, as well as an interest in working collaboratively with their neighbouring groups.

There are many positive incentives to the co-operative model. The organisational form of co-operatives provides the possibility to mobilise finances in the community through joint efforts, incur expenditure in a social and non-profit way, control and monitor the spending jointly and regularly, and create joint responsibility and solidarity in the community (Thordarson, 2000). A co-operative allows communities to re-invent their livelihood and provides a way in which people can mediate their relationship with the market, compromising between local and market values. Among the distinguishing features of the co-operative form of organisation are its voluntary and democratic character, participatory nature and, above all, its commitment to high ethical standards such as honesty, openness, social responsiveness, and caring in all its dealings and activities (Taimni, 1998).

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The format of co-operatives has enhanced their applicability worldwide. Thordarson (2000) writes:

> In almost all countries around the world, co-operative enterprises owned by their members play an extremely important role in providing agricultural, financial and other services to more than 760 million individual people, making co-operatives actually the largest socio-economic grouping in the world. The United Nations has quantified this significant contribution of the co-operative movement and estimated that the livelihoods of three billion people - half the world's population - are to a significant extent made secure by co-operative enterprises. (online)

Agricultural co-operatives, in particular, constitute an important force within the agricultural sector, with production estimated at US $522 billion (Thordarson, 2000). It is estimated that approximately one-third of all foodstuffs and drinks are marketed and processed by co-operative enterprises (Secretariat of the International Cooperative Alliance, 2000). The World Food Summit Plan of Action, which states that economic and social organisations of the rural population should be fostered, adds that agriculture

co-operatives are, together with the much smaller number of farmer unions, the true representatives of farmers (Secretariat of the International Cooperative Alliance, 2000). In Canada, agriculture co-operatives are a vital instrument of economic development particularly in the dairy, hothouse, grain, vegetable, orchard and flower sectors.

Co-operatives are also significant in a number of aboriginal communities. It was during the 1950's that co-operatives were first utilised as instruments of social and economic development in native settlements, predominately in Manitoba, Saskatchewan, and Alberta (Sprudzs, 1975). They are used in training, the production of goods and services, marketing and wholesale/retail. Aboriginal co-operatives are particularly significant in Nunavut and the Northwest Territories (NWT). Co-operative associations represent the primary economic institutions of the aboriginal people of the NWT (Lyall, 1993). Economic development in NWT communities has been greatest where co-operatives have been strongest. Lyall (1993) argues that the success in the NWT is the result of a combination of 100 percent local ownership and strong support services. Bridgen (1971) also notes that indigenous communities in Ontario have found co-operatives to be a satisfactory method of improving their economic and social environment.

Beyond the general principles briefly outlined above, there are a variety of reasons why the co-operative model has been successful and could be a potential means of native plant nursery development for the Xaxl'ep. Narayan (1997) argues that:

> An important reason for building on indigenous principles of organization is that to be effective, a group must own and enforce its own rules defining membership criteria, the allocation of responsibilities, contributions and benefits, and the mechanisms for ensuring accountability and resolving conflicts. If these rules are dictated from outside, people do not feel obliged to follow them, free riding becomes common, conflicts escalate, and the group becomes ineffective. (World Wide Web)

It is apparent that the principles used by indigenous organisations, as outlined

by Narayan, are reflective of the principles of the co-operative model. Co-operatives are consistent with indigenous peoples traditional values and have provided a means for achieving financial independence (Lyall, 1993).

There are a number of specific reasons why co-operatives are especially applicable to indigenous communities. These points were detailed in a report by Bridgen (1971):

'The Xaxl'ep are structuring all current and future development planning on community based initiatives.'

1. Co-operatives have a very similar philosophy to that of Aboriginal groups — a cultural concept of sharing and equality. Other forms of business do not use a sharing concept, and earnings or savings are not distributed on the basis of patronage.
2. There is an expressed desire on the part of Aboriginal people to organize and operate community business as co-operatives.
3. Co-operatives have been accepted by Aboriginal people in other areas of Canada as a means of serving their needs. As with other forms of business venture, not all co-op development efforts have been successful, but achievements and successes have far outweighed the failures.
4. The co-operative control concept of one member - one vote, encourages individual involvement and participation in this form of business operation.
5. Co-operative corporations are people oriented rather than profit oriented. Personal development of people is a most important objective of this type of project — co-operatives by their control structure, philosophy, and personal involvement of members, encourage personal development.
6. Co-operatives meet a social need of Aboriginal people [and I would add all people] — the need to belong. This need is met through ownership and participation; and through group relationships developed by working together.
7. Co-operative development in Aboriginal communities can relate to similar co-op activities in the non-Aboriginal sector

> of Canadian society, thus building a valuable bridge between cultures. (pp. 19-20)

Although Bridgen's report was written 30 years ago and the wording to express the same values today would probably be more culturally sensitive (Aboriginal has been substituted for Indian), the reasons that co-operatives were, and continue to be, appealing to indigenous peoples has not changed.

'Co-operative development initiatives are appropriate to the new, or returning interest in communal property arrangements. Furthermore, evidence increasingly indicates that, when the institutional framework is right, participatory, community-based programs actually cost less and are quicker to implement.'

Economic initiatives by both indigenous and rural communities are primarily focused on community-based economic development (CED). The Xaxl'ep are structuring all current and future development planning on community-based initiatives. In contradiction to the 'tragedy of the commons' theory, expressed in the late 1960's, community ownership may in fact be much more environmentally and economically sustainable. Feeny, Berkes, McCay and Acheson (1999) argue that:

> A new and more comprehensive theory for common-property resources must be able to account for sustainable resource management under communal-property regimes. The theory should be capable of accommodating user self-organization or lack of it. Such a model can better explain whether and under what conditions sustainable resource management will occur, rather than simply predicting the demise of all resources held in common. (p. 88)

Co-operatives are a means for local communities to maintain control and enhance use of their resources. Co-operative development initiatives are appropriate to the new, or returning interest in communal property arrangements. Furthermore, evidence increasingly indicates that, when the institutional framework is right, participatory, community-based programs actually cost less and are quicker to implement (Narayan, 1997). Another result of co-operatives is that incentives for performance are easier to institute when agencies are required to be financially viable, to have autonomy to manage themselves, and to have control over hiring and firing of staff. The structure of co-operatives is flexible; allowing communities with different values and needs to manage accordingly.

Successful co-operatives provide a democratic way for a community

group to run a business. Many benefit by "combating exploitation, reducing disparities, improving social conditions and gender sensitivity, and helping to create a more just society with pronounced concern for environmental protection and sustainable processes of development" (Taimni, 2000). Other advantages of establishing a native plant nursery as a co-operative are the associated benefits, not only in doing work that people love, but in the potential for healthier living, the improvement of the environment and the development of opportunities for members who may later transfer these skills to other occupations and initiatives. Support from co-operative organisations could also provide training in areas such as management, conflict negotiations and decision-making strategies.

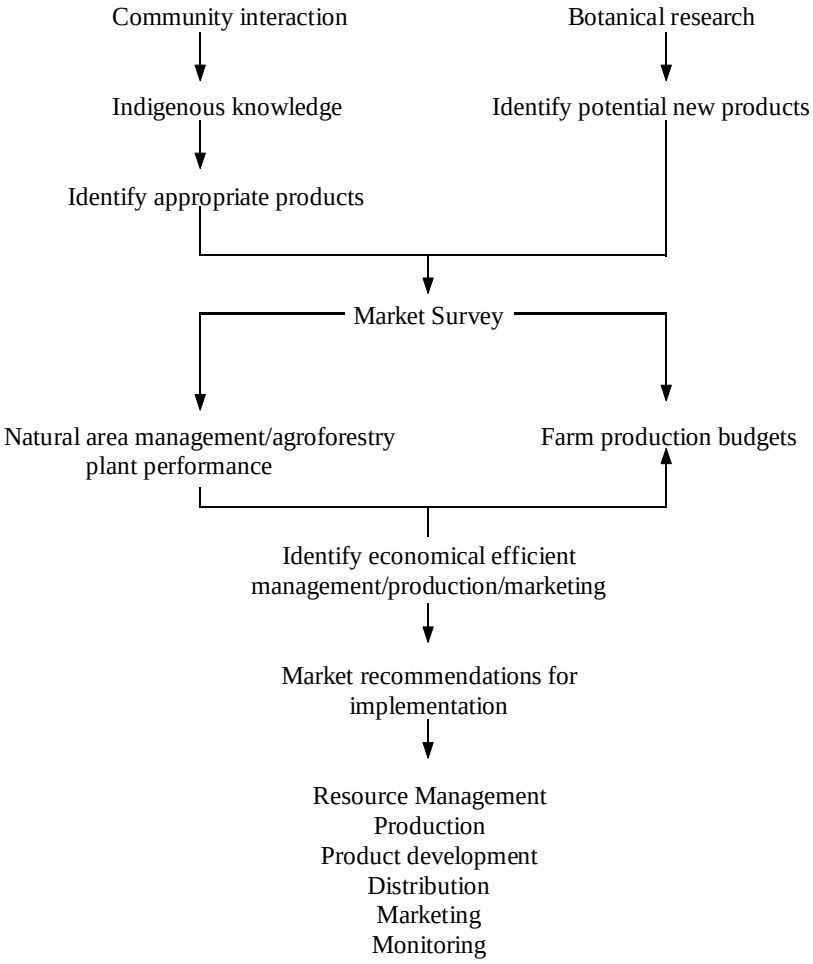
Issues and Concerns with the Development of a Native Plant Nursery

Concerns with the creation of a co-operative native plant nursery are related in part to the co-operative structure but primarily to the process of beginning a nursery and the propagation of native plants. There are many issues related to the domestication process. Mander, Mander and Breen (2000) feel that the lack of understanding with respect to the cultivation and economics of producing useful indigenous plants can be considered one of the most limiting factors in commercialisation. Producers are reluctant to undertake the research needed to commercialise native plants, as there is no indication of the potential costs and returns involved.

The stages necessary to bring a plant to production, including acquiring the facilities and equipment required, constitute the major concern in creating a native plant nursery. The steps involved in selecting native plant varieties for domestication and developing them as a product for sale are outlined in Figure 1. It is important to note that every native plant nursery has requirements specific to a particular location, product, market and proprietors. Common to all nurseries are a number of general conditions that must be met. The greatest necessities are those that are crucial to the growth of plants: seeds, water, soil, and sun.

Figure 1

Two pathways in domestication and commercialisation of native plants



Source: Sinclair et al. (1996) . Product domestication and adoption by farmers. *Domestication and Cultivation of Non-Timber Forest Products in Agroforestry Systems: Non-Wood Forest Products 9*. Available World Wide Web: http://www.fao.org/docrep/w3735e/w3735e35.htm

Seeds

The choice between growing from seeds or vegetative propagation is often determined by the plants themselves. Many plants are difficult to germinate from seed and even when this is successful they may be extremely slow growing. Vegetative propagation, an alternative to seed, is done through techniques including grafting, rooted cuttings, and tissue culture. Plants propagated through vegetative means are identical to the parent plant. Because of this, vegetative propagation is not necessarily the most desirable form. Rose et al. (1998) outline the reasons why seed propagation is usually the most ideal technique:

> Seed propagation is encouraged whenever possible because it is easier to capture and preserve genetic variation with this method than with vegetative propagation. In addition, seed propagation preserves the wide genetic adaptation that is critical to successful seedling establishment. (p. 1)

These concerns are substantial enough to choose germination by seed whenever it is feasible.

The acquisition of seeds for sale and the propagation of native plants are associated with a number of complex issues. First Nations people understand the necessity to only collect what resources are needed to allow the successful perpetuation of species in the wild. Seeds are an important food source for insects, mammals, and birds, thus complete removal of seed or fruits in the wild can have an impact throughout the food web.

Not only can the collection of seed affect natural systems but the propagation of plants can also impact plant genetics. Plants do not move around and as a result, species can become isolated in geographical pockets. These pockets have formed naturally as a result of moisture changes, elevation and aquatic barriers. Isolated pockets are also increasingly the result of human development and habitat fragmentation. The impact of mixing seeds from different places and the genetic influence on wild plants is still relatively unknown. Burton and Burton (1998) outline some of the genetic concerns with propagation of native plants:

> Developing a line of cultivated seed from wild plants

> (sometimes called an 'ecovar') brought together to inbreed from a wide range of locations may contradict some definitions of what constitutes 'native' plant material. Purists frequently argue that only plants or seeds collected locally should be used for restoration work, and that any cultivation inevitably constitutes some selection against the genetic diversity needed for local survival and continued evolution. (p. 9)

A great deal of research still needs to be undertaken on the plant genetics of individual species. Presently, it seems that the only solution is to minimise genetic disruption as much as possible.

The geographical area from which seed is collected can also be a factor in how well seed germinates and transplants into gardens or restoration sites. In *Propagation of Pacific Northwest Native Plants,* Rose et al. (1998) express the basic concerns related to seed source:

> Seed source affects seedling performance in two ways: cold tolerance and growth rate. In general, seedlings grown from seed collected from higher latitudes or elevations will grow slower but tend to be more cold hardy than those grown from seed from lower elevations or more southern latitudes. (p. 2)

Ideally, seeds should be collected from the area in which they will later be planted. Many of the plants of Interior British Columbia are well adapted to the intense dry heat of the summer and cold in winter. Plants accustomed to the moisture, and mild temperatures on the Pacific Coast are less likely to survive if introduced to the Interior.

Given an increase in an understanding of natural systems, escalating human impact on the earth and concerns voiced at the Rio Conference's Convention on Biodiversity, there is a probability that seed collection will be regulated in the future. The Royal Botanical Gardens Kew is a world leader in seed and plant collection. Kew recently adopted guidelines on access to genetic resources and benefit-sharing. Under this policy "RBG Kew attempts to seek the prior informed consent of a government body within the country in which seed collecting has been proposed, usually in addition to permit requirements already in place" (Way, personal communication, 1999).

Guidelines such as those adopted by Kew have an effect on national policies all over the globe. Increasingly, conservation organisations are documenting recommendations for seed collecting. The Canadian Wildflower Society's *Gardener's Guidelines* (1994) has 14 general points to consider when propagating native plants. These guidelines are an excellent reference for collecting native plant seeds and propagules.

For the Xaxl'ep, selectively harvesting from the land is an integral part of their culture. Weinstein (1995) writes:

> The Xaxli'p think about land use as a whole set of behavioral relationships. Use is economic in part. The resources of the territory are the historical basis for the economic livelihood of the Xaxli'p. But the relationship requires a caring exchange according to the cultural rules learned by the ancestors from living on the land. (p. 2)

Traditional Xaxl'ep knowledge could be incorporated into the selection and harvesting of wild seed.

Associated with the concerns of seed collection are the challenges of propagation. As mentioned above, the documented information on propagation of Pacific Northwest native plants is limited. Growing native plants is a continuous challenge. Rose *et al.* (1998) write:

> Obviously, native plant propagation requires some experimentation and innovation. With so many species-specific propagation requirements and very little information available in the literature, native plant growers must refine their techniques based on trial and error and their available equipment, supplies, and facilities. (p. vii)

It is often difficult to determine what needs to be done with seeds. Do seeds need to be directly sown, and if so, at what time of year? Should a seed be stratified first[1] ? Is it necessary to scarify seed[2] ? Some plants do not transplant well and must be germinated initially in large pots. Other species need a light soil spread very thinly over the seed surface. Is the seed viable? How long will seed remain viable if stored? The answers to these questions and many more are determined through luck and extensive experimentation. Crucial to

the seed germination process are detailed notes that can be summarised into informative propagation cards for future use. The challenge lies not only in finding the best formula for the seeds to germinate but also in getting the plants to the ideal size at the time of year crucial for retail sales.

Unfortunately, some people see the collecting and transplanting of live plants as a means of reducing the challenges of seed germination or vegetative propagation. The removal of live plants from their natural setting has a detrimental impact on the species of plants and the ecosystem from which they are taken. Parish et al. (1998) discuss the impact of whole plant harvesting:

> In the past it was common to transplant wild plants to the garden, and some of our rarest and most beautiful wildflowers are threatened with extinction because of past collecting practices. One might think that digging up a few plants from the wild is harmless, but this is not the case, and the uncontrollable collection of native plants has caused significant harm. In addition the chances of successfully transplanting well established native plants from the wild are very low. (p. 24)

Kruckeberg (1982) and the Canadian Wildflower Society (1994) condone the digging of native flora only in situations where habitat is scheduled to be destroyed by practices such as housing development or road construction. Kruckeberg (1982) and Parish et al. (1996) note the difficulty of selectively transplanting wild native plants. Having condoned some digging of plants, both authors note, it is still necessary to remind the collector that such plants are hardest to introduce successfully into the garden. Again, seed germination is recommended over vegetative propagation and wild plant collecting.

Water

Seeds, even those of plants adapted to the driest ecosystems, need water to germinate. The water's chemical makeup is an important consideration when choosing a location for a plant nursery. Water testing is necessary in order to market plants as organically grown. It is necessary to consider the

cost of water. A nursery requires a large amount of water and 'free' water is an enormous financial benefit.

As already mentioned, the Interior of British Columbia is extremely dry in areas. Weinstein (1995) writes:

> For the Xaxli'p, water is the #1 concern. Traditions recognize water as the connector. Water looks after people, fish, animals and trees. Xaxl'ep elders say 'without water we are lost.' The Fountain Valley is a lush, green jewel in an otherwise parched landscape. The ecology of the territory depends on the supply of water. And the residential occupancy of reserve lands and their use for agriculture depends on both water flows and water quality. (p. 4)

In determining the location for a native plant nursery on Xaxl'ep, a number of factors need to be considered. When using fertilisers it is necessary to consider water sources and the effects of runoff. On Xaxl'ep land in the Fountain Valley, there are three small lakes. These lakes could serve as a source of water for a nursery; however, the impact of removing large quantities of water from the lakes and the possibility of irrigation (and therefore fertiliser) run-off from the nursery needs to be considered. It is also common to use bleach for sterilising nursery pots. The run-off of toxic materials from this process could also be detrimental to aquatic systems. Thus, water location and the impact on water sources are of major concern.

Singh and Kumar (1998) note that in many arid and mountainous regions areas for additional crops and increasing agriculture production are unavailable thus the cultivation of native plants and agriculture must be made complementary to each other. Both require common agricultural resources that are potentially limited and/or scarce. It is therefore necessary to develop well thought out strategies to achieve targeted output, both in medicinal and traditional agricultural crops, through proper and optimal utilisation of available resources. It is also vital that any development initiatives in Xaxl'ep Territory do not negatively impact the Xaxl'ep community. Planning needs to be initiated so that water used for a nursery would not impact home gardens and existing agriculture irrigation.

Soil

Plants in the wild grow in a substrate that is very different from that common in home gardens and in nursery propagation. As in processing seeds, it is necessary to experiment with soil materials to achieve maximum propagation. Growing a plant in its native soil is potentially better than propagation in pots because there is not as much chemical input, loss of moisture, added expense of extra materials, and waste products such as pots. The difficulty with growing plants in their native soil arises when the plants are to be sold. Digging and transplanting can be both difficult and damaging to the plants root structure.

First of all, the financial cost of using sterilised soils in pots for germination and heavier soils for transplantation is a factor to bear in mind.

Another factor in the propagation of plants in pots is a need for fertiliser. Growing native plants in four-inch pots, a standard practice in nursery production, is a problem because the nutrients leach out when the plants are watered. Therefore, fertiliser is a requirement. Applying compost can provide important nutrients to plants but there is the risk of detrimental effects from insects, fungi and weed seeds contained in the composted soil. There are a number of different options for fertilizers including chemicals, bonemeal, and fishmeal. None of these fertilizers are without environmental considerations and the final decision as to which fertilizer to use will involve a weighing of ecological impact concerns, soil nutrient requirements, and financial costs.

A solution for the issue of chemical fertilization needs to be further researched. One possibility may be field growing of plants. Although field growing avoids the problem of nutrient loss due to leaching out of pots, it does pose other concerns. Aggressive weed growth makes it difficult to start plants in the field. Inevitably, some plants will be lost. Further research needs to be conducted in choosing between a nursery structure involving pot propagation versus *in-situ* field propagation. It seems that ideally, given the ecological concerns, propagating and growing nursery plants organically would seem to be the best choice.

Sun

Equally important to the growth of plants as soil and water is the requirement for sunlight. Typically, in the Interior of British Columbia, there is more than adequate sunlight for plant growth. The sun, however, can be too much of a good thing. The combination of wind and sun has the intensity to dry salmon; it also easily burns tender seedlings or causes potted seedlings to dry out too quickly, which increases the need for watering. Some plants, characteristic of the forest understory, require shade to grow. In direct sunlight, they will have little chance of survival. In order to protect tender seedlings from the elements, sheltering structures are required. Crucial to the building of a greenhouse or shade house is the consideration of orientation. A greenhouse with its short end facing the wind benefits from the natural ventilation, which the wind provides. Failure to position a greenhouse in this manner can result in structural damage and may be more expensive to heat. Greenhouses must be built to withstand extreme weather conditions. In 1996 a freak snowfall piled a large amount of snow on the West Coast within a short period of time. The greenhouses that were built adjacent to one another collapsed when accumulating snow was not able to slide off. The number and size of shade houses and greenhouses required is determined by the number of species, volume and size of plants to be grown. Realistically, the number of structures will also be determined by financial considerations and land availability.

Electricity is expensive so the most economical means of heating and lighting greenhouses needs to be researched in detail. One further requirement, not initially apparent but crucial, is the need for a heated, well-lit, indoor workspace. This structure should include a basic kitchen and sitting area for employees, an office and a seed processing and preparation area. Seed preparation is generally done in the winter months so could not feasibly be done outside. The facility could also double as a meeting facility, a craft area and a processing area for plant products.

Wind, sun, snow, and water all need to be considered in determining the location of structures for a native plant nursery. A final consideration, which could limit location possibilities, is the issue of land classification.

Regulations governing the use of land are complicated. Land within the Xaxl'ep territory can be commonly owned or occasionally, private Band member land. There may not be agreement over the lands classification or its future use.

Marketing

For most nurseries, it is necessary to market for both wholesale and retail sales but usually economic constraints limit the spending of advertising dollars on just one of these two sectors. However, determining which sector to favour, retail or wholesale, can be difficult. Wholesale involves the sale of large quantities of the same species for purposes such as restoration and greening of schoolyards. It provides a guaranteed source of income because it is done on a contract basis. The downside of this strategy is that plants are usually sold at a reduced price. Retail involves sales directly to homeowners in small quantities. There is no guarantee of how many plants will be sold, however plant prices can be increased to make up for the risk.

For many native plant nurseries, pamphlets, brochures and seed catalogues are a major source of market outreach. The literature varies depending on nursery specialty and the customers to whom they are appealing. The creation of catalogues can be a major expense especially if they need to change from year to year to reflect plant availability. Other forms of advertising are not as direct but can be valuable. For example, landscaping the nursery surroundings with native plants is a useful form of advertising, as it can play an important role in showing people how great these plants can look. Through the use of interpretive signs, landscaped grounds can also educate people about the plants potential uses, how to grow them, and why it is beneficial to grow native plants. The impact of education is not only an increased awareness of the native plant market but an increased sensitivity to native ecosystems. Locating a native plant nursery along a major road can also be a valuable form of advertising, as views of beautiful native plant gardens would be witnessed by passing motorists. If a location near a major road meets all the requirements for a nursery listed above then the only other concern is security. Greater visibility can increase the chances of theft and vandalism. Advertising

does have a further implication. Advertising means it is necessary to have the stock available when people come to purchase it. To advertise yet not be able to meet customer demands results in a negative image.

For the Xaxl'ep there are many projects related to a native plant nursery that can be undertaken for additional revenue. Not only the plants themselves but also the value-added products developed from the plants could be marketed. A few ideas for the Xaxl'ep are to sell seed as well as plants, create products such as salves, and jams from the plants, sell hand crafted cards from plant materials and market a field guide for plants and ethnobotany for the region. These are just a few of the many business ventures associated with native plants. Additional avenues may be sought by contacting companies such as LUSH, AVEDA, and the Body Shop (a British international cosmetics company committed to ecologically responsible products) that develop and market skin and cosmetic products made from plants.

The creation of a native plant nursery takes a large amount of money and an even greater amount of time. Given the risks involved it is recommended that the Xaxl'ep begin the co-operative slowly, focusing on plants desired by the members and those needed by the Band for restoration. Any remaining plants could then be marketed to the local community at the farmers market in Lillooet.

Labour

All of the work outlined above requires a large amount of human effort. The time spent collecting and sorting seed, sowing seed, transplanting, watering, recording, educating and selling are just a few of the tasks necessary to operate a native plant nursery. Co-operative members are the labour force and it would be desirable to have band members as paid staff. Typically, decisions on staffing, such as how many, part or full time, are based on finances and the scale of the nursery.

Miscellaneous

There are a number of miscellaneous items required for a native plant nursery, such as pots, tools, hoses, tables, gloves, seed collecting, and labeling

materials. Some of the simplest materials can be very expensive. For example, good shovel can cost $80-100. Labeling tags are an example of a small yet important item for the marketing of plants. Plants sell better when people have an idea of what they will look like in bloom and how to care for them. Commercial nurseries place informative and colorful tags in each individual pot to be sold. Tags are also valuable for monitoring and keeping track of plants within the nursery. These tags are ordered in bulk from large suppliers. Currently there are no native plant tags and the cost of having tags custom made is very high. A solution to this problem needs to be worked out so that customers have an idea of what a plant in bloom will look like. Some nurseries create laminated information cards and locate them above the different species so that people will know what the plant looks like in bloom as well as its growing requirements.

The financial expenses for materials can add up and many needed tools will not be thought of until well into the propagation process. Budgeting for these costs is difficult and the best method is to spend time visiting other nurseries to see their operational needs. In order to acquire an understanding of sources for materials such as tags, pots and soil it is beneficial to join a growers' trade association. Through a co-operative native plant nursery, members could pool their existing tools and resources to accomplish the tasks at hand.

Finances

By now it is apparent that money is the major requirement for a native plant nursery. Enough money for startup costs and for a continuous cash flow is beneficial to such a business venture. Many owners of start up nurseries find it necessary to work in other fields to support the initial costs of their native plant nurseries. The largest delay in cash flow is due to the time required to grow the plants. Initial expenses will be specific to the site location and the availability of materials.

A major financial stumbling block for many First Nations groups and individuals is that they do not have access to large amounts of capital. Through the co-operative model it may be possible for the Xaxl'ep to access non-

governmental and government grants as well as loans for economic initiatives. Currently, however, the majority of funds are being allotted to basic living expenses and Treaty negotiations.

The above discussion presents a number of areas of potential concern and complication in the development of a native plant nursery. To conclude, each decision made should uphold the Xaxl'ep commitment to sustainable management of the land

Specific Concerns with the Development of a Co-operative Native Plant Nursery

There are a few other issues that relate to First Nations that immediately come to mind when considering development initiatives. The greatest of these is Intellectual Property Rights (IPR). The purpose of IPR is summarised by Greaves (1994) as "a legally workable basis by which indigenous societies would *own* their cultural knowledge, *control* whether any of that knowledge may be used by outsiders, and require acknowledgment for its authorised commercial use" (p. 4). Posey and Dutfield (1999) stress that the reason that IPR is becoming a more pressing issue is because traditional lifestyles, knowledge and biogenetic resources of indigenous, traditional and local peoples have been deemed by governments, corporations and others to be of some commercial value, and therefore to be property that might be bought and sold. The knowledge that is of economic value includes present and future agricultural varieties, herbal medicines, musical instruments, and plants for technology just to name a few. It is probably impossible to estimate the full market value of traditional knowledge.

IPR was originally developed to protect individual and industrial inventions. Because IPR has not risen out of an indigenous mandate there are a number of conceptual problems with enforcing it. Typically, IPR is established through patents and contracts. IPR laws are generally inappropriate and

inadequate for defending the rights and resources of local communities. The protection that IPR offers is primarily economic, whereas the interests of indigenous peoples are only partly economic and linked to self-determination. Greaves (1994) also notes that copyrights and patents are for new knowledge, not for knowledge that already exists. Furthermore, copyrights and patents are conferred on individuals or corporations (legal entities acting as individuals), thus providing ownership rights that are denied to other members of society. Patents are also ineffective because they are meant to confer temporary rights that have an expiration date. Contracts provide fewer impediments but are difficult to execute. Indigenous peoples do not usually have the funds to pursue breach of contracts and laws are difficult to enforce across borders. Posey and Dutfield (1999) argue that:

> The value of end-products developed from resources and knowledge of indigenous peoples is usually far greater than the benefits returning to those peoples. Just compensation is a moral obligation; it can also be argued that international principles make compensation a legal right. (p. 33)

Several international legal instruments contain useful principles and rights that contribute to the protection of indigenous peoples' resource knowledge, however these are often ignored.

It is also difficult to protect knowledge that may not only be common in one group but may exist over a broad geographical region. It is illogical to patent a plant that grows naturally across an entire continent. IPR is a tool for reinforcing and defending cultural integrity against ethnocide but its effectiveness is under debate. For the Xaxl'ep, the plants that they use may be of cultural significance for people throughout the Interior of British Columbia and south into the United States. To protect the plants and the rights of the people working with them, it is recommended that the Xaxl'ep work jointly with neighbouring indigenous groups on economic initiatives.

Another concern, which was alluded to in the discussion of financing the creation of a native plant nursery, is the land claims issue. Many First Nations communities are already overtaxed, in both financial and human resources, in their battle over land claims and for self-government. Community

based economic development, particularly co-operatives, needs to come from within the community to be fully embraced by those who it will benefit. The processes which the Xaxl'ep are involved in are all-consuming and it may be some time before there is the human energy or finances to develop something as seemingly beneficial as a co-operative run native plant nursery.

Complications with the Co-operative Model

There are a few potential difficulties within the co-operative framework. Currently, the Ministry of Community Development, Cooperatives, and Volunteers is understaffed and only a small amount of literature on the steps to creating a co-operative is available from them. Difficulties with receiving support from the Ministry may be alleviated by a number of other organisations that are available and eager to provide guidance in a variety of formats. A few of these are listed in Appendix 1.

The co-operative model seems so appropriate to a number of different initiatives that the Xaxl'ep are considering, that I am curious as to why it has not been considered previously. It is possible that there is a general lack of understanding how the co-operative model works, what its advantages are and how it can be implemented.

With regard to the co-operative model specifically, concern can be expressed over principle one. Principle one states, "co-operatives are voluntary organizations, open to all persons able to use their services and willing to accept the responsibilities of membership, without gender, social, racial, political, or religious discrimination" (ICA, 1996, p. 14). This principle is valid in its attempt to put equality at the forefront of the co-operative movement. However, does this principle block the formation of a purely First Nations co-operative, if the Xaxl'ep desire it to be so? Or do the principles of the International Co-operative Alliance (1996) allow for some flexibility when it states the following:

> Many people understand principles as ironclad commandments that must be followed literally. In one sense, that is true in that principles should provide standards of

> measurement. In another sense, they should restrict, even prohibit, certain actions while encouraging others. (p. 14)

Ideally a co-operative run, native plant nursery would be established on Xaxl'ep philosophies that are, as has been indicated, very compatible with co-operative principles allowing for open membership while maintaining a First Nations majority. Open membership may allow for outside experts to participate and for stronger relationships to develop with the surrounding community. In the end, however, the question of membership should be left up to the Xaxl'ep and I am not in a position to speak for them.

One final concern is not limited strictly to the co-operative model but could be a difficulty in any economic initiative. Hazards of all development ideas are risks of financial losses, diminished member participation, little investment in equity capital, and inadequate education and training.

It seems apparent that the difficulties outlined in no way outweigh the positive reasons for the creation of a co-operative native plant nursery by the Xaxl'ep community. All that is left is to provide a few recommendations for the development of a nursery and for the undertaking of economic development initiatives in Xaxl'ep territory.

Recommendations

My goal in writing this paper was to provide the starting point for a better understanding of native plant nursery creation and plant propagation in a co-operative model by the Xaxl'ep First Nation. I have attempted to compile a broad and often vague body of information. I hope that the material contained here can be of use to the Xaxl'ep in their work for sustainable community development. It was also my goal to provide a case study for the British Columbia Institute for Co-operative Studies in order to increase their understanding of the feasibility of the co-operative model to be used by indigenous peoples and so that they can direct assistance and guidance to communities attempting to undertake co-operative development.

There are a number of recommendations that can be made to conclude the material that I have presented. The first series are not directed at native plant nursery creation or the incorporation of the co-operative model into

indigenous communities, but reflect the concerns of Xaxl'ep elders and councilors. The insight and sensitivity of the advice given make these points applicable to a wide variety of rural-based development plans that have sustainability as part of their mandate. Weinstein (1995) summarised the Xaxl'ep's concerns for compatible land use planning and resource use:

> 1. Take care of the land first (ecological),
> 2. Go slow; development based on a long-term plan (sustainability),
> 3. Include work done by a band company (benefits),
> 4. Heal and nurse forest and land after cutting (healing damages),
> 5. Result in no damage to water (preserve water supply and quality),
> 6. Avoid *the cutting of corners* that comes from a primary focus on $ and profit (full commitment to principles), and;
> 7. Be based on a land use plan that has a heart and feelings toward the land and the people traditionally dependent on this land (socially-based planning). (p. 7)

At a presentation to Xaxl'ep Band members, Martin Weinstein (1999) expressed a key concern for sustainable development by First Nations people, "[development] can not ignore tradition, the past must balance with modern uses." In a report written for the Xaxl'ep Band, Weinstein (1995) outlines the perspectives that need to be met for any development process to succeed, "The Xaxl'ep value system carries the burden of ensuring a combination of: sustainable resource use, eco-system integrity, and cultural transmission" (p. 1). A native plant nursery meets the requirements of sustainability and is relevant to the traditions of the Xaxl'ep.

The words of the elders, listed in the seven points above, are applicable to the values and principles of the co-operative model. In order to begin to implement these points towards the creation of a co-operative native plant nursery a number of requirements need to be considered simultaneously. The following list is just a sample of work to be initiated:

- Needs assessment: a more in-depth survey of the native plant nurseries

in the Interior of British Columbia needs to be conducted. This survey would involve visiting nurseries to observe their facilities and to discuss propagation techniques and species lists of plants grown and marketed.

- Seed collection: The collection of seed is crucial to the propagation of plants and seed is not available all year round.
- Feasibility study: a business plan needs to be drawn up in order to look at the economic feasibility of native plant nursery creation.
- Economic benefits study: a better understanding of markets is important. Restorationists, foresters, horticulture organisations and naturalists need to be consulted in order to determine which species of plants there will be a demand for.
- Propagation techniques need to be researched thoroughly and tests should be started.
- Information packages on the co-operative model need to be supplied for interested Band members.
- A thorough analysis of the biological and ecological characteristics for a number of key species in the area should be undertaken.
- Soil and water tests of proposed sites and of native habitats within Xaxl'ep territory should be conducted.
- A synthesis of botanical, social and economic information will provide opportunities to identify the most economically efficient cultivation strategies.

The points listed for beginning a native plant nursery and the guidelines prepared by Xaxl'ep elders for development along with the principles of co-operatives seem like a daunting combination of rules to follow. Community-based development from a co-operative model, however, would result in members working together to address these issues instead of leaving them to one or two individuals. There are also a number of principles and recommendations that overlap, and as with the co-operative guidelines, meeting one will result in a step towards accomplishing many of the others. Furthermore, from my perspective the initiatives that are already being undertaken by the Xaxl'ep are sensitive to, and meet the above outlined guidelines.

Pattison (2000) writes that co-operative development takes time. Thus

communities need some kind of shelter under which they can develop. For the Xaxl'ep, co-operative development will take time as members, especially elders, feel that any development should move slowly. At a meeting in Xaxl'ep territory, the words of elder Maggie Adolph were used to express Xaxl'ep concern: "No Rush, No Damage". These words should be the touchstone to any attempts at building a sustainable working economy.

Closing Remarks

The perpetuation of cultural knowledge within the Xaxl'ep community necessitates an extensive and diverse landscape. An ecologically healthy and diverse landscape can also assist in supporting the sustainable living of the Xaxl'ep in the future. Successful economic initiatives will have the components of restoring the landscape and promoting culture. The innovative and collaborative format of the co-operative model allows for a shared approach to business planning that can be adapted to meet the needs of each community.

A native plant nursery can be a difficult and complex economic initiative. Working with native plants takes time and can be challenging. When germination experiments fail, or plants die from a fungal attack, it can be disheartening. However, watching native plants grow and knowing that what you are doing is helping the environment can be a very rewarding experience. Economic initiatives, such as a native plant nursery, are especially relevant where people are interested in finding ways to maintain a land based livelihood. There is also the opportunity for the Xaxl'ep to work within their community and outside of it to share with people their culture and heritage. This paper illustrates one of the many ways that traditional; botanical knowledge can be applied to community economic development. The Xaxl'ep have over 5000 years of continuous use of the plants in their territory. If these plants are to be utilised for economic gain than those who have generations of history working with the plants should be the principal benefactors.

Notes

[1] Stratification is the pregermination treatment of seeds to break down dormancy; this is accomplished by exposure to heat or cold, soaking or other treatment of the seed.

[2] Scarification is the process of mechanically or chemically breaking the hard exterior coat of a seed in order to facilitate the penetration of water and atmospheric gases.

Appendix 1

Potential Sources and Contact Information for Assistance in the Creation of Co-operatives

British Columbia Institute for Co-operative Studies
University of Victoria
University House 2 --Room 109
Po Box 3060 STN CSC
VIctoria BC V8W 3R4
rochdale@uvic.ca
http://web.uvic.ca/bcics

The Canadian Cooperative Association (CCA)
national umbrella organization of anglophone co-operatives provides support through a variety of services
http://www.coopcca.com/

Cooperative Association Act
Information available on how to incorporate a cooperative
Ministry of Community Development, Cooperatives, and Volunteers
http://www.gov.bc.ca/cdcv

Coopnet and COOPREFORM
programs collaborative with INDISCO to assist indigenous peoples' cooperatives http://
www.coopnetupdate.org/perspectives/persp05.shtml

International Co-operative Alliance (ICA)
independent non-governmental association which unites, represents and serves co-operatives worldwide.
http://www.coop.org/ica/

Center for Indigenous Knowledge for Agriculture and Rural Development (CIKARD) focuses on preserving and using the knowledge of farmers and rural people around the globe to facilitate participatory and sustainable approaches to development
http://www.public.iastate.edu/~anthr_info/cikard/

Food and Agriculture Organization (FAO)
initiated a new program for the training of trainers in cooperative development
http://www.fao.org/sd/rodirect/ronar496.htr

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About the Author

Kimberlee Chambers is a Masters of Science Student, in Environmental Studies and Geography. The main focus of her graduate research is to work with the Xaxl'ep First Nation near Lillooet BC on a project to develop techniques for propagation of Arrow-leaved balsamroot, or Spring Sunflower (*Balsamarhiza sagittata*), a traditional root vegetable and edible green of the dry Southern Interior of the province. Balsamroot was used extensively by Interior Salish peoples, and has horticultural potential as an ornamental and crop species. It is hoped that her research will assist in our understanding of how a plant of both cultural and ecological significance can be applied to economic development.