

WORKER PARTICIPATION IN THE REFORESTATION LABOUR FORCE IN
BRITISH COLUMBIA

by

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90

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ABSTRACT

One response to problems of low productivity and decreased job satisfaction in the workplace has been the institution of worker participation in decision-making. Evaluations of worker participation programs generally have shown them to be beneficial in terms of both job satisfaction and increased productivity.

In British Columbia, we have a unique example of worker participation in the contract reforestation labour force which can be seen as an informally structured, semi-participative worker participation group. In light of theory on worker participation, this study examines two reforestation crews, one a contract crew and one a non-contract crew, to compare worker participation in the areas of technology, division of labour and organizational structure. Worker participation has been found by most researchers to be cost effective. This study compared cost differences between the two labour groups, and although it did not generate conclusive evidence of the relative cost efficiency of the contract group, it is suggested that the British Columbia Ministry of Forests Section 88 final planting cost data is not a reliable basis for determination of relative cost efficiencies. However, the perspectives of those working in reforestation, and an economic analysis of one case study suggest that the contract group is more cost effective.

But changes in the contract work force are occurring. These changes can influence the worker participation evident in contract planting, and hence the cost effectiveness of contract planting.

In order to capitalize on those attributes in the worker participation model which have value to the forest manager in the goal of forest renewal, the concept of stewardship, a long term contract which begins with planting and carries through to the "free to grow" stage, is one of the alternatives proposed for future reforestation contracts.

FOREWORD

One fine day, in the Spring of 1981, I loaded my old Volvo with raingear, planting bags, shovel, and enough insect repellent to last three months, and headed to the interior of British Columbia to join a tree planting crew. Rumour had it that tree planting offered "big money", enough to pay for another year at university.

Well, I made almost enough money to pay my university expenses, but I gained something far more important. I became curious about the tree planters' way of organizing their workplace, which was unique in my work experience. I was keen to learn more. My undergraduate honors paper in Sociology dealt mainly with the number of planters and contractors, their age and sex, hiring practices, average daily production and wages. This study, while it was used by the Ministry of Forests in further research, (Townsend 1982) did not satisfy my curiosity sufficiently. Why did planters often seem to enjoy planting? What was it that made hard labour under difficult conditions of rain, sun, blackflies and blisters somewhat fun? Could whatever it was that seemed to be special about this group be adopted in the wider society?

In the fall of 1983, I entered the University of British Columbia, Department of Forestry, Faculty of Graduate Studies, to further indulge my curiosity. This thesis, while it answered some of the questions I asked, did not answer them all. I am still, thankfully, curious about people and societies and trees and forests.

ACKNOWLEDGEMENTS

The Canadian Forest Service very kindly funded the project. One of the province's larger forest companies was most accommodating. They provided access to their land and the opportunity to observe their planting crews at work. I very much appreciated both these sources.

The planters and contractors who participated in the interviews, and gave of their time so willingly and openly, have my heartfelt thanks. I hope that I have represented them fairly and honestly, and that something that they found valuable in planting will continue to have value. Members of the Pacific Reforestation Workers Association (PRWA), Western Silviculture Contractors Association (WSCA), and the International Woodworkers of America (IWA) are also to be thanked. They each kindly allowed me to "audit" their meetings, and talked with me at great length. Personnel from the Ministry of Forests, the United States Bureau of Land Management, the Northwest Reforestation Workers Association, contractors from Oregon, the Labour Relations Board and some of the major forest companies in British Columbia willingly gave of their time and their input is appreciated.

I would like to thank my thesis advisory committee members, Dr. Jack Thirgood, Dr. Patricia Marchak, Dr. Al Chambers and Dr. Jack Wilson for supporting me through the agony of learning "the uncomfortable wrestle with words and meanings". I am especially appreciative of having the opportunity to observe Dr. Phil Haddock and Dr. Al Chambers, whose personal integrity lights the darkness. I noticed.

I am deeply indebted to my children. Skooker, for his recent acknowledgement that his mother can do more than bake bread, and Shaney, who saw all the low points in my education process, but never thought for a second that I couldn't do it. Thanks kids, we're even now!

And my support team of friends, you know who you are, and you know I couldn't have made it past the first semester without you, nor the last semester without Lee. Thanks.

Table of Contents

ABSTRACT	ii
FOREWORD	iii
ACKNOWLEDGEMENTS	iv
1. THE WHYS, THE HOWS AND THE THEREFORES	1
1.1 INTRODUCTION	1
1.2 WHY PLANT TREES?	1
1.3 TREE PLANTING IN BRITISH COLUMBIA	5
1.4 THE NON-CONTRACT GROUP	9
1.5 THE CONTRACT GROUP	11
1.6 THEORY	14
1.6.1 Worker Alienation Theory	14
1.6.2 Worker Participation Theory	17
1.7 METHODS	20
1.8 THE MANAGEMENT OF LABOUR AND THE SOCIOLOGY OF WORK	23
2. FROM THEORY TO PRACTICE	28
2.1 INTRODUCTION	28
2.2 TECHNOLOGY	29
2.3 DIVISION OF LABOUR	31
2.4 ORGANIZATIONAL STRUCTURE	35
2.5 DISCUSSION	40
3. MORE BANG FOR YOUR BUCK?	45
3.1 CONVENTIONAL WISDOM	45
3.2 PARALLELS AND PLANTING STUDIES	48
3.3 MEASUREMENT OF LABOUR EFFICIENCY	51
3.3.1 Quality of Planting	51
3.3.2 Productivity in Planting	55

3.3.3	PLANTING COSTS	56
3.4	COST DIFFERENTIAL IN THE CASE STUDY	57
3.5	COST DIFFERENTIAL IN A BROADER CONTEXT	57
3.6	DISCUSSION	60
3.6.1	Economic Data and Real Costs	62
3.6.2	External Influences	64
3.6.3	Conventional Wisdom or Conventional Myth	68
4.	DEAD ENDS AND NEW/ DEPARTURES	72
4.1	CHANGES AFFECTING THE WORKER PARTICIPATION MODEL	72
4.1.1	Formation of Planters and Contractors Associations	72
4.1.2	Union Interest in Reforestation	74
4.1.3	Changes in Section 88 Policy	75
4.1.4	Labour Market Changes	76
4.2	THE EUGENE EXPERIENCE	79
4.3	THE CONCEPT OF STEWARDSHIP	81
	REFERENCES	83

List of Tables

Table	Page
3.1 TIME-MOTION STUDY(IN SECONDS) OF CONTRACT AND NON-CONTRACTPLANTERS IN CASE STUDY	54
3.2 PLANTING COSTS COMPUTED AS COSTS PER TREEOF CONTRACT AND NON-CONTRACT PLANTERS IN CASE STUDY	58
3.3 ONE WAY ANOVA: COSTS PER HECTARE	61
3.4 ONE WAY ANOVA: COSTS PER TREE.....	61

Figure	<u>List of Figures</u>	Page
3.1	THEORETICAL SUPPLY/DEMAND FOR CONTRACT LABOUR	66
3.2	THEORETICAL SUPPLY/DEMAND FOR NON-CONTRACT LABOUR	67

1. THE WHYS, THE HOWS AND THE THEREFORES

1.1 INTRODUCTION

This thesis is a sociological study of two labour groups, contract and non-contract, presently working in reforestation in British Columbia. Specifically, the thesis compares the two labour groups to determine differences in their work structure which might account for the supposed differences in performance and cost.

I have constructed the thesis as follows. Part I is an introduction to the rationale and policies of reforestation, a sketch of the historical development of the two reforestation labour groups, a review of the sociology and management of labour in general, and a summary of the theory and methods used in the study. Part 2 combines theory with practice, and examines evidence relevant to the hypothesis that the contract labour group uses a form of worker participation. Part 3 examines the comparative costs of the two groups, using Ministry of Forests Section 88 planting cost data, case study economic data, current perspectives and parallels with other labour groups and then discusses the problems inherent in these forms of analysis. Part 4 discusses changes in policy and labour markets and the influence of peripheral associations which can effect the worker participation model exhibited in contract planting. Stewardship, a long term contract for forest renewal is proposed as a possible option for reforestation labour.

1.2 WHY PLANT TREES?

By far the largest contributor to the economic well-being and development of British Columbia over the past half century has been the forest resource. But faced with the culmination of the forests as a gift of nature, we must now accept the challenge of ensuring adequate forest management to provide a perpetual wood supply and continued

economic prosperity.

Therefore, it is no surprise that forest management is the focus of discussion in current forest practice and policy issues. The British Columbia Forest and Range Resource Analysis, published in 1980, concluded that serious wood supply problems lay ahead. In the long run, after the virgin timber is exhausted, "the provincial supply will be approximately two-thirds of the present harvest if forest management programs are continued at past levels. In the short-run, falldown in local supplies is projected within 5-10 years in 7 out of 8 administrative regions" (Canadian Forest Service 1982: p.12).

Les Reed, former head of the Canadian Forestry Service, stated in a report: "indications are that present levels of forest renewal activity, the most important aspect of forest management, will not sustain a harvest level sufficient to fulfill future needs" (Canadian Forest Service 1982: p.47).

In November of 1983, the Canadian Forest Service declared that "this future falldown in timber supplies could be alleviated by improved forest management" and that "failure to improve forest management can result in substantial social and economic costs being imposed on future generations" (Canadian Forest Service 1983: p.iv).

The problem of the forest industry future was also addressed by the Science Council of Canada (1983), who estimated that failure to practice a higher level of management would result in "mill closures and more unemployment. Because some 300 communities derive their livelihood from logging, and the related processing industry, one result would be destabilization of much of rural Canada" (Science Council of Canada 1983: p.6).

Sten Nilsson, a visiting forestry Professor from the Royal College of Forestry in Sweden, warned in an address to the UBC Faculty of Forestry in the Spring of 1984,

that a reduction in British Columbia's allowable cut from 75 million m³ to 65 million m³ would mean a loss of 6,900 direct jobs. Recent major reports and books on the state of forestry in Canada have been published. Among these are Swift's (1984) Cut and Run, Oberle's (1979) Green Ghetto, Druske's (1984) Stumped, Marchak's (1984) Green Gold and MacKay's (1984) Heritage Lost - The Crisis in Canadian Forests.

These publications all point to a history of cumulative lack of foresight and suggest that this has brought us to the present situation of wood shortages. Increasingly, the annual meetings of organizations and agencies involved in forestry have strongly emphasized the need for more intensive reforestation in British Columbia to maintain a viable forest industry. Each presentation contributes significantly to the public awareness of forestry issues, and assists in political, social and economic awareness of the forest resource.

The current focus on reforestation opens up new areas of decision making and new questions to be addressed. What are the elements of adequate forest management? Should we reforest on all sites or only the most productive? Who will bear the financial and administrative responsibility of forest renewal? What is the most cost effective manner of reforestation? It is this last question to which this study is directed and specifically to the input of labour.

However, while labour and planting are important parts of the reforestation effort, much more is involved. Increasing forest growth and yield by intensified forest management can include: site preparation for reforestation; planting or seeding areas where natural regeneration is insufficient; use of genetically improved stock; choosing appropriate species; brushing and weeding; spacing and thinning to increase yield; pruning and fertilization; protection of the forest from fire and forest pests; more efficient logging and use of the crop; optimal harvesting and regeneration techniques (Science Council of Canada 1983: p.6). Planting seedlings is only one stage in the total

reforestation process but it is a critical stage. Planting of seedlings can help to ensure a good stand of a desirable species on the site, approximately 15 years before natural regeneration could produce it, and can provide genetically superior trees with a faster growth than naturally regenerated stands.

But planting seedlings is expensive, labour intensive work, and the difficult terrain of most planting sites in British Columbia makes the likelihood of mechanized planting remote. The greatest cost incurred in forest renewal are labour costs; approximately 70 percent of the cost of planting (Five Year Forest and Range Resource Analysis 1982-1987: p.17). Planting a hectare of forest land costs on average about \$250-350.00 and generates about 1.5-2.0 person-days of employment. (MoF Annual Report 1982-83). Given the increase in basic and intensive forest renewal projected by the B.C. Ministry of Forests (MoF), labour may, assuming the proportion of costs directed at labour remain constant, be as high as \$165 million by 1987-88. Given the importance of the forest resource, and considering that the social and economic future of the Province is at stake, it is important that reforestation dollars, the bulk of which are directed to labour, be wisely spent.

While understanding the bio-physical variables that influence tree establishment and growth and development of mechanized planting have been the subjects of research for a number of years, little is known about the labour force involved in reforestation. Yet labour is one of the major factors involved in successful plantations: "the actual planting should be done by experienced or trained crews, since the best quality stock can have low survival if poorly handled and planted" (Daniel et al 1979: p.76). The people carrying out the important task of planting seedlings in British Columbia have been described in many ways, from "a rag-tag, gypsy-like band of workers" (Mackie 1982) to "an integral part of the forest management team" (ABCPF

AGM 1983)¹. Attitudes obviously cover the spectrum, in some circles contract planters command no respect at all, while others think very highly of them, and the work they are doing. Perhaps these attitudes can be partly explained by the development of the contract reforestation labour force in British Columbia, which has its roots in the counterculture movement in North America which was particularly strong in the late 1960's.

1.3 TREE PLANTING IN BRITISH COLUMBIA

Combinations of physical, technical, organizational and social factors have contributed to the present nature of the reforestation labour force. This section describes the historical development of the planting workforce, describes the steps involved in planting, and gives profiles of the contract and non-contract groups discussed in this study.

Logged or burned forests have been planted in British Columbia since the 1930's, although areas were small at first and confined to Vancouver Island. The Sayward forest fires of 1938 emphasized the need for reforestation, as did the Sloan Royal Commission of 1956, which recommended planting to ensure long term success of sustained yield policies. However, no action was taken on this recommendation until the early 1960's, when the Ministry of Forests (MoF) announced a policy to steadily increase the reforestation effort. Planting programs have steadily increased, with the largest increase from 27 million in 1973 to 97 million in 1983 (MoF Annual Reports).

Planting is ultimately the responsibility of the Ministry of Forests on all Crown land, which accounts for about 95 percent of the forest land base in the Province. The administration of planting is sometimes done by the forest companies who hold tenure on Crown land. One study claimed that 43 percent of reforestation was done directly by the Forest Service, 43 percent was done by forest companies on Crown

¹ Association of British Columbia Professional Foresters - Annual General Meeting.

land, and 14 percent was done by forest companies on private land (Pearse 1976). The introduction of Tree Farm Licences, a form of tenure that included administrative responsibilities for reforestation in the terms of the tenure, assisted the MoF in administration of the increasing reforestation efforts. These licence obligations provided five year management plans, including reforestation obligations. The forest companies administer the planting projects. Through the mechanism of Section 88 of the Forest Act, they are reimbursed the costs they incur by a credit to stumpage (stumpage is the money logging companies pay for crown owned timber). Because the seedlings must be planted within a time period which offers them the optimal growing advantage, the season for planting in each area is relatively short (6-8 weeks). But the varying climate throughout the Province means that a staggered planting season can last from early March on the coastal sites to late July in the interior, and can often include a late Fall planting season in the northern interior. This physical requirement of the seedlings, and the increase in the number of seedlings planted in the last decade, has brought about the development of an increasingly larger, highly mobile labour force, which moves with the seasons from the coast in the Spring to the northern interior in the Fall.

It is difficult to determine whether planting is semi-skilled or unskilled work. Certainly it is not initially hard to learn; it requires an appreciation of the care and handling of the seedlings, and a degree of physical stamina and endurance. Because planters must make many subjective decisions as to the best planting spot, however, it does take a certain amount of time to become skilled enough to do the job efficiently and (in the case of piece-rate planting) make an adequate daily wage. For example some of the planters I spoke with were able to decide by the vegetation covering what kind of soil was underneath, and they thus saved themselves countless "bad strikes", looking for planting spots that were inappropriate.

In the early years, planting was done by "pick-up" crews; local people who could work seasonally. Native Indians were often employed, and according to Vyse (1974) even preferred. In periods of high unemployment, planting was an obvious area for job creation, as it had some use value, and little displacement of existing workers. Payment was by the hour. The use of contract planting (and the piece-rate method of payment in planting) began to increase dramatically in the late 1960's. Because of the seasonality of planting, the increase in Provincial planting programs, and the transfer of administration of planting projects to the forest companies,² a need was created for a large, semi-skilled, seasonal, mobile labour force. Response to this need resulted in the development of the present contract planting structure, comprised of labour contractors who enter into an agreement with the MoF or a forest company to plant trees at a set amount per tree. Those who plant for the contractors are also paid by the tree, or on the piece-rate method of payment. The mobility of this rather unique labour force can partly be found in the way in which it moves, like a band of gypsies, through the Province, staying in each area only long enough to finish the contract.

The counterculture movement of the 1960's was tailor-made to fill this labour niche. Their ideals were not compromised by planting, which was an area where they could actualize their chosen lifestyle in a working context. Kostash (1980) wrote of the goals of the counterculture as:

"Buy a little piece of land and take responsibility for your own survival, for your food and water and heat and clothing. Pay back to the earth what you owe" (p.118).

The contract planting workforce began to reflect these values. Camps served vegetarian meals, women, children, friends, drugs, saunas, and nudity became, for many observers, synonymous with treeplanters.

²The flexibility of the companies, ie: to be able to respond quickly to a more cost effective planting workforce, along with the companies taking on more reforestation responsibility contributed to the dramatic increase in the contract workforce over this time .

The contract planters gather together from all parts of the province, although there are pockets of planters in certain areas, such as the Kootenays (Slocan, Riondel, Winlaw) and Vancouver Island (Courtney, Cumberland) according to Kostash (1980). Since 1975, an increasingly large number of planters have come to British Columbia from Quebec and Ontario, responding to high unemployment in those provinces at that time. Many of the planters are illegal workers, and raids by immigration authorities on tree planting camps is a frequent occurrence. The mosaic of contract planters began to change through the 1970's to include university students, and artists, but still it could be seen as a very unique labour group. As one of the planters I interviewed put it:

"In tree planting camps, you can find every runaway from every upper-class family in Canada. I was working with one woman for two years before I found out she had gone to finishing school in Switzerland and her father owned Massey Ferguson (Contract Planter, personal communication).

More recently, planting crews have included such unique groups as the complete wrestling team from the University of Alberta, ski teams and bands of musicians.

Planters can work for up to six months of the year. They begin to plant on the coast as early as February, and move eastward as the season progresses. Planting operations close down over the warmer summer months, and then recommence with a fall planting season.

Existing alongside the development of contract planting have been non-contract planters; mainly local people hired by the MoF. More recently, the International Woodworkers of America (IWA) union has begun to target planting as an area where they can employ their membership. On the coast, where the IWA is most represented, there is an increasing number of union non-contract planters. The decline in IWA membership in 1983 was 22 percent of its 32,805 membership, the first decline since 1962 (Labour Research Bulletin 1983). The IWA, in their contract negotiations with the forest companies have stipulated that contract planters join the union before planting on land to which the forest company holds tenure and giving IWA workers the option

to planting on projects prior to contract planters being allowed to plant, and actively trying to organize the existing contract labour force.

These two methods of employing planting labour, contract and non-contract, have very different ways of going about doing the same job. The following descriptions of the two groups refer to the general planting population in the Province.

1.4 THE NON-CONTRACT GROUP

The Ministry of Forests estimates that less than 10 percent of the reforestation labour force in British Columbia are non-contract crews, paid on an hourly basis (Townsend 1982). Some non-contract workers are hired by the MoF through the British Columbia Forest Service (BCFS) who justify this method, which they believe to be more costly, as a community service (BCFS forester, personal communication). Other non-contract planters work for the forest companies on Crown land. Those who work for the forest company are all IWA members. One group are employed year round as forestry crews (hired for that specific purpose and unionized) and do silviculture work other than planting, while others are union workers, who have been employed in some other capacity but if currently laid off their permanent work can take the option to plant seasonally for the company. Some union contracts (master agreements of groups of Locals) specify that laid off union workers must be offered any jobs which become available within the forest company. These have often been planting jobs. In the Spring of 1984, a forest company on Vancouver Island closed down one of their mills, laying off approximately 300 union sawmill workers. The forest company was obligated to phone all these workers and offer them planting jobs before they could put contract workers on the site (Company forester, personal communication).

The non-contract planters usually work within daily travelling distance of their homes, therefore the number of days they can plant each year is limited, as planting can occur only over the time which is seasonally appropriate to the area. This can be

from 1-2 months, depending on the area and the weather.

Hiring is done either by the company, within the constraints of the union seniority process, or, in the case of the Forest Service, through regular Canada Manpower centres. The planters are paid an hourly wage. They are paid every two weeks, and planting productivity is not a consideration in the wages paid. These crews averaged 250-800 trees planted per day (Townsend 1982; Company forester, personal communication). The average hourly wage of non-contract union planters was \$13.40/hour without deductions. The workdays are from Monday to Friday, from 7:00 a.m. to 3:30 p.m. (Company forester, personal communication). Equipment is provided by the employer. The union planters received planting tools and bags, raingear, gloves and sunglasses, while BCFS crews were provided with tools and bags.

Supervision ratios on the non-contract crews averaged about 6 persons per supervisor. The supervisor's responsibility entailed delivering seedlings to the site, closely supervising the planters, supplying explicit planting directions and checking planting quality.

There were no existing corroborating data on the age, sex and education of the non-contract planters. I asked Company and BCFS personnel about the makeup of their crews in this regard, and specifically about male/female ratios on crews, as this seemed the most obvious difference. They reported a few isolated instances of women planters on these crews.

In all instances I observed or inquired about, the method of planting of the non-contract crews was line planting. With this method the entire crew forms a line, approximately 3 metres apart and moves forward together approximately 3 metres to the next planting spot. They follow a line ribboned off by the supervisor.

1.5 THE CONTRACT GROUP

Contract tree planters are transient, seasonal workers paid on a per-tree basis. There are estimated to be between 2500-3000 workers in this group in British Columbia although numerical estimates are clouded by the possibility of planters not completing the season, or moving between contracts. Estimates are also difficult because reforestation work is not listed as an occupation by Statistics Canada. Contractors stated that many people apply for planting jobs, but new planters are most often hired by having a friend on a crew who will recommend them (Davis-Case 1982) and those without the connections of friends have a difficult time obtaining work with a contractor.

Reforestation labour contractors are individuals or groups of individuals who have obtained contracts from the BCFS or companies to plant a prescribed number of seedlings, of a certain stock type on a prescribed site. The process of obtaining a contract usually entails a number of contractors viewing the site, reviewing the terms of the contract, and then entering bid prices of cost per tree. The contractor who submits the lowest, or in the case of the forest company it could be an "invitational" or "preferred" bid, wins the contract. There was a change in MoF policy in 1985 whereby the Forest Companies would be compensated only the lowest contractor bid in submission of their costs. This has forced the companies to either accept the low bid, or pay the difference in cost between the low bid and a preferred bidder. The successful contractor then hires or sub-contracts a crew of planters. The costs absorbed by the contractor are: viewing of the site, administration of payment to planters, Worker's Compensation Board payments, supervision costs, transportation of the planters from camp to the site, and sometimes a portion of the employee deductions. The planters absorb their own costs in planting tools, shovels and bags, clothing (gloves and boots, raingear, etc.) camp costs, and transportation costs to camps. Payment is usually given to contractors at the completion of the contract, and the planters are paid at

any time after this period. Most contractors pay the planters only after they have been paid, and there are instances of planters waiting up to five months for their wages (PRWA News: Spring 1984). Quality checks and inspections by the Forest Service or forest company supervisors are carried out and poor quality, or improper stock handling is sanctioned by fines to the contractor which are then passed on to planters, or shared by the planting crew.

Reforestation contractors must have planting experience before they can obtain contracts (Section 7:215(a) Ministry of Forests Silviculture Policy Manual). There are approximately 150 active contractors in the province at any given time (Townsend 1982). Contractors fall into three categories. (a) Contractor-operated: usually one or two crews with the contractor on site. (b) Absentee-contractor: those who employ up to 200 planters, and (c) Co-operatives: who function as a group in all phases of contract negotiations, distribution of the workload, planting and financial rewards.

The productivity of workers, and the variation in rates paid per tree (ranging from \$0.04 to \$0.50 per tree) influence the earnings of individual planters. Some experienced planters could earn (in 1979-83) \$200.00 per day, while most fell in the \$100.00 per day range (contractor, personal communication). A commonly heard expression amongst contract planters was that \$100 a day is worth while, (that is after deducting personal overhead expenses), and under that it just doesn't pay. Contract planters usually are away from home while working.

Planting sites are generally remote from communities, or physically inaccessible and require a plane or barge to access. In these instances, "tent camps" are set up. These usually consist of a cook tent, a drying tent and a sauna that are all communal, and personal tents, or more sophisticated accommodation such as camping vans. Appendix A illustrates fairly typical contract tent camps. Camp costs (cook and food) are charged to the planter, at a rate which varies from \$7-25.00 per day.

While there is some variation among contracting firms in the ratio of supervisors to planters, most contract supervisors I spoke with reported that the best ratio was 17:1. Some studies have been done on the sex, age and background of planters, and have discovered some interesting information. Davis-Case (1982) found that contract planters in B.C. tended to be between 20-27 years old, were generally university educated and approximately 40 percent were female, while Gunn (1980) in an unrelated study described contract planters in Oregon as "between 20 and 30 years old, single and college educated if not degree holders. Approximately 40 percent of the members are women." (p.154).

The workday for contract planters generally starts around daybreak. The contractor is responsible for transportation of crews from the camp to the planting site. The major daily loading and unloading of seedlings is shared by the group. Planting is done alone or in groups of two or three. Rather than work in lines, as in the non-contract group, the contract planters area plant. This entails moving back and forth in formation, ribboning off sections to direct them. Breaks and lunch periods have no set time, although generally they are as short as possible so that personal production goals can be met. The day ends at an agreed upon time, generally at whatever time it takes to arrive back in camp before dark. The days of work are flexible; with no set days off. The days off generally depend on the length of the contract, "how it is going" relative to the date the contract must be finished, and the morale of the crew.

In summary, the development of the contract and non-contract methods of labour in reforestation have been influenced by the physical demands of the seasons and seedling stock, the large areas in the province to be covered, and the semi-skilled labour niche to be filled. These factors have contributed to the development of a large, semi-skilled, transient, seasonal labour force who plant on a contract basis. The constraints imposed by unions, and the community service commitment by the MoF in

some areas, have led to the parallel development of a small, permanently located, seasonal non-contracting reforestation labour group. These two groups will provide the basis for the case study in this thesis. I will discuss them in terms of two complementary theories.

1.6 THEORY

Theories are pernicious creatures. They invariably restrict, they rarely liberate, but they do serve to keep us from leaping the walls of our imagination. In a complex subject such as the sociology of work, it is theories which generally isolate and amplify some aspects of reality at the expense of others. It is seldom the case that one's findings permit the choice of a perfect "fit" within one theoretical framework, or even to conclusively reject others. But theories, with all their restrictions and faults, are necessary.

I have chosen to examine the subject of work from the perspective of two theories. The first is a theory of worker alienation as espoused by Blauner (1964) and the second is a theory of worker participation described by Pateman (1970); Schwartz (1981); Nightengale (1975); Nightengale (1981); Murphy (1984); Katzell (1977); and Hunnius (1976). While these two theories are mutually exclusive, in many important ways they are complementary, in that if one were looking for non-alienating work environments, worker participation would be the most obvious place to look.

1.6.1 WORKER ALIENATION THEORY

The central focus of worker alienation theory is power. This theory stresses the way in which work is organized and the belief that the work process is a critical social arrangement that defines, for the large part, what it is to be human. Blauner asserted that "productive work is the expression of man's essential human nature" (1964: p.3). According to his theory of worker alienation, work processes which distance

the worker from decisions about the work environment result in alienation. Alienation has a negative value according to Blauner who assumed that "work which permits autonomy, responsibility, social connection and self-actualization furthers the dignity of the human individual, whereas work without these characteristics limits the development of personal potential"(Blauner 1964: p.11).

Conventional approaches to the study of work ignore alienation, relegate it to the remote past, or locate it in other societies or in atypical segments of today's labour force, such as automobile assembly lines. In contrast, I have assumed that some degree of alienation is a normal condition in modern society. Some jobs are, of course, better than others, and work is never completely devoid of gratifications. There are many variations in the milieu and content of work in contemporary society, but at the same time there is a striking sameness to work in that the majority of workers exercise little control over the process and purpose of their labour. This fact must be realized in order to understand work and its discontents, for the way that most work is presently structured is relatively impervious to human needs and wasteful of human talent.

Literature on the subject of alienation is profuse, and encompasses assertions ranging from the actual quality of personal experience (Baxter 1982) to programs for amelioration of the human condition (Arendt 1958; Fromm 1961; Pateman 1970). I chose to parallel much of Blauner's work on alienation because he defined it in a way that is susceptible to analysis: "alienation exists when workers are unable to control their immediate work process, to develop a sense of purpose and function which connects their jobs to the over-all organization of production, to belong to integrated industrial communities, and when they fail to become involved in the activity of work as a mode of personal self-expression"(Blauner 1964: p.15).

Blauner identified four types of alienation, each of which has a corresponding non-alienating state: Powerlessness is the inability to control the work process;

Meaninglessness is the inability to develop a sense of purpose connecting the job to the overall productive process; Isolation is the inability to belong to the integrated overall industrial communities; and Self-estrangement is the failure to become involved in the activity of work as a mode of self-expression. Blauner's thesis is that there are "powerful alienating tendencies in modern factory technology and industrial organization" (p. 16) quantified by the above four measurable forms of alienation in four different work environments: A continuous flow chemical operation; An automobile assembly line; A print shop; and A textile mill. Blauner reported that the degree of alienation, as he defined it, is correlated to the type of industry in which people work; specifically to three attributes within the industries: Technology; Division of labour; and Social organization.

Technology is defined by the nature of the product. The more standardized the product, the more amenable it is to intense rationalization of the work process, and to automation. In the industries where work was less automated and less rationalized, alienation was less marked. Associated with technology in certain industries is the ability to divide labour into specific tasks and to assign tasks to specific persons (division of labour). Blauner reported that workers in industries which had the most intense division of labour experienced greater degrees of alienation. He also found that social organization had a bearing on the extent of alienation. Industries organized along bureaucratic lines, in which the enterprise was regularly subjected to systematic rationalization and formal rules tended to replace personal considerations were more alienating than industries in which the employee/employer relationship depended on custom and past practice, or on special personal loyalties between workers and employees.

This thesis will accept the description and causes of alienation suggested by Blauner. Specifically it will subscribe to the theory that worker alienation is defined as normlessness, powerlessness, meaninglessness, and isolation, and is unequally distributed

between types of industries. But it will depart from Blauner on a very important point. Alienation not only varies between industries, but it also varies with management style. Thus alienation can be expected to vary within a given industry in which a range of management styles can be observed. This is a positive step, because it suggests that levels of alienation may change within an industry, or indeed, a single plant, recognizing constraints imposed by the nature of the industry as well as those imposed by the workers themselves.³ If, as worker alienation theory suggests, the factors of technology, division of labour and organizational structure contribute to a more or less alienated work environment, and given my departure from Blauner noted above, it follows that changes in these factors may influence the degree of alienation experienced by workers. It is these factors, especially the division of labour and organizational structure, which are addressed in theories of worker participation.

1.6.2 WORKER PARTICIPATION THEORY

Worker participation is a complex concept, although it sounds relatively simple. Often its meaning is buried under assumptions, and mistaken for one of its derivative causes or effects. Some (e.g. Hunnius 1984; Levine 1976) object to any form of worker participation, believing it to be only further attempts by owners and managers to control labour and increase profits, while others (Peters and Waterman 1984) assume without question that the existing productive process is legitimate, and that enhanced participation is a key not only to increased productivity but to the health and well-being of workers as well.

³Although, because tree planting is not mechanized, it has the potential for greater worker participation. Meissner suggested that: "work at the technically undeveloped, almost pre-industrial level, and the most advanced and perhaps post-industrial level (automation) appeared to permit the widest range of choices when it came to the integration of voluntary and necessary co-operative and communicative acts"(1969: p. 239).

Many words seem to be synonymous with worker participation; "co-determination", "self-determination", "worker control", "self-management", and "job enlargement" are some of the more popular terms. While each definition has some unique characteristics, they all broadly fall under the definition which I will propose for this study: that worker participation is the distribution amongst workers of power and decision making, along with the acceptance of a mutually agreed upon procedure for reaching decisions.

Worker participation, as I have defined it, can be measured along a spectrum of "full" to "none", and can be "formal" or "informal". Fully participative would denote that workers completely control all facets of the productive process on which they work. At the other extreme, no participation would mean that there is no input from the workers at all. Formal worker participation is when the areas and processes of participation are a legitimate part of the work structure, with a clear (often legislated or contracted) set of rules and commitments to some form of worker participation. Informal participation is where the participation is part of a tradition, often not clearly articulated, but rather "expected" behavior. The distinction between informal and formal participation has been made by Nightengale (1975).

Exploring the historic roots of worker participation reveals that people in many of the industrialized countries have pursued this concept. Common to most all is the belief that workers can organize their productive process without outside control and direction. The incidences of worker participation have been attributed to critical reactions to industrial capitalism (Gunn 1980) and to a natural extension of democratic ideology to the workplace (Pateman 1970).

Twentieth century manifestations of worker participation have been many and varied. They include Russian workers' soviets, created in the early 1900's, worker councils in Germany in 1918, the worker movement in the Basque region of Spain from the 1920's to the present, the Israeli Kibbutzim movement and Yugoslav worker's

groups that have been undergoing development and refinement for the past 30 years (Gunn 1980, Pateman 1970). More recent examples include co-determination in current German industries, where workers sit on the Board of Directors of large companies; and the Japanese industrial policy which has fostered a "tradition of participation as thinking human beings rather than as cogs in the productive machinery" (Struthers 1981: p.365). Criticisms of worker participation models have fallen into four main categories. The first is that these models require long term commitments, and yet are often regarded as "quick fix" solutions. Thus evaluation for increased productivity or job satisfaction is done before the participative programme has been fully developed, and evaluations can show some results, few results or decreases in productivity. The second criticism is that "informal" as compared to "formal" participation can work only for a limited time, and only within certain unique settings (Nightengale 1981). Another criticism comes from those who believe that worker participation without formal control of the production process by workers is another manipulation of management to get workers to work harder (Schwartz 1981). The fourth criticism is that the concept has an element of self fulfilling prophecy in it, because people are told they ought to be participative and thus their behavior in this direction is reinforced.

Worker participation, the distribution of power and decision-making in a specified way, has been found to affect productivity and job satisfaction in a positive way. A recent report on 103 experiments in the United States aimed at increasing worker productivity found that "the wider sharing of responsibility and control, sometimes called participative management, is more than just a philosophy, it usually is found to have positive results as well" (Katzell 1977: p.40). A comparative study of the degree of worker participation in six countries found that "the most positive outcomes are found in organizations which have combined a program of job improvement with enhanced employee participation in decision making" (Nightengale 1981: p.210), and that "the overall ranking of the countries confirms the belief that the amount of worker

control over the enterprise influences the levels of morale, motivation and satisfaction of workers" (Nightengale 1975: p.352). A study of ten Canadian industries with worker participation and ten "control" industries without it, found that "employees in formally participative organizations are more committed, less alienated and express greater satisfaction with their jobs and their lives in general than people in conventionally managed organizations" and that "nearly all successful job innovations in job enrichment and industrial democracy have led to an immediate decrease in worker dissatisfaction and corresponding increase in production and profits" (Hunnius 1976: p.220). And closer to home, Cottell found that job satisfaction among British Columbia loggers embodied some of the same values of worker participation:

"The dominant work values expressed by forest workers might be summarized in the word freedom. Freedom on the job included the ability to set one's own workspace, and in some cases, hours of work. It meant the absence of close supervision, so that one could exercise some choice in the use of work methods and tools. It meant being able to move around on the job and not be restricted too closely to a work station"(Cottell 1975: p.36).

This thesis will draw on both alienation theory and worker participation theory to explore the thesis statement that the contract reforestation labour group offers an example of an industry with semi-participative, informally structured worker participation. They will therefore be more productive and have greater cost efficiency than labour groups without this structure.

1.7 METHODS

The methodological approach taken for this thesis is participant observation, a research method whereby a researcher assumes the role of a participant and gathers data on a group or an organization through involvement in it. A number of features distinguish participant observation from other research methods. Among these are that the method does not require the researcher to have a clearcut research problem, or a set of hypotheses prior to doing the field work. Participant observation also allows a

researcher to observe social events as they take place in their natural setting. Finally, rather than collecting one type of data, a researcher using participant observation gathers all kinds of information which are related to the group being studied. A participant observer writes field notes, conducts interviews, collects materials such as minutes of meetings, by-laws of a club, correspondence and notices. All these materials constitute the data base for sociological analysis (Li 1981).

I chose participant observation because as a "first run" on a subject it is particularly well suited to yielding rich materials of social situations that other more tightly defined methods may miss. In particular, participant observation is a useful means of developing concepts and hypotheses, and is well suited to studying social processes within small groups in isolated situations.

Some of the decisions which had to be made before embarking on field research concerned my objectivity as a researcher and whether the planters knew exactly when and why they were being observed. The first concern, my objectivity as a researcher, has been the focus of a long process of soul searching and personal growth which continues today. I was biased towards the contract planters and all the "ideal values" that I felt they embodied. Having planted previously I was accepted as a member of that group, but was less comfortable with the non-contract planters. They were also less comfortable with me, and were clearly not used to women in their workplace. Interestingly, however, the contract planters were more suspicious of me than the non-contract planters. One of the contract planters, on hearing I was in forestry, called me a "pimp to the industry". The non-contract planters appeared to be more "impressed" with my educational status than the contract planters. To deal with my biases, I recognized them and articulated them whenever I could, and tried to compensate for them. I clearly stated my identity and my research topic, but remained rather vague about the focus of the study.

The geographic area which offered examples of both contract and non-contract groups, and in which planting conditions and other bio-physical variables were relatively consistent for both labour groups was southern Vancouver Island. The forest company, hereinafter disguised as the South Island Forest Company, was chosen because it employed a number of crews of both labour groups being studied. This Company indicated a willingness to participate in the study, and relevant data from the MoF were readily available in the Regional office in Vancouver. The field study took place between February and May 1984. In total, three weeks were spent on the worksites, interviewing and observing the two groups during work and after work. Interviews were conducted with approximately 30 people in various situations; at the worksite, during dinner and lunch breaks, in the beer parlor, chopping wood, driving to and from the worksite and at almost every stage in their daily cycle. Six hours of videotape records were collected on both groups at the worksite for future reference. These tapes are presently being used by the Kinesiology Department of Simon Fraser University to study the body movements of planters.

In addition, interviews or correspondence with 61 persons other than those in the field study groups were a part of the investigative method. Among these were Forest Service personnel, forest company and silviculture foresters, union officials (IWA), Worker's Compensation Board and Labour Relations Board personnel, contractor and planter Association (WSCA & PRWA) members, and contractors and planters in the non-contracting season. A trip to Eugene, Oregon in April 1984 to interview members of three reforestation companies, officials from the Northwest Reforestation Workers Association and officials from the Bureau of Land Management (BLM), was also undertaken as part of the study.

Correspondence was initiated with district offices of the British Columbia Forest Service, with four University forestry schools, and two graduate students working in reforestation labour in South Carolina State University and Cornell University in the

United States.

1.8 THE MANAGEMENT OF LABOUR AND THE SOCIOLOGY OF WORK

Work is a central part of most of our lives, and, some would say, it defines our other social relations as well. On the one hand, the sociology of work attempts to cope with the practical problems of how to organize the work of human beings as efficiently as possible in light of the goals of those doing the organizing. On the other hand it attempts a critical analysis of the organization of work which is believed to have an end point in politics. Consequently, the "audience" of the research can establish the way in which the research will be structured, and the kinds of questions it will ask.

Any social investigation must first ask the question of how little or how much it can assume about the nature of human beings. Often, untested assumptions have preceded investigation and closed off avenues of inquiry. More seriously, they have constrained interpretations unnecessarily. While no sociologist can avoid using some assumptions about human nature (my own humanist perspective is fairly obvious), it is important that we make our conceptions as openly clear and as transparent as possible, since each "assumption" is in itself socially constructed. Instead of assuming that we are naturally labouring creatures, or self-interested, inherently aggressive or territorial, co-operative or competitive, we may be better advised to assume we can be any of these, depending on the social and environmental situation.

Generally, work has been studied under three paradigms each of which hold underlying assumptions about human nature. These three paradigms: "scientific management", "human relations" and "empowerment" have provided the framework within which work has been studied in the post industrial period.

Frederick W. Taylor, a popular theorist in the 1900–1920 period, was the first to propose the concept of what has been known as scientific management or Taylorism.

Scientific management assumes about workers that (a) People in their natural state are unorganized, and they require supervision to be productive; (b) People are primarily motivated by self-interest, so management must sublimate this self-interest for work to be useful to the organization; and (c) People make decisions rationally, by carefully calculating the advantages and disadvantages of their options in terms of overall goals. Under the paradigm of scientific management the task of management is seen to be to carefully supervise and control workers to meet production goals (Miller 1981).

Those who practiced scientific management argued that to refine the division of labour to the ultimate degree of detail would provide maximum output at lowest cost. Each task in the organizational process could be fragmented, a chain of these fragmented tasks resulting in the total process. If each phase or fragment of the total of the total process were easily learned, individual workers could be easily replaced (Marchak 1979).

Within the school of scientific management work structures which are hierarchical and coercive, and which give workers as little control as possible are necessary. The only motivation and rewards for work are self interest, which is generally equated with money. And there is evidence everywhere that the assumptions of scientific management are true. Many workers seem to be concerned only with their paycheques and many slack off when control is loosened. Thus the assumptions about the workers held by those in the scientific management school are supported by everyday experience and they are pervasive in that they are often held by workers, management and union representatives alike.

Scientific management techniques are even today a regular feature of much of production. And yet, even with the most refined techniques, productivity is still problematic. Criticisms of scientific management are that skilled craftspeople and highly individual talents are viewed as unimportant contributors to a production process, that hierarchical organization and tight, detailed supervision can preclude or destroy working

groups of interdependent members (Marchak 1979).

It has become necessary to re-examine these assumptions as workers have resisted scientific management techniques over the past 65 years. The most conspicuous form of resistance has been the strike, but equally as damaging to management objectives have been worker sabotage, work to rule and absenteeism (Burawoy 1979). Most researchers who have observed shop floor behavior have recounted instances of these three worker responses and resistance to management techniques (Miller 1981; Burawoy 1979).

Although many instances of scientific management are still apparent in industrial settings, their viability has been challenged by those supporting the arguments of the Human Relations paradigm. Elton Mayo and a team of Harvard researchers inadvertently discovered during a study of lighting at the Hawthorne plants of the Western Electric Company in the early 1930's that productivity increases were affected by informal group pressures. This led to a series of enquiries into the nature of informal groups and the reasons for their development (Marchak 1979). In recognizing and encouraging the sentimental ties and emotional needs of workers to belong to a group, it was thought that the productivity goals of management could be better met. The assumptions about workers under the Human Relations paradigm is that they work for reasons which are not only economic but social and psychological as well. Within this paradigm the atmosphere of the workplace is ideally one of mutual consent and association in which workers can achieve personal satisfaction and build meaningful relationships, in addition to making a living.

Criticisms of the human relations school has come from a philosophical critique and from information that production increases gained through manipulations of group structure have not been as large or as steady as anticipated (Burawoy 1979). Another major criticism was that it gave precedence to the group over the individual (Marchak 1979). Miller (1981) challenged the Human Relations paradigm for claiming that

although workers do have enhanced needs other than monetary ones, they are still incapable of directing themselves. Miller compared the relationship of the employee/employer under the Human Relations paradigm to a parent/child relationship, where management must always be there to direct the children to adopt the managerial attitude, and to curb their tendencies towards sloth, excess and misjudgement.

Marchak (1979) related that one of the unexpected effects of encouraging work groups was that the groups "would establish themselves so as to achieve a minimum level of production required by management and a level required to maintain their social needs" (p.177). The same problem was found in a study of workers in an industrial manufacturing setting. The workers had established a group acceptance of restriction of output (Burawoy 1979). Group studies of work settings were prodigious during this period, and yet there was always the problem of atypical groups, but they did not indicate what the role of the group was, or if it was related to workers' satisfaction. The link between group dynamics and productivity also failed to materialize (Marchak 1979).

The Empowerment paradigm is a current popular theory about work and workers. Popular concepts of "self-determination", "co-determination", "employee participation", "worker control" and "worker participation" are appearing in popular publications, such as the Harvard Business Review, Canadian Business, and a recent management guide, In Search of Excellence (1984). Murphy (1984) and Gunn (1980) showed that worker participation and control in the current economic crisis in the United States is no longer an "aberration or a fantasy of a political minority. Instead it has bipartisan support in congress" (Murphy 1984: p.54). There are approximately 500 enterprises in the United States who espouse some form of worker participation according to Gunn (1980), who argued that a necessary condition for successful and long-lasting worker participation is policy support from government.

Assumptions about human nature under the Empowerment paradigm are that workers want to "self-actualize", that workers generally prefer to exercise self-control and self-discipline at work, and that this occurs spontaneously if they are "allowed to contribute creatively to organizational problems in a way which enables them to meet their need for self-actualization" (McGregor 1960).

But as do Scientific Management and Human Relations paradigms, the Empowerment paradigm also has some inherent deficiencies; it also locks itself into assumptions about human nature. In practice, each of these approaches has "worked"--- sometimes for management in the form of increased productivity, and sometimes for workers by increasing job satisfaction. But this is partly because each have qualities of self-fulfilling prophecy. Each is derived from value-based assumptions whose advocacy can bring about what was first claimed or pretended to be inevitable.

When it is seen that basic (often undeclared, and untested) assumptions can generate whole traditions of management styles and techniques, and when it is seen that the effects of these techniques are often evaluated at a time when "self-fulfilling prophecy" is in effect, one must realize that the most social researchers can do is assume that workers are complex products of their social and environmental milieu. Operation within any "paradigm" that denies this multiplicity of human nature and motivations is impoverished in attempting to make sense of the social world.

Nevertheless, worker participation falls most easily into the empowerment paradigm, and is one of the theories of work which is presently being heralded as the new management technique.

I will now examine the contract and non-contract labour groups of the case study, to see if worker participation as described in theory, is present.

2. FROM THEORY TO PRACTICE

2.1 INTRODUCTION

Worker participation can be detected by examination of the areas and ways in which workers make decisions with regard to their work environment. Part 2 will examine theory as it relates to a specific case study of reforestation workers employed by the South Island Forest Company in the 1984 season to compare worker participation in the contract planters to worker participation in the non-contract planters. Meissner suggested that the range of possible areas where workers can legitimately interact and influence their work environment in this way are limited by technical constraints. However, since both groups in this instance are subject to the same technical constraints and fall into the "technically undeveloped, almost pre-industrial level" (Meissner 1969: p. 239), where there are many options available for decision making by workers, both contract and non-contract planters have equal potential for access to the areas of decision-making. What limits their participation is not the technical constraints but an "attitude" by both worker and managers in perceiving the possibilities for decision-making available to the workers.

In order to know the extent to which the contract group can be categorized as worker participative, the two groups will be compared, in terms of areas and degree of decision making on the job, to their counterparts in three areas; technology, division of labour and organizational structure. Although the sample size is small (31 in the contract crew, and 7 in the non-contract crew) and was not a random sample, but chosen by the South Island Forest Company (who considered ground, stock and contract and non-contract labour groups in assigning me to these crews) it can serve as a beginning point for exploration of this subject. The South Island Forest Company personnel have suggested that these two crews were fairly typical of other contract and non-contract crews. Therefore, while the findings of this study are suggestive of

applicability in a broader context, this should be done with caution, and with the appropriate qualifications.

2.2 TECHNOLOGY

The technology for both the non-contract and the contract groups is similar and relatively simple. What distinguishes the groups technologically is ownership of the equipment, and the development and refinement of even this basic technology of bags and planting tools by the contract group.

The non-contract planters used the equipment provided by the company. This equipment (bags, mattocks and other extras such as raingear, gloves, hardhats, sunglasses) were maintained by the supervisor. The non-contract group all planted with mattocks, and all had two-bag, waist-cinched planting bags. The mattocks were kept sharpened by the supervisor and dispensed to the workers on a first come, first serve basis. In the one instance in which I observed the workers receiving sharp mattocks from the supervisor, they appeared happy to get them, anxious to work with a mattock that suited them and one that they might have had before. They practiced swinging them back and forth and tried to remember which had "felt best" before.

I asked the planters why they didn't sharpen the mattocks themselves, since it made their jobs easier (the sharp mattock cuts through the grassy sites better) instead of waiting for the supervisor to get around to it. They replied that it wasn't part of their job description.

In the contract group, where the equipment was owned by the planters, there was quite a different attitude, and different equipment. All but one of the 30 planters were using shovels on ground that was very similar to that which the noncontract group were planting with mattocks. The shovels (spades) were of various sizes and designs, although all had long blades to accomodate the large (2 + 1)⁴ stock being

⁴ The 2 + 1 stock refer to stock which has been grown 2 years in the initial

planted. Although members of the contract planting crew bought basic stock shovels from a silviculture outfitter, they often modified them to suit their height and planting style. The shovels were sharpened around the air-tight stove in the evenings and at these times I heard many discussions about the advantages and disadvantages of different shovel designs, such as the tempering of English steel, shock absorbency of wooden handles and weight reduction that resulted from having a custom made shovel with one kick plate.

Nineteen of the 31 contract planters had four-pouch planting bags, with waist-cinch and planting harness. The remainder had three-pouch bags. The advantage of having more pouches was that less time was spent "bagging up", or returning to the landing for more trees. One of the planters told me of his new design for planting bags made of heat reflective material with heat reflective covers, which were quickly removable from the waist cinch so that they could be stored close to the planting area and did not have to be carried all the time.

One of the considerations of the contract planters in terms of the design of their equipment was that it cut as many corners as possible to allow production rates to be as high as possible. Another consideration was the health of the planter. For example, some planters had rubber "washers" in their shovel handles, between the steel and the wooden handle to help absorb the shock of the ground, and thus reduce the risk of irritation of the tendons of the forearm (tendosynovitis). Four full planting bags weighed about 45-50 pounds, and the clip-on, heat resistant pouches had been developed to alleviate the problems that could develop in the planters body from the extra weight of four-pouch bags.

With this relatively simple technology, the comparison between the two groups shows that members of the contract group decide which equipment to use, and they often design it themselves. Within quality of planting and health considerations they

 4(cont'd) medium, and one year in subsequent medium.

have considered ergonomic factors⁵ to produce equipment which will give them an "edge" in increased planting productivity. On the other hand, members of the non-contract group have decisions concerning equipment made for them.

In the area of technology the differences discussed suggest that the contract planters have available to them more worker participation options than members of the non-contract group. That they have available to them the option to design and modify their equipment has given them a productivity edge which the non-contract group do not have, and it has also given them an area where they are making basic decisions about the most fundamental aspect of their work environment, the equipment that they use to get the job done. In addition they believe that their modified equipment is safer to use, and this may be the case.

2.3 DIVISION OF LABOUR

The systematic manner in which the operations of workers and machines are assigned to individual employees as work tasks is referred to in general as division of labour. The rational calculation of tasks has been successful in increasing productivity in factory settings, but this refinement also removes many of the areas in which workers could make decisions. In this particular instance, since both kinds of workers perform the same job, division of labour could, theoretically, rationalize the work to some extent, and yet I found that the two displayed very different divisions of labour, and therefore different options for worker decision making. The form of the division of labour (ie: flexible vs. rigid) reflects the form of worker participation (ie: the options available for worker decision-making). Because of this, research into the division of labour must go beyond just looking at who does what, to who decides who does what. I will use the examples of loading and unloading boxes of seedlings, and root pruning to show differences in division of labour between the two groups.

⁵ The study of machine-body interactions.

The members of the non-contract group were not responsible for loading and unloading boxes of seedlings, a job that was done daily. This was the supervisor's role. At the beginning and end of the day, when this task was performed the planting crew watched the supervisor, and waited for him to finish. I asked them why they didn't help him, and they all laughed, and one of the planters said, "Hey, we're planters, we can't do an important job like load boxes".

The members of the contract group showed a less defined division of labour. In the morning, they stop at the seedling storage building (reefer) to load up the trucks. Loading was done by all members of the crew. It was organized in a "bucket brigade" manner, and took 8-10 minutes to load about 28 boxes. The afternoon unloading was done by each small satellite crew as crews arrived at the reefer area at different times. The planters carried the boxes from the truck back to the reefer separately on these occasions, probably because there were not enough people to make the fire brigade organization practical. The supervisor was not always present at loading times, but it was his responsibility to tally the boxes at the end of the day. He then would announce totals at the dinner table, amid groans or cheers.

This comparison shows that when the division of labour is flexible, different ways of organizing work tend to emerge which are specifically geared, under different conditions, to get a task done as efficiently as possible. Workers under strict role structure and more rigidly defined division of labour do not have this option available to them. Even if they think of ways to work more efficiently, there is not a structure available for their input. Another instance which exemplified the differences in division of labour was found in root pruning.⁶ The contract group shared the task so that each morning it was somebody else's turn to do this job. In the non-contract group, it was the supervisor's responsibility.

⁶This is the cutting of the roots of the seedlings if they are too long, so that "J" or "L" shaped root form do not result in structural problems in future tree growth. This must be done with a sharp instrument, such as a machete.

I observed the non-contract group root pruning twice. The supervisor did it both times; once when the crew were out planting, and once during the day when the crew had run out of pruned seedlings. In the latter instance the crew had a "smoke break" and watched the supervisor prune the roots from a box of seedlings, a job which took about 15 minutes. The crew then bagged up and returned "back to the line".

In the contract group on three successive mornings, root pruning of all seedlings was required. Three different planters performed this task, while the others were loading their bags with seedlings. Two or three other planters would jointly "bag up" for whomsoever happened to be pruning roots that day. The crew then all left the landing at approximately the same time.

I conclude that a work structure in which the division of labour is inflexible allows fewer opportunities for workers to make decisions about who will do what. The non-contract group appeared to have a very defined division of labour, and defined role structure and this limited their options for decision-making in this area, and thus their chances of being as much a model of worker participation as the contract planting group. On the other hand, members of the contract group, because the division of labour, and role structure was more flexible, had the opportunity available to them to make decisions about how some of work would be divided. When it was time saving to share a task so that the whole crew could work more productively, they chose this option. It seemed to me that a group spirit was fostered in the contract group by this sharing of tasks, although I wondered about the compliance implicit in this arrangement. Were those who did not "take their turn" at the jobs that required group co-operation be socially sanctioned by the group? In the same way, I could not help but think that any of the non-contract crew who might help the supervisor in performing any of his tasks might also be sanctioned by members of their work group.

Worker participation theory and alienation theory state that highly rationalized and rigidly structured division of labour takes basic decision making away from workers, at the expense of the workers' dignity, and eventually at the expense of work productivity. These examples of variation in the form of division of labour in contract and noncontract groups have shown that the contract workers make more decisions about the division of labour within the group, about when it is appropriate to divide up the work, and about when this is not appropriate. Always in the background in the contract group is the clear goal of productivity gains.

Where the "rules" allow workers even minor decisions in dividing up work tasks, where the atmosphere is supportive of co-operative behavior and the goals are clear, both efficiency and work satisfaction can be accomplished. Where the "rules" do not allow workers to help each other; especially workers at different levels in the hierarchy, to divide up their work in whichever way works best at the time, then the only way the workers can influence a large part of their lives, and maintain some personal efficacy, is in non-productive behavior, such as purposely not helping when that would be the most appropriate action to take.

In the contract reforestation labour group, division of labour appeared to be flexible, and the "rules" support co-operative group behavior toward a definite goal, daily productivity. This contributes to the actualization of the goals of both the contractors and the planters. In the non-contract group, the division of labour is well defined, and pre-defined, and the "rules" support the rigid adherence to this division of labour. This tended to result in instances of inefficiency and what would seem to be the opposite of the objectives of the division of labour. When rationalized work structures are inflexible and cannot respond to specific situations, they are sometimes inefficient.

2.4 ORGANIZATIONAL STRUCTURE

The trend in industrialized society toward increasingly mechanized technology and more rationalized or sub-divided work tasks also included a shift in social organization from traditional to bureaucratic principles (Burawoy 1979). In traditional work organizations the rules of employment relationships depend on custom or past practices and on special personal loyalties between workers and employees. In bureaucratic organizations, the rules are subject to systematic rationalization and formal procedures tend to replace personal considerations. What is evident in our society at the present time is a co-existence of both forms of organizational structure.

Blauner (1964) concluded that workers within the more traditional form of organizational structure were less alienated than those in the bureaucratic organizational structure. Worker participation theory suggests also that a "flat" (ie: non-hierarchical) organizational structure will tend to foster more equitable distribution of decision-making and power amongst workers. The reforestation workers I studied presented two very different styles of organization. The contract planters tended to have the characteristic attributes of the more "traditional" model while the non-contract planters presented the more bureaucratic form of organizational structure.

I will illustrate these differences in organizational structures by comparing the decision-making process regarding work scheduling, planting methods and pay rates.

Generally, in the industrial model of work, even the smallest decisions at the work site or on the plant floor, are made by the specialists, the managers or supervisors and the union negotiators. At this point, a distinction must be made between legitimate and illegitimate decision-making. I propose that legitimate decisions are those which are recognized, supported, and agreed upon areas in which the worker has a claim, recognized by formal or informal rules, to take part in the decision-making process. On the other hand, illegitimate decision-making is that which is made without the agreement of the whole organization. Although it may be agreed

upon amongst workers that they are responsible for decisions in certain areas, such as daily quotas, this decision is illegitimate unless it is known and supported by "management."

Work scheduling offers many examples of different decision-making processes in the two groups. The work days, work hours and breaks are determined for the most part by the workers in the contract group, and by the union/management in the non-contract group. The hours are set by union/management negotiations, and both the worker and supervisor adheres to them. Members of the non-contract group rigidly apply the "hours of work" which are set. If the crew I observed reached the rallying yard early, they sat in their vehicles and talked and smoked until precisely 7:00 a.m. Similarly, quitting time was precise, with the scheduling of work towards the end of the day oriented towards "quitting time."

Scheduling of work days differed considerably between contract and non-contract crews. The contract planters worked on a schedule that did not regard Sundays and statutory holidays as distinct from any other days. Days of work on this crew were negotiated informally between the supervisor and the workers. The contract crew I observed generally worked between the hours of 7:00 a.m. and 4:30 p.m. However, I did observe one example of the flexibility in these hours when the group decided, by consensus the night before that they would all sleep in an extra hour in the morning, and work an extra hour at the end of the day. ⁷ The supervisor was advised of this decision and agreed, with the provision that they "just get the trees in."

Union/management negotiations were again the basis of the lunch and break periods of the non-contract planters, and these times were strictly followed by planters and supervisors. On two instances I observed the crew (who all took their breaks at the same time) walking back to the crew truck with partially full bags of seedlings, over ground that had yet to be planted, to take their coffee breaks. The supervisor

⁷This was precipitated by a friend/planter arriving in camp with two bottles of brandy.

told me that he made a point of being on the site over the break periods, and being there 10 minutes before the lunch break to make sure that they didn't take their lunch breaks early or take more than the allotted time. He would rap on the side of the crew truck as soon as the lunch period was over. The supervisor and the crew did not eat together, the supervisor taking his lunch alone in his truck and the planting crew in the crew truck. The supervisor told me that the lunch breaks and coffee breaks were not "company time" and it would not be appropriate for me to question the workers at these times, nor for him to ask them to give me that time. I ate my lunch alone, within sight of the crew truck, for three days before they asked me to join them in the crew truck.

I observed an example of an "illegitimate decision" by the non-contract workers on my fifth day in the field. The supervisor had been called back to the office to attend to some business just after lunch. Although I always travelled with him, and he asked me to accompany him back to the office, this time I assured him that I would be fine, and would continue observations for the afternoon. By this time, the planters (all but one who never spoke to me), were comfortable with my presence. They spoke freely about their jobs, their families, and their attitudes about work in general. Shortly after the supervisor left, there was a dramatic increase in planting activity alongside the road. After about fifteen minutes of this, they told me to turn off the camera, it was coffee break!

The coffee break lasted two hours, and it was at this session that I obtained my richest ethnographic material, as they told me stories about their work habits, how they "got back" at the supervisor, and their attitude to their work. At one point in the "coffee break" I nervously jumped to attention upon hearing a far off rumble, and they broke into laughter and told me that it was an airplane, and not to worry, they could tell from ten miles away whether the supervisor's truck needed a tuneup, and there was enough time to "look busy" again. The co-operation and organization

they had exhibited in their "illegitimate decision" to take a break suggests that these workers are able to make decisions about their workplace, and if this is not available to them in a legitimate form, it may surface in an illegitimate form which may be counterproductive to work objectives.

Scheduling of lunch and coffee breaks also differed between the contract and non-contract crews. The breaks of the contract crew were decisions of teams of workers, and breaks happened serially all through the day. When I asked several of them how they decided when to break, they indicated that breaks were taken at the cumulation of goals rather than at set times. Their answers took the form of "I try to get a certain area completed before I have my lunch"; "I do three short runs and then have coffee"; "I take breaks to reward myself and give me something to shoot for". I observed one instance in the contract group that I at first thought was an illegitimate "decision", but that turned out to be a legitimate option open to the planters. One planter worked from 7:30 a.m. until 10:00 a.m., and then went back to the truck and slept until the late afternoon. That evening at dinner he was teased by the supervisor and other planters for imbibing too much the night before. This acceptance of his behavior would give it legitimacy.

Decisions about how and where to plant were also handled differently by the two crews in the case study. Two very exclusive "styles" of planting had developed in each group, and the way in which planting areas were assigned to workers was authoritarian in the non-contract crew and negotiable in the contract crew. The non-contract crew worked together in one small area of the planting block, and when this was complete they all moved to the next small area. They planted in a line, approximately three metres apart, and the line moved progressively through from one end of the area to the other. Not only were the non-contract planters told precisely how far apart from each other they should hold the line, but also the order of individuals within the line was established by the supervisor (the supervisor told me

that he did this to separate the "talkers").

In contrast, members of the contract crew organized themselves into teams of two or three. It was decided within the team how the area would be covered. All the contract planters I observed "area planted"; that is they planted in a zig-zag manner rather than following a straight line, which is "line planting" ⁸. The assignment of areas within the contract group appears to be decided by a form of group negotiation and direct commands. Although the supervisor or crew leader would tell each team where they would plant, this could be altered by negotiation if a team were unhappy with the assignment. In one instance, a team complained about the assigned area, "Isn't it about time we got some cream (easy ground), we've been working in the shit (difficult ground) for two days now, and we're not making any money". The supervisor told them he would move them to some "good stuff" the next day. On two instances, I observed the supervisor and members of the contract crew studying maps together in the cookshack after dinner. The supervisor told the planters what he had planned, and these plans were discussed. On one occasion, a decision about "who would go where" (the crew were split into three sub-crews and one was working about three miles from the other two crews) a planter said to the supervisor, "Why don't we all go in and help them finish off this block in the morning, and then get together on the good stuff in the afternoon". The supervisor replied, "Yeah, right, I'll get the next batch (of trees) up to you by noon".

Finally, in decisions about rates of pay, where it may be thought that there would be little room for decisions to be made by the workers, I observed differences between the groups. The rates of pay within the non-contract group are not negotiable on an individual level; union and management have this decision making power. Once these decisions are made, the hourly rates of pay are binding for the period of the

⁸However, new contract planters are often taught spacing by line planting for the first few days.

union/management contract. The per tree rates for the contract crew are set at the beginning of the contract, and in one instance rates of pay were negotiated between the planter and the contractor even after they were established. The incident was precipitated by the contract crew being shut down for a week because of snow, and returning to work (some from as far away as 200 miles) only to be shut down again after one day of planting. A meeting was called in the cookshack after work by one of the planters, and, by consensus, the 30 planters decided they would approach their supervisor and ask him to negotiate with the contractor for compensation for shut down, either in the form of a hardship bonus or an extra (retroactive) amount per tree. When the supervisor arrived back in camp he told the meeting that he had realized there was a problem, and had already phoned the contractor, who was prepared to offer them compensation of an extra 0.02 per tree, retroactive to the beginning of the contract. The planters discussed this and accepted the offer.

The decisions workers make about organizing their work schedules, the ways in which they are able to organize within their working groups how the work will be accomplished, and the rates of pay, are all areas where the contract planters make decisions. This is especially clear in comparison with the non-contract workers' organizational structure. Worker participation theory suggests that flat, traditional organizational structures are more conducive to workers' participation in decision-making within the work environment. The non-contract group, on the other hand, with an hierarchical, industrial organizational structure, gave few options for decision making on the part of either the workers or the supervisors.

2.5 DISCUSSION

In summary, while the same number of options for decision making, theoretically, were open to both crews, the contract crew exhibited more worker participation in decision making than the non-contract crew. In examining decision making processes in three

main areas, (technology, division of labour and organizational structure) it was the case that the contract crew made decisions in each of these areas while the non-contract crew did not.

This is not to say that the contract crew made decisions about all facets of their work environment. There are many, many instances of areas in which neither crews were allowed input. For instance, they do not establish the quality of planting standards, the type of stock to plant, the criteria for care and handling of seedlings, the contractors capital expenditures, or in most instances the hiring of planters.⁹ I did not observe a single instance in which the non-contract planters made legitimate decisions about their workplace. However, this is not to say that the non-contract planters were incapable of making decisions. or that they made none. The illegitimate decisions that I observed in the non-contract planting crew shows that they can make organizational decisions concerning their workplace, and although the goal is often counterproductive, this need not be the case. The incidence of illegitimate decision making may also indicate that workers are using this release mechanism to lessen feelings of alienation, especially powerlessness.

There are two qualifiers to the acceptance of the contract crew as an example of worker participation. The first is that it is semi-participative in that there are areas where workers input is neither acknowledged nor welcomed. For example, in the contractors' negotiations with the company regarding bid price and duration of contract, the workers had no input. The second qualifier is that the contract group was an informal form of worker participation. There were no explicit rules, either written or even easily articulated concerning the areas of decision making open to workers. When I asked the workers about how they knew how to operate in this work setting the

⁹Some contractors and supervisors hire friends of those already on the crew, thus ensuring a fairly homogenous work group and a steady supply of recommended workers. In these instances, the contract workers are sharing in the decisions of whom to hire. In the contract crew, there were four crew members who had been hired in this way for the season.

answers all referred to "tradition," with experienced planters influencing the green crew members to the "way things were done." In this way, it seems, the concept of worker participation has been carried on from year to year.

It could be argued that the union had collectively made the decisions for the non-contract workers, and this is a form of collective worker participation. That would be a valid argument if the unions truly represented the workers. However, when I asked the six unionized workers about their interactions with the union, only one said he was involved, and he had only been to two meetings in four years. One other had used the union once for a grievance and felt it had been effective for him. They did not agree that the union was effective on getting them higher wages, arguing that the strike losses never covered the wage gains.¹⁰

It could also be argued that the "choices" of the contract group are not real choices, because the peer pressure to make the "correct choice" allows no alternative decision. For example, scheduling hours of work would be difficult if only one person decides to sleep in and work an extra hour later in the day. This decision would no doubt be vetoed by the group because of transportation problems when they all travel together to the site.

The method of payment is also a confounding factor in the examination of the two crews to determine worker participation. One of the criticisms which can be leveled at this study is that it has overlooked the obvious motivator to work, piece-rates in the contract group, and this might, in fact, be the case. However, I would like to relate why I have chosen against what would seem to be the most obvious answer. First, when there is an obvious potential answer, looking further for other questions and other answers is often neglected. Looking beyond the obvious has, in this instance, been a fruitful endeavour. Second, in many ways piece-rates serve not

¹⁰ It should be noted that the union which represents these workers presently has a quality of work pilot project on Vancouver Island, which was begun in 1983, and will soon be evaluated (IWA representative, personal communication).

so much as money incentives to work, but as clearly attainable goals upon which workers can focus. Third, the planters I interviewed considered their piece-rate daily wages to be less important than their lifestyle, than the fact that they perceived themselves as being their own bosses, than their conviction that planting was ideologically correct and in line with their political beliefs. Burawoy (1979) discusses piece-rates as a game:

"It is not so much the monetary incentive that concretely coordinates the interest of the management and the worker but rather the play of the game itself, which generates a common interest in the games outcome and in the games continuity" (p. 85).

However, this "game" is also described by Burawoy as detrimental to workers:

"workers are not sufficiently strong and well organized to enforce restriction of output. Instead they are compelled to compete with one another in producing at an even faster rate, and this stimulates management to cut piecework prices. The piecework game becomes a self-defeating spiral of labour intensification unless it is stabilized by operators transforming the rules and restricting competition. Workers find themselves in a prisoners dilemma: what is in the interest of the individual worker - the maximization of output- operates to undermine the workers' collective interest, higher piecework prices" (Burawoy 1979: p.86).

Piece-rates may well influence contract planters in ways which I have not examined, nevertheless, I have chosen to see piece-rates as providing clear, easily communicated goals which focus decision-making. Nor can I overlook the possibility that because responsibility for productivity is built into the contract system it would tend to make the planters want to make decisions that increased productivity. On the other hand, it might be the case that the non-contract planters would not have the incentive to make decisions about the workplace when a time reduction would accompany productivity gains. Thus it may be irrational to be a part of decisions that increase productivity.

Nevertheless, there is no doubt that worker participation, defined as the distribution amongst workers of power and decision making, along with a mutually agreed upon procedure for reaching decisions, is well developed in one contract crew

of the South Island Forest Company, and not present in a non-contract crew of the same company. By degrees, worker participation in the contract crew must be described as semi-participative and informally structured, but it is almost absent in the other crew.

It should follow that contract labour crews described in this one instance as a worker participation group, (but said by the forest company to be a fairly typical contract crew) would be more cost effective than non-contract crews, (also described as fairly typical of non-contract union crews) and who are not worker participative. Part 3 compares the cost effectiveness of the contract and non-contract groups by using four methods: informed sources, parallels with other similar work situations, cost data from the case study and data from the MoF Section 88 total planting cost data.

3. MORE BANG FOR YOUR BUCK?

Because it is a form of worker participation, according to the argument presented in Part 2, the contract method of labour should be more cost effective as suggested by Katzell (1977); Nightengale (1981); Hunnius (1976). In this part, I will test this prediction by comparing the cost effectiveness of the contract group relative to the non-contract group. I will explore cost efficiency in four ways; by collecting viewpoints of people who work in reforestation; by looking for parallels in other areas and similar studies; by estimating labour costs in the case study; and by analyzing the planting labour costs in four districts on Vancouver Island over a three year period.

3.1 CONVENTIONAL WISDOM

Throughout my investigations, I heard many different and often contradictory viewpoints on the subject of relative labour effectiveness between the contract and non-contract labour groups. While it is easy to imagine that some of the viewpoints could be based on vested interests or shared fallacious beliefs, there would seem to be some element of validity in each of the viewpoints. These viewpoints were solicited by formal and informal interviews with contractors, planters, International Woodworkers of America (IWA) officials, forest company, forest service (BCFS), and Ministry of Forests personnel, University Forestry professors and research silviculturists. Where interviews were not possible, correspondence was initiated with the Canadian Forest Service Regional Silviculture offices, the Ministries responsible for Silviculture in Manitoba, Saskatchewan, Alberta and Ontario. The Forest Service District silviculturalists, reforestation companies in Oregon, and forestry graduate students working on similar projects are also included. Altogether, I interviewed or corresponded with 61 people, and what follows is distilled from that sample.

These comments were given in response to a question concerning the comparison of contract and non-contract groups regarding their relative efficiencies, especially in

terms of productivity and cost.

"We (the Forest Service) experienced higher costs and poorer planting quality when we hired planting crews at an hourly rate. Also production only averaged 500 trees per manday. Piecework contracts are more efficient as well as more favorable to planters and employers" (Forester, BCFS).

"There are no studies to support the view that contract planters even plant more trees than union crews. I think they all plant about the same number" (Official, IWA).

"If you are paying by the tree, there is a greater risk of poorly planted trees. People can simply discard a greater number of trees in the bush"
-(Company Forester, PAPCO).

"Our costs using union wage labour were about five times as high as when we used contract planters. Within a constrained planting budget, we are forced to plant fewer trees using the wage labour group"(Company Forester, MACBLO).

We worked right next to those guys (union planters) on a contract last year, and we'd be up the hill and down again and have stopped for coffee before they had put in one run" (Contract Planter).

"At least we (wage rate union planters) can take the time to make sure our trees are in the ground and well planted. We are not furiously racing up and down the hillside to plant as many as we can to make the most amount of money" (Non-contract Planter).

"I wouldn't work on piecerates...you've got to work too hard. I tried it once for a few days and that taught me a lesson. Those guys are nuts!" (Non-contract Planter).

"Although a good team of tree planters can plant considerably more than this (1000 per day) when workers are paid piecemeal there are sometimes "horror stories" of them neglecting quality" (Company Forester, PAPCO).

"Contract planters are finally being recognized as an integral part of the forest management team" (Company Forester, Whonnock).

"You have to watch them (contract planters) all the time or they'll stash trees and plant sloppy. They are generally undesirable types, but they are all we've got right now" (Forester, BCFS).

"Of course, contract crews are more cost efficient. There haven't been any studies that I know of, but people on the site confirm the higher productivity. We need them (contract planters) to facilitate the window of planting. Its a short season, and we need lots of planters for a short time. Costs will go up tremendously if wage rates are paid for planting...its about fifty cents a tree that way" (Company Forester, PFP).

"There is no doubt in my mind that the contract planters are more cost efficient than wage planters. We don't have a forestry (waged) crew anymore, we had four crews, but phased them out. Contract planting costs less with as good or better quality" (Company Forester, BCFP).

"They might be cheaper labour, but they still make too much money. Last year I saw two of them in Hawaii. They were staying at the Royal Hawaiian, while the wife and I were at a cheaper place down the street." (Forester MoF)

For sure IWA (non-contract group) cost more, there's no question about that" (Economist, MoF)

"The hourly waged forestry crews (non-contract) used by the large forest companies have rarely been able to keep up with the increase in company planting programs. Costs per seedling have been very high for the company. They often produce dismal planting quality since there are few incentives for good planting. Costs (non-contract) easily run up to seventy-five cents a tree or more" (Contractor).

"We do not separate out labour costs because most of the work is done by contract crews" (Forester, Alberta Forest Service).

"The average number of seedlings planted per day by forest service hired crews (non-contract) was close to 800" (Forester, BCFS).

"How could they (non-contract) be even comparable---we (contract crews) have used all our creative energy to figure out how to maintain high productivity and high quality so we can make some money---of course we're going to be more efficient" (Contract Planter).

"Oh yeah, for sure the contract planters are cheaper by the tree" (Forester, BCFS).

"We had to deal with that (contractor and non-contractor labour efficiency) down here, and we always came out smelling good" (Spokesperson, Northwest Reforestation Workers Association).

The perspectives of the IWA official and one of the Company Foresters are clearly different (ie: same productivity, same cost, better quality versus the non-contract crews were thought to be five times more expensive). The difference might be due to differences in personal bias, or vested interest, which I will discuss below (part 1.7.3.). In economic terms however, these views of relative cost effectiveness are incompatible, and one of them must be inaccurate. Among possible ways to evaluate them are studies of cost effectiveness in other, similar situations.

3.2 PARALLELS AND PLANTING STUDIES

A parallel can be drawn in British Columbia between contract loggers and their non-contract counterparts, on the one hand, and contract tree-planters and their non-contract counterparts on the other. Harvesting by the contract labour method is preferred by the Forest Companies, who frequently exceed the quota of harvesting using contract loggers set by Ministry of Forests guidelines. Pearse (1976) stated that:

"Indeed one of the most conspicuous features of the logging industry in recent years has been the remarkable expansion in contracting, which testifies to the relative efficiency of the smaller enterprises---the success of the contracting industry undoubtedly reflects the relative efficiency of this form of enterprise" (p.330).

Parallels drawn between harvesting and reforestation by contract and non-contract labour groups, and the fact that consumers of labour have shown a marked preference for contract harvesting support the perspectives that the contract method is more cost effective, and that consumers of labour have shown marked preference for contract harvesting.

Research done on relative labour efficiencies in the reforestation labour force has been minimal. Some reports (Vyse and Birchfield 1972; Vyse and Wallinger 1974; Vyse 1974) dealt with the problem of labour efficiency on non-contract crews. A comparison of relative labour efficiencies in the two groups acknowledged higher daily performance by contract crews. Vyse and Wallinger (1974) studied planting productivity in a "special crew" and a "district crew", both paid regular wage rates, in order to establish a planting performance standard for the Ministry of Forests. The special crew did considerably better than the district crew, and the report concluded that to attain these performance standards "the planters must be fit, healthy, have a good attitude to the job, and they must be well led" (Vyse and Wallinger 1974: p.11).

But while studies by Vyse and collaborators recognized that productivity increases could be attributed to workers being paid on a piece-rate basis, they also recognized attributes which contract planters possessed and which Vyse assumed could be

introduced to non-contract crews:

"Trained and well guided crews with a high morale (perhaps bolstered by incentive payments), are capable of sustaining high productivity with the slowest of methods even on difficult sites. On the other hand, sneaker-clad, soft-handed, pick-up crews are a disaster under any set of conditions" (Vyse 1974: p.6).

Interestingly, studies on reforestation labour have recognized the significant influence of labour on reforestation costs (perhaps even more than factors such as site quality and variations in stock), but none have actually tried to quantify the cost differences.

"Past studies have revealed the influential effect of site and planting method, but their precise effect has been obscured by uncontrolled variation in the planting workforce. Both normal and incentive wage rates have been paid to permanent, semi-permanent and casual pick-up crews of both sexes, working under foremen of very mixed competence" (Vyse and Wallinger 1974: p.27).

It is worth noting that the period within which the reports by Vyse and collaborators were produced (1972-1974) was the period of greatest growth and development of the contract method of planting. In retrospect it seems that the high performances of the contract crews were a mystery to the MoF, and these reports were an attempt to understand this phenomena, in order to attain this kind of performance in the non-contract labour force. One of the early planters recalled the high productivity phenomena in contract planting in this way:

"A reforestation official from Victoria showed up when he heard we were planting 1,400 seedlings a day. Back then it was inconceivable that anyone could plant that many and still keep the quality up" (Cowell 1979: p.28)

The thrust of these early reports by Vyse and collaborators was that non-contract crews can perform as well as contract crews, given better supervision and training. Because the contract crews noticeably comprised great numbers of women planters, and the non-contract crews were all male, the sexual make-up of crews examined in these reports offered some quite interesting results. In 1974, Vyse gave women contract crews a performance standard of 10 percent less than standards for male contract crews:

"General opinion presumably based on experience, suggests that women are slower but more careful planters than men. Project managers might therefore wish to set performance standards for competent women crews, say at the 90% level" (Vyse 1974: p.20).

However, in 1974, the report by Vyse and Wallinger contradicted this suggestion with their finding that "an experienced woman crew" had "production levels which were the highest of all District operations in 1973" (Vyse and Wallinger 1974: p.20).

The subject of variation in cost and performance between contract and non-contract crews was also addressed by Weadick (1976) who stated:

"Planting with your own crews (non-contract) will generally be more costly than contract crews due to the slower daily production" (p. 16).

and by the Canadian Forest Service (1982) who reported:

"The high cost per planted tree of the (non-contract) crew operation in comparison to the contract operation has led to the decline of its use" (p.36).

The Forestry Handbook, published by the University of British Columbia Forestry Undergraduate Society (1984) stated that although there were two reforestation labour options available, (contract and non-contract) it was apparent that with contract crews "production is usually greater and costs are less" (p.189).

All of the literature that I reviewed that pertained to the costs of labour in reforestation suggested, usually on the basis of indirect arguments, that the contract method was more cost effective. The parallel with forest harvesting labour also suggested that the contract method should be more efficient, and the perspectives of those involved in reforestation was weighted toward greater cost effectiveness in the contract group. Can these perspectives, parallels and studies be given a more substantial basis? I tried to answer this question by first establishing a similar method of measuring labour efficiency.

3.3 MEASUREMENT OF LABOUR EFFICIENCY

Labour efficiency is traditionally conceived as a function of cost, productivity, and quality of product (Drummond 1976). These variables are integrated into the larger product mix which includes the supply inputs of labour, land and capital. Thus:

PRODUCT INPUT (LAND+CAPITAL+LABOUR [cost,quality,productivity]).

In general, labour efficiency is most commonly quantified in terms which consider costs, productivity, and quality. If the same criteria are used to establish labour efficiency in both labour groups, the value obtained (be it costs per tree or costs per hectare) can serve to evaluate one group relative to another. This value is called a cost differential. In addition, as long as the criteria for evaluation of the groups remain consistent, the "efficiency" obtained does not have to represent absolute reality,¹¹ since it is used only for comparison. The most frequent method of establishing labour efficiency is to use an equation which establishes costs per unit of production. Quality, productivity and cost will now be considered in the context of planting labour.

3.3.1 QUALITY OF PLANTING

Establishing quality of most products is straightforward, and considers guidelines such as craftsmanship, materials, use-value, strength, and design. But determining quality of planted seedlings is not as straightforward, and if the measure of quality is tree survival to rotation age, the problem of quality becomes even more difficult to estimate.

Estimates of survival of planted stock must consider such factors as animal browse, weather, nursery quality, species, stock type, planting tool, micro-site selection,

¹¹ The cost differential is similar to the discounted rate of return for reforestation investment criteria. Both are used as models. The investment model serves as a tool to evaluate the costs and benefits of different rates of growth, site productivity and species differences. It is an assessment tool, not a predictive tool. Cost differentials can serve in a similar way to assess trade-offs and labour mixes.

soil, slope, exposure, altitude, proper planting prescription, care and handling of seedlings, forest fires, forest pest infestations, and nutrient availability (Forestry Handbook 1984; Smith 1962). For the purposes of this thesis, however, I will assume that "quality of seedlings" refers only to the quality of the planting process, as defined by the planting quality checks carried out by the Forest Service before payment for planting is approved, and not by quality as it relates to survival rates. The Forest Service quality check assesses a sample of plots soon after planting, each plot being a 50 square metre circle. Within this circle there are a set number of planting spots (at 2.7 metre spacing, there would be 8 plantable spots). In each of these locations, if there is a suitable planting spot, a seedling should be planted. Payment calculations are based upon the total of satisfactorily planted trees over the number of plantable spots, converted to a percentage. This is called an Unsatisfactorily Plantable Spot Allowance Tree or UPSAT % (Ministry of Forests 1983). These quality checks are carried out on all lands for which the Crown assumes financial responsibility, that is on all but private forest lands. Companies with a tenure arrangement which allows them to apply for financial reimbursement from the Crown through Section 88 credits to stumpage must undergo the Forest Service quality check before credit is approved. Planting quality must be 95 percent for full credit of planting costs. Planting quality from 85–95 percent is paid a proportionally lower amount, and planting quality below 85 percent is not approved by the Forest Service for payment. For this thesis, I will assume that the costs paid by the Ministry of Forests for planting have considered quality, and therefore that all costs are either 95 percent quality planting, or that the approved costs reflect the lower quality.

It has been established that one component of seedling survival is planting quality. A study by MacMillan Bloedel (Project 342–1). concluded that "planting quality does affect survival and on some sites also affects height increment. This study showed that in terms of survival a well planted seedling is more important than choice of

micro-site" (1975-78: p.8). It has been argued that slower daily production rates in planting yield better quality, and therefore better survival (IWA union official, personal communication). While my study did not include detailed examination of planting quality, this question did arise in the course of the study and I will review it briefly. It must be stressed that this is offered as an interesting peripheral observation, explored at only a cursory level. A well designed research methodology would have to be undertaken in order to make a definitive statement.

Both from field observations and from videotapes, I noticed that the two labour groups appeared to use the available work time in very different ways. Using a stop-watch I measured the proportion of total time devoted to each of two mutually exclusive components of total activity: Searching time - from the first step away from one planted seedling to the first "strike" of the planting tool in preparation for the planting of the next seedling and Planting time - from the first "strike" to the first step away. This time period included "screefing" (clearing away debris), digging the hole, planting the seedling, "tamping" (firming the soil around the seedling), and checking the seedling for firmness. I observed (both on-site and from videotapes) 52 trees planted by contract labourers and 73 by the non-contract labourers. These results (Table 3.1) suggest that this issue could be usefully studied in a rigorous way. The contract labourers had average planting cycles which were approximately three quarters of the average planting cycle of the non-contract labourers. But even more interesting is the difference of planting time relative to searching time found between the two groups. The non-contract labourers spent a greater portion of their planting cycle (34%) searching for planting spots when compared to the contract group who spent 27% of their planting cycle in searching. On the other hand, the contract group spent approximately 10% more of their planting cycle in planting time than the non-contract group. While this might suggest that the non-contract planters spent more of their time choosing a suitable spot, the video tapes clearly revealed that a further

	CONTRACT		NON-CONTRACT	
	TIME (s)	% OF TIME	TIME (s)	% OF TIME
SEARCHING	8.9	27.4	15.4	34.4
PLANTING	23.5	72.5	29.3	63.5
MEAN DURATION OF ONE PLANTING CYCLE	32.4	100.0	44.7	100.0

TABLE 3.1 TIME-MOTION STUDY (IN SECONDS) OF CONTRACT AND NON-CONTRACT PLANTERS IN CASE STUDY.

breakdown of time use would be necessary to reach more conclusive results. For example, planting and search time of the non-contract group included many more instances of non-productive use of time such as waiting for other crew members to finish planting in order to maintain the line planting organization, looking around, scratching, and adjusting clothing.

As previously stated, although examination of planting quality and speed were not objectives of this thesis, the observed phenomena are worthy of more detailed examination.

3.3.2 PRODUCTIVITY IN PLANTING

Comparisons of labour productivity are relatively easy to make in planting because the seedlings are discrete units which can be easily counted. The production wage (piece-rate) paid to the contractor group lends itself to establishing productivity rates as each worker's productivity is calculated daily. With the non-contract group, a simple tally of the number of seedlings planted in the day on a site, divided by the number of workers gives a daily production rate.

In the comparative case study of the two groups planting for South Island Forest Company the criteria for choice of groups had been that the planting site and stock were to be as similar as possible for both groups. I did not consider some of the obvious variables which can affect productivity, the ratio of workers to supervisors and planting tools.

In the larger, comparative study of planting costs from the Vancouver Forest Region data of planting costs and total trees planted, the variables which affect productivity (slope, aspect, stock type and size, site access, site quality, site preparation, and supervision ratios) were not considered at all. I assumed that these factors varied in the same way in both populations sampled.

3.3.3 PLANTING COSTS

The costs of planting, when productivity is considered as part of the costs, are the key to the measurement of relative labour efficiencies. Generally, labour costs, if quality is assumed equal in both labour groups, must be done differently for either group. In computing the costs per tree in the contract group, labour productivity does not matter as whatever the daily production, the cost is still so much per tree. In the non-contract group, because workers are paid a daily rate, regardless of productivity, the daily production must be considered in computing costs per tree.

I have added (in the case study cost analysis) a 25% overhead in computing costs per tree because this has been added to the costs that the forest companies submit to the MoF for credit. The overhead is a percentage of the costs in labour costs, crew boss, accomodation and meals (when required), crew transportation, equipment and supplies, mobilization and demobilization, and access to the projects.¹² The inclusion of an overhead allowance for both groups will tend to bias the costs of the contract group upwardly, as the bid price of the contractor already includes planter supervision, vehicles, WCB payments, etc., although the forest companies must pay for the overall supervision of the contractor.

In summary, costs per tree, computed in each labour group, can give a cost comparison which can be used to compare labour efficiency. It is costs per tree that I use in comparing costs in the case study. I have assumed that quality is similar for both labour groups, and I have used daily productivity of planting to calculate the non-contract cost per tree.

¹² Early in 1985 a MoF policy change dropped the overhead allowance and allowed the forest companies to credit only the low bid contract.

3.4 COST DIFFERENTIAL IN THE CASE STUDY

The case study offers an example of specific labour cost differences. The silviculture forester for South Island Forest Company had, at my request, arranged to have both planting sites (difficult coastal) and stock types (2 + 1 Douglas fir)¹³ as similar as possible for both planting groups I studied. Thus, as far as was possible, the only variation between the two groups was that one was a contract group, and the other a non-contract group.

Production in the non-contract group, related to me by the supervisor of this crew, averaged 250 trees/person/day. On a similar site, with the same stock size and type, the supervisor of the contract crew told me that his crew were averaging 800 trees/person/day. Both these figures were confirmed by the respective planters. The labour costs of the non-contract group were given to me by the forester who supervised planting contracts. These costs were \$13.40/hour, or \$107.20 per day. Allowing the 25% overhead and calculated by costs per tree, the non-contract group's costs in this case were \$0.535 per tree. The costs of the contract group in this case were \$0.258 per tree, as illustrated in Table 3.2. A cost differential of \$0.270 per tree, or a little more than twice as much was found between the contract group and a non-contract group, although the sample size was small and did not warrant statistical analysis. These kinds of simple, specific studies and computations might lead one to think that the contract labour group was most effective. I will next examine costs in a broader context.

3.5 COST DIFFERENTIAL IN A BROADER CONTEXT

I thought that the large cost differential established in the case study would be corroborated by planting costs recorded in MoF files of final planting costs. Using labour as the key variable in analyzing other planting projects, I examined the Section

¹³ Pseudotsuga Menziesii(Mirb.) Franco. Var.menziesii.

	(1)	(2)	(3)	(4)	(5)	(6)
	PLANTER PORTION (\$)	CONTRACTOR PORTION (\$)	AVERAGE DAILY PROD.	PRICE PER TREE	OVER- HEAD (25%)	TOTAL PLANTING COST
<u>CONTRACT*</u>	0.120	0.087	800	0.207	0.051	0.258
**						
<u>NON-CONTRACT</u>	107.20	N/A	250	0.428	0.107	0.535

*CONTRACT COSTS COMPUTED BY: $(1) + (2) = (4) + (5) = (6)$

**NON-CONTRACT COSTS COMPUTED BY: $\frac{(1)}{(3)} = (4) + (5) = (6)$

TABLE 3.2 PLANTING COSTS COMPUTED AS COSTS PER TREE OF CONTRACT AND NON-CONTRACT PLANTERS IN CASE STUDY.

88 cost records gathered by the Ministry of Forests for four regions over three years.

The final records were generated as follows:

1. Company submits a planting proposal for work to be done;
2. A price per tree is negotiated between Forest Service and a forest company, the Forest Service setting a price by guidelines for planting appraisals which take "efficient operators" and an estimate of planting site difficulty into account;
3. Planting proposal is accepted;
4. Company invites bids from planting contractors, or chooses the non-contractor option;
5. If the contract planting option is used, contractors view sites and submit their bids, the contract is awarded, planting is done to the satisfaction of the company, and the forest company pays the planting contractor;
6. After inspection of planting quality by the MoF, the forest company submits final costs to the Forest Service for credit to their stumpage (the payment to the government for rights to cut timber). This is done no matter which labour group option (contract or non-contract) is taken; and
7. Forest Service applies credit to stumpage to the company.

My procedure for collecting the data was as follows. I examined the project history cards only for those projects completed for which final payment had been approved. The projects covered the 1980-83 time period for Forest Service Districts Six, Seven, Eight and Nine which are included in the BCFS Vancouver Regional records. Eighty-six files containing Contract Planting Payment Certificates (FS-795), Planting Reports (FS-753) and "Schedule B Planting Only" reports were examined, but only forty-six of the files contained relevant data. The figures collected for each project were:

1. Total costs of the planting project;
2. Number of trees and hectares planted by contract labour groups, only 31

projects;

3. Number of trees and hectares planted by non-contractor labour groups, only 10 projects; and
4. Number of trees and hectares planted by with both contract and non-contract labour groups on the same project, only 5 projects.

I estimated costs per tree and per hectare for each labour group using variables #1-3, then performed a one-way analysis of variance (ANOVA) to evaluate the influence of type of labour input on labour costs. My hypothesis for this analysis was that there would be a difference in costs attributable to type of labour. The ANOVA indicated no significant difference in costs, either per hectare (Table 3.3) or per tree (Table 3.2). This was true whether or not the shared labour projects were included in the ANOVAS. In fact, the average costs were very similar for both labour groups (contract: \$0.30/tree, \$269.00/hectare; non-contract \$0.34/tree, \$273.00/hectare; shared: \$0.29/tree, \$216.00/hectare). Although I had expected non-contract projects to be 1.5 to 2.0 times more expensive in terms of both costs per tree and costs per hectare, based on interviews and information from the field study, this was not the case. Surprisingly, labour type had no significant influence on total planting costs.

3.6 DISCUSSION

Expecting the cost differentials to be significantly different, as predicted in the case study, by conventional wisdom, parallels in harvesting, and the research that had been done previously on the subject of comparative costs, I was surprised to find that the Section 88 total planting cost data showed no differences in costs attributable to labour groups. In exploring this apparent contradiction, I pursued many leads and returned to company foresters and the Ministry of Forests personnel with new questions. Three of the more fruitful explanations for the apparent contradiction are that the appraisal system does not indicate "real" costs, that external factors (labour markets) influenced

SOURCE OF VARIATION	DF	SS	MS	FTEST
TYPE OF LABOUR	2	13033	6517	0.85*
RESIDUAL	43	329417	7661	
TOTAL	45	342450		

* $F_{0.05} = 3.23$. NOT SIGNIFICANT AT 0.05.

TABLE 3.3 ONE WAY ANOVA: COSTS PER HECTARE

SOURCE OF VARIATION	DF	SS	MS	FTEST
TYPE OF LABOUR	2	0.01327	0.00663	1.26*
RESIDUAL	43	0.22624	0.00526	
TOTAL	45	0.23951		

* $F_{0.05} = 3.23$. NOT SIGNIFICANT AT 0.05.

TABLE 3.4 ONE WAY ANOVA: COSTS PER TREE

the labour costs, and that "conventional wisdom" has more of a basis in myth and preferential bias than in fact.

3.6.1 ECONOMIC DATA AND REAL COSTS

One of the steps I undertook in order to interpret the data was to understand the process by which planting costs are collected and eventually recorded in MoF files. This process shed some light on the contradictions found in cost differentials, conventional wisdom, parallels and similar studies.

Responsibility for planting on Crown lands rests ultimately with the government. However, under tenure agreements, forest companies accept responsibility for replanting and their costs are reimbursed by the Crown through the Ministry of Forests by the mechanism of credits against stumpage payments, as provided by Section 88 of the Forest Act of 1978. Section 88 specifically states that:

"Where a person performs work on Crown land by applying reforestation or other silviculture treatment, and where the work is approved in advance by the regional manager, and where the work is performed to the satisfaction of the regional manager, the expense that is approved, or is ascertained according to the formula, shall be applied as a credit against stumpage" (Ministry of Forests Act, Section 88, 1978).

Section 88 planting costs, which were the data used in this study, are determined by the Forest Service using an appraisal formula, which varies in circumstances and over time. Although guidelines are provided (Section 88 User Procedures Appendix 1V. 1983), the appraiser's informed discretion in determining the unique character of each plantation is recognized (BCFS forester, personal communication), the general criteria used are planting difficulty ratings (easy, difficult and medium sites), and an estimation of the costs an "operator of average efficiency" would incur in planting. This estimation is indifferent to the costs actually incurred by forest companies. An overhead of 18-32 percent is added to the estimated costs to cover supervision and administration costs, so the forest company is paid for supervision and management in

planting. The Forest Service appraisal derives partly from averages of the planting costs the MoF incur themselves (BCFS forester, personal communication).

The Forest Management Partnership Proposal discussion paper by the Ministry of Forests released in September 1983 reiterated this continuing policy. Section 88 costs will be assessed on the basis of "efficient operators" and that "project costs would continue to be assessed by the Forest Service on the basis of expected cost for work of a similar nature" (MoF 1983).

The relationship between the forest companies and the Forest Service is tenuous, and often appears to me to be one of mutual distrust. A precedent has been set for this relationship in the area of logging costs (Pearse 1974). It is necessary to estimate production costs to establish revenue to the Crown. The Forest Service estimates approved costs on the basis of past records of operators of average efficiency (measured by logging phases such as felling, bucking, skidding, loading and so on) with allowances for discretion of the appraiser in accounting for the unique conditions of each cutting permit. The Forest Service uses logging contractor costs as a guide (with some modifications) because they contain both operating and capital costs.

If the forest companies' actual costs are more than the Forest Service will allow, they must cover the extra costs themselves. The "real" costs of logging are found neither in the appraisal nor the costs submitted by the forest companies to the Forest Service. If the forest company is more efficient than the average operator, it can enjoy the financial benefits of its special innovation and skill, and, if less efficient than average, will suffer the consequences in less than normal returns (Pearse 1974). A parallel process may be evident in planting, with costs appraised by the Forest Service being the constraint around which the forest companies must operate.

While it is not clear that the same scenario that is found in logging costs is being enacted in planting costs, there is a strong possibility that it is. If this scenario is accurate, the consequences of interpretation of my analysis of economic data are

clear. If the costs submitted to the Forest Service by the companies are the costs which the Forest Service has agreed to pay rather than real costs, they would be meaningless for quantifying cost differences between labour groups because the appraisal does not consider variations in costs of labour groups.

When presented with this idea, a number of foresters who had worked with forest companies in administering planting contracts agreed that their objective was to break even on planting costs. They said that they submitted for credit whatever the Forest Service was willing to pay, and if they were more efficient than the Forest Service had anticipated, so much the better.

Therefore, it is a strong possibility that MoF official economic data on planting costs do not indicate the real costs of planting, but instead reflect costs the forest service appraisals will allow. If this is the case, it is not surprising that data analysis of the Section 88 costs showed no significant difference when labour groups were compared.

3.6.2 EXTERNAL INFLUENCES

External factors outside the boundaries of this study (externalities) can effect interpretation of the economic data. In this section I will explore the theory of labour supply and demand and discuss the different labour markets within which the two groups operate. Unfortunately, these externalities were not considered in the experimental design of this study.

The labour contractors operate on a freely competitive labour market, outside the constraints of minimum wages and/or set wages. Labour is purchased by the buyer (in this case the contractor) at the lowest price possible. If the contractors can get labour at a lower price, they can bid lower on planting contracts. Conversely, labour is sold at the highest price possible by the planter.

Theoretically, the contract group should respond to any changes in the supply or demand for labour. Figure 3.1 illustrates the theoretical supply/demand relationship for contract planting labour, which operates in a freely competitive market. Given labour demand curve (D) and labour supply curve (S), equilibrium is achieved at the price of labour P^* , and the quantity of labour (Q^*). However, a decrease in the supply of labour from S^* to S_1 in response lower unemployment, would increase the price of labour to P_1 . Conversely, an increase in the supply of labour from S to S_2 responding to high unemployment, would decrease the price of labour to P_2 . Figure 3.2 illustrates the theoretical supply/demand for non-contract labour. The demand (D) and supply (S) curves are the same as the previous example (Figure 3.1). However, because the non-contract labour group have a set wage (W), the wages will not respond to labour market changes such as low unemployment S_1 or high unemployment S_2 . The price of labour in this case will remain at whatever the set wage is, no matter what labour market changes. ¹⁴ The non-contract labour group do not respond to external labour market changes such as fluctuations in supply and demand.

It could be that I examined labour costs at a time when the supply/demand interactions on the competitive labour market which the contract group responds to were almost the same as the non-contract groups fixed wage. If I had gathered the data in a different time frame (for example 1975–1980), the price of labour could have been at P_1 , while collecting labour costs in the future (assuming high unemployment) could mean the price of contract labour is much less (P_2). A longitudinal study of these groups would have alleviated this problem and perhaps yielded economic data which allowed for these external variables.

¹⁴ Unions control wages of unionized workers by restricting supply or by fixing wages. Ideally, unions would like an inelastic supply and demand curve, over which they have some control. For further exploration of the effects of unions on labour markets, see Ehrenberg and Smith "How Unions Achieve their Objectives".

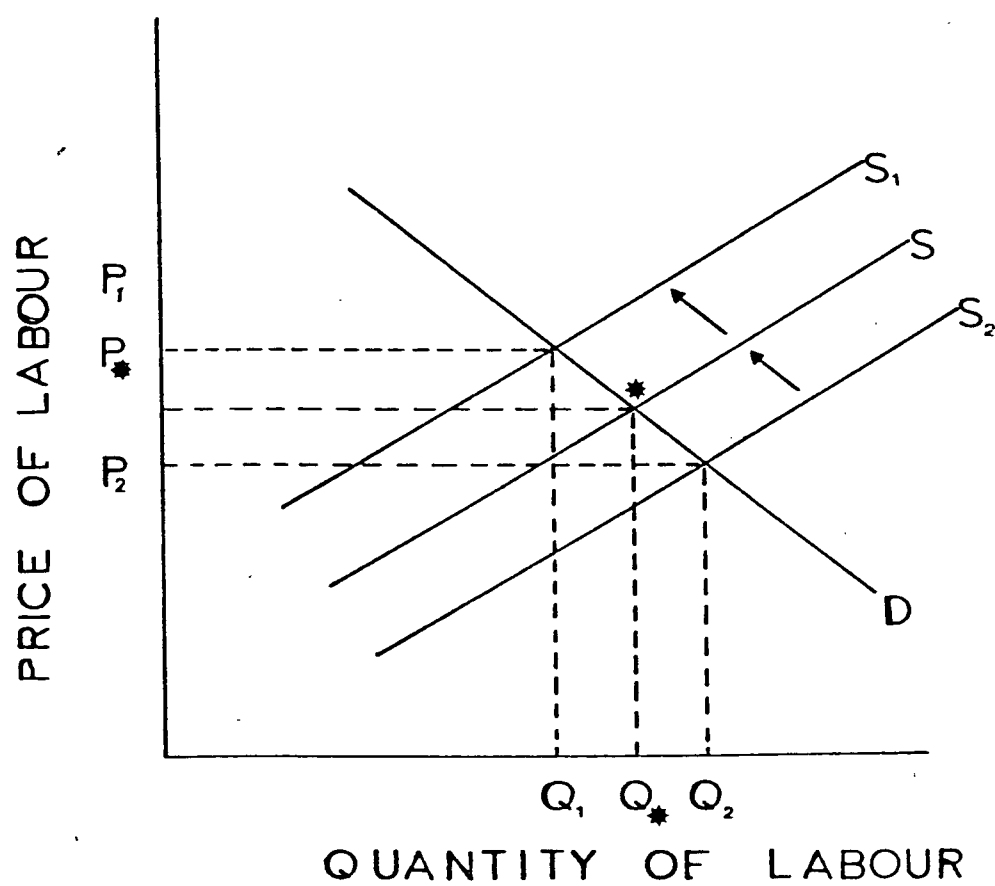


FIGURE 3.1 THEORETICAL SUPPLY/DEMAND FOR CONTRACT LABOUR

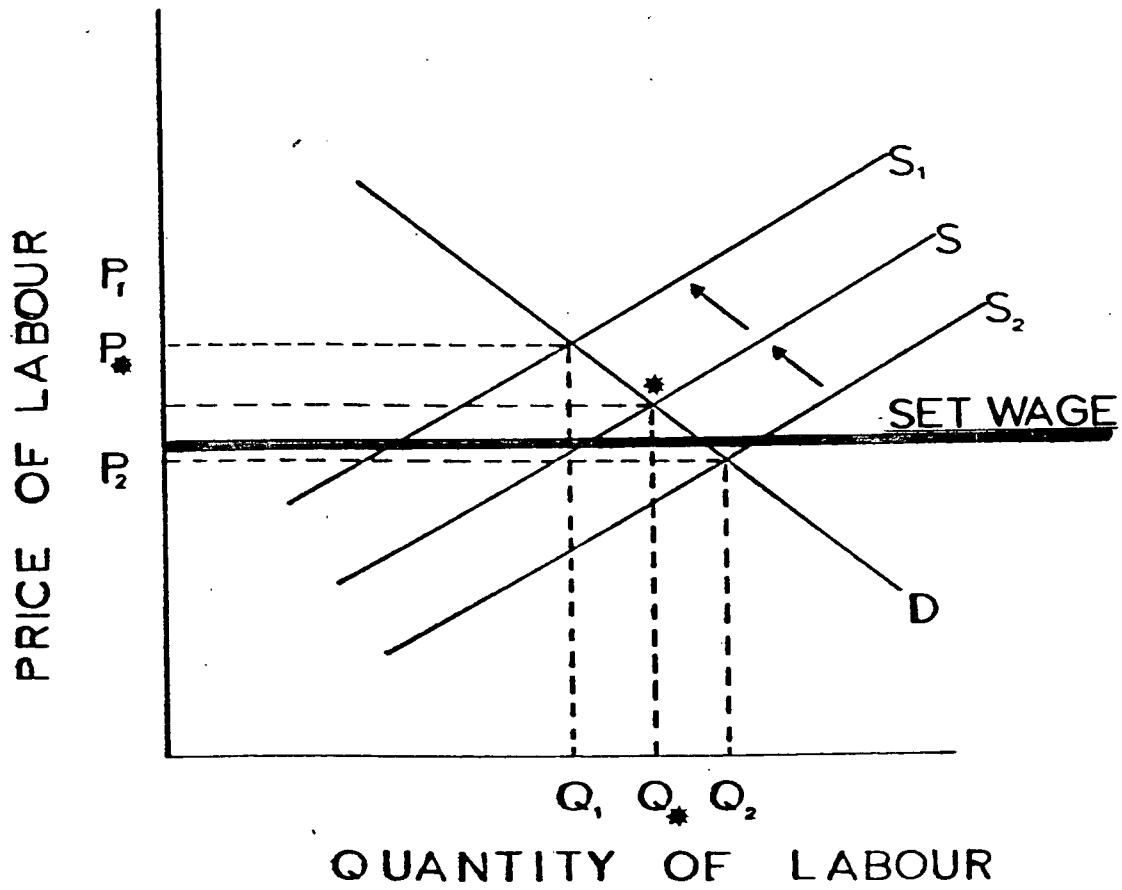


FIGURE 3.2 THEORETICAL SUPPLY/DEMAND FOR NON-CONTRACT LABOUR

The nature of the labour market for planters could be operating in such a way that analysis of an average price of units planted by the two labour groups over a longer period (perhaps 10 years and calculated in 1980 dollars) would be the only way to produce cost effectiveness estimates which could take the external labour market into account. Because external factors were not considered in this study, this could produce spurious results.

3.6.3 CONVENTIONAL WISDOM OR CONVENTIONAL MYTH

It is often the case that we take things for granted, and neglect to question our assumptions about what goes on around us. Because this kind of problem may be especially characteristic of approaches that seek viewpoints (ie: biases) of respondents, it is useful to explore possible problems when this approach is used. Some of the more obvious problems are that the biases of both interviewer and interviewees may not be clear or that more weight should be given to sources which have more information available to them relative to other sources or that common practice may lead to the belief that because something is done extensively, it is right and does not have to be examined further.

Bias is a problem in any approach to research. This is especially so with social research when both subject and researcher are biased. There is also sampling bias, as viewpoints were collected from whoever answered my letters (non-response bias) or those that were available to interview. Those interviewed may have been subject to preferential biases, for example a pro or anti-union bias which might have reduced their objectivity. They also may have had vested interests in giving their viewpoints which could override an objective response to the questions. For example, an interviewee could favor the contract labour group because they are mobile, because they can work seasonally, or are easier to supervise. The compliance constraints regarding quality control (non-payment for low quality) and the care and handling of

seedlings (for example, fines levied against contract planters for leaving seedling boxes open, or not keeping the planting bags moist), might sway preference to the side of the contract planters, even if the cost efficiency differences are slight. On the other hand, union membership or a position as a union official might result in a biased viewpoint towards the non-contract group. There is little that can be done to completely rule out interview bias, and this constraint must be accepted. Collecting data from many diverse sources is one way that bias was dealt with in this study.

The perspectives of those who had worked with both groups, or who were employed by forest companies must be given more weight than other viewpoints. For example, the company personnel may have privileged access to cost data which others would not have. I assume that the decisions they make are made on as sound an economic basis as they can afford. When company foresters say that contract planters are more cost efficient, their viewpoint has the weight of privileged information behind it, and must be considered in a different light than those without this information.

The use of contract planters has increased dramatically in the past two decades. While this may show a preference for this group for reasons other than cost efficiency, such as mobility or seasonal employment, it is a fact that they now comprise almost all of the planting labour force¹⁵. The overall acceptance of this labour group would reinforce the opinion that it is the more efficient method of providing reforestation labour.

Casual observation is another way in which viewpoints are reinforced. Those in the field who watch the experienced contract planters moving quickly through a plantation with few unnecessary steps and little wasted motion would logically conclude that this group is working more effectively. This might easily be interpreted as cost

¹⁵Planting programs have steadily increased from 27 million seedlings in 1973 to 97 million seedlings in 1983. The contract method of planting, begun in the late 1960's steadily increased in popularity, and this method now accounts for approximately 90 percent of reforestation projects in the province (MoF Five Year Range and Resource Analysis 1982).

effectiveness in the contract labour group. It might be counterintuitive to watch the two groups performing their jobs and not believe (even discounting the costs per tree) that the keener planter who has the best gear and the most streamlined operation is not going to be more efficient, and it would be an easy step to assume this is also cost efficient.

Conventional wisdom or myth? This is difficult to establish, but on the surface, considering the privileged information of the company sources, observation, and use of the contract group, it would seem that conventional wisdom is based on something more tangible than bias. While this type of subjective data is "messy", it nevertheless must be accepted as a part of this type of research.

Four salient points emerged from examination of the question of which reforestation labour group is more cost efficient in British Columbia. The first point is that it is reasonable to assume that the economic data that I used to quantify cost efficiency has little relevance to real planting costs. They are therefore of limited use for establishing cost differences between the groups or, in fact, for any analysis of other variables which affect planting costs. A more useful exercise would be to analyze cost data using the "real" costs kept by the forest companies. The second point is that external factors can influence the type of cost analysis I performed and it is necessary to understand and control for them as much as possible. The third point is that "conventional wisdom" is useful in many ways, but it should not be used as conclusive evidence. A fourth point is that it is useful to use many methods of data collection to cross check any given data source.

Although I could not conclusively establish a cost efficiency between the contract and the non-contract groups, there is enough evidence to suggest that the case study and conventional wisdom support the cost effectiveness of the contract group and that the planting costs collected in the Section 88 credits reflect the appraised costs, not the "real" costs. Further attempts to elicit meaningful information from this source will

be fruitless.

Earlier in this thesis (Parts 1 and 2), I argued that the contract reforestation labour group is characterized by a form of worker participation, and will have benefits in terms of cost effectiveness. However, in Part 3 I was unable to establish conclusively that worker participation is more cost effective, but can strongly suggest that this is the case. I will now look at changes which are developing in contract reforestation which will affect worker participation in reforestation in British Columbia.

4. DEAD ENDS AND NEW DEPARTURES

In this study I have suggested that the contract reforestation group is an example of worker participation which is informal (there are no formal rules for the model) and semi-participative (not all decision making is distributed amongst the workers). This was especially so when it was compared to the non-contract planting group in the areas of technology, division of labour and organizational structure.

In this study I have also argued, although not conclusively, that contract reforestation labour is more cost effective, relative to non-contract labour, and have discussed ways in which more reliable cost data might be more effectively obtained. I will now turn to events which have effected change in the reforestation labour force and explore ways in which the information from this study can assist in providing a more effective structure for reforestation labour and the long term objectives of forest renewal.

4.1 CHANGES AFFECTING THE WORKER PARTICIPATION MODEL

Changes in government policy and labour markets, as well as planter, contractor and union pressures each contribute in part to major change in the ways in which reforestation labour operates in the Province. These changes will have an effect on the applicability of worker participation in contract planting.

4.1.1 FORMATION OF PLANTERS AND CONTRACTORS ASSOCIATIONS

The Pacific Workers Reforestation Association (PRWA) began in 1977 as a loosely structured organization of planters and contractors. It became a registered society in 1981. Shortly after that it began to focus on issues of concern to planters and it also began to limit the membership of contractors. Membership in PRWA has gone from 220 in 1981 to 64 in 1984. The role of the PRWA has been varied, from an informal association to a more structured society which took on issues of interest to

planters (health and safety, labour relations and knowledge networking) to joining with the International Woodworkers of America (IWA) in 1984 in an unsuccessful bid to unionize the contract planters. The role of the PRWA at the present time appears to be mainly information networking with the focus on health and safety and workers advocacy (PRWA Newsletters 1980-1985).

The Western Silviculture Contractors Association (WSCA) was formed in 1981. Membership has fluctuated from approximately 40 members in 1981 to 23 members in 1983. WSCA has, for the most part, taken two roles. The first is that of a lobby group representing the interests of contractors in British Columbia. An example of this is their response to the Federal government job-creation program proposal for planting in 1984, when WSCA argued that jobs should not be taken away from existing planters and contractors. The second role of WSCA has been that of a professional association, guided by a code of ethics (WSCA Newsletters and Annual General Meetings 1981-1984).

Neither PRWA nor WSCA have been able to capture a membership sufficient to consistently represent planters or contractors. PRWA has suggested that membership has dropped because of the seasonal, transient and independent nature of planting (PRWA Director, personal communication). The contractors association, WSCA, has perhaps failed because there was never an obligation to join.¹⁶ But the two organizations have, in just a few years, developed a somewhat antagonistic relationship based on what they perceive as "conflicting interests".

Both contractors and planters that I interviewed in the course of this study suggested that there has definitely been a breakdown of trust between the contractors and the planters. Whether separate organizations who see themselves as antagonistic has affected this trust would be difficult to speculate upon, but the possibility exists that

¹⁶Professional Associations like the British Columbia Registered Professional Foresters can restrict entry, and make entry a condition of employment as a professional forester in the Province. WSCA did not have such an option.

both WSCA and PRWA, although not representative of all planters or all contractors, have had this effect on the work environment. The worker participation model is predicated on some degree of trust between employers and employees, and any breakdown of this trust will have an effect on worker participation. The "team" spirit of cooperation on the worksite will deteriorate if the situation is seen as antagonistic or one-sided.

4.1.2 UNION INTEREST IN REFORESTATION

The International Woodworkers of America (IWA) represents most of the forest industry workers in British Columbia. The IWA has, in the past five years, shown an interest in representing reforestation labour¹⁷. Some of the ways in which this interest has been manifest are: (1) The Master Agreements between unions and companies stipulate that IWA members must receive first choice on planting jobs (IWA official, Company Forester, personal communication); (2) Contract planters have been asked to join the union before they are allowed to plant on some contracts (although under contracts of less than 30 days they receive no benefits, and few contracts last 30 days); (3) Contract planters have often been "bumped" from contracts by union crews (PRWA Newsletter January 1982), and (4) Laid-off union workers must be given the option to work planting, and if there are is any work left after union crews are formed, then the contract workers can plant, (PRWA News December 1981).

In January of 1982, the IWA formed a Treeplanting Committee, with representatives from every local on the coast, and reporting to the Western Regional Council. This committee invited the participation of PRWA in their efforts to organize. PRWA assented, and in the Spring of 1984 a PRWA/IWA organizing drive was underway. This organizing drive failed to attract sufficient membership to be successful,

¹⁷ It should be noted that the IWA union membership dropped by 9,243 members in 1982. Labour Market Bulletin November 1983: p.12).

and the IWA now appears to show a lack of interest in unionizing reforestation labour.

The attempt by the PRWA/IWA to unionize must have contributed in part to the change in the workplace that is being recognized. It could contribute further to the breakdown of trust between the contractor/planter thus antagonizing an already deteriorating relationship. This would make worker participation in the contract labour group less likely to happen.

4.1.3 CHANGES IN SECTION 88 POLICY

There has been a trend by the MoF towards allowing only the price of the lowest bid on planting contracts, which is the basis upon which the MoF lets out their reforestation contracts. Contractors and companies have, in the past, dealt on a preferred or invitational bid system, which meant that the company could choose a contractor at its discretion, and negotiate a price which was within the MoF appraised costs for that particular planting site. The companies did not have to inform the MoF of the bid price if it was within the guidelines of "approved costs" on the appraisal by the Forest Service (Forester, MoF). However, an announcement by the Deputy Forest Minister, Al MacPherson early in 1985, signaled that in the future companies must put all projects up for competitive bid, and only the lowest bid price would be paid by the MoF, and over and above that low bid award the Company would have to make up the cost difference. The companies either have to take the low bid contractor or take a preferred contractor but pay the difference if the bid is higher than the low bid.

The changes in Section 88 policy can affect the planting labour force in many ways. One way is in introducing new contractors and planters to the labour market. When the only criterion for obtaining a contract is the lowest bid, contractors who try to provide fair wages, to provide workers with adequate health and safety on the job,

and provide a good camp will be at a competitive disadvantage with contractors who do not provide this more costly work environment. Ease of entry because of low venture capital requirements, and few barriers to entry¹⁸ can mean that there will be many more contractors bidding, and this competition can force the bid prices down. Changes in the pool of contractors can mean changes in the structure and the people in the contract planting labour force. For example, two of the new contractors in the 1984 season had a policy of all male crews, and one contractor I interviewed had a policy of never hiring a planter for more than one season because "that way they don't have any expectations from last year about how its going to be, or what they will be paid" (Contractor, personal communication). The worker participation model may have difficulty surviving with new planters and new contractors, as the informal nature of worker participation in this setting requires that it be taught by tradition.

4.1.4 LABOUR MARKET CHANGES

Unemployment in the 1980-84 period was high in British Columbia especially in comparison to the Canadian rate of unemployment (Labour Market Bulletin 1984). This has meant that the supply of labour is high relative to the demand for labour, therefore the costs of labour (in a market that is not fixed) should come down. The contract planting labour force, unlike most other labour groups, is not restricted by minimum wage laws or fixed wages. New entrants to this labour force may, because of the high unemployment, have lower wage expectations, (just as labour that immigrated from Ontario and Quebec in 1979-81 had lower wage expectations). Contractors can bid as low as they think the labour market will bear. Can worker participation in reforestation exist in this environment? Is worker participation predicated on wage expectations? It is purely speculation at this point, but the general feeling I

¹⁸A contractor must have planted before, and be a Canadian citizen. The capital outlay to begin contracting can be as little as \$5,000 (MoF Silviculture Policy Manual 1979; Davis-Case 1982).

had when interviewing planters, contractors and foresters, was that there are many changes in the contract planting which are being attributed to the change in wages. Among these are changes in the planter/contractor relationship and worker sabotage.

The planters have begun to question the existing role of the contractor. As one planter put it "I wouldn't mind so much if contractors were making less profit than last year, but my wages have dropped by \$30.00 a day, and I work harder than I did last year. I'm not going to do his (the contractors) job of hauling trees around and setting up camp so he can make a killing" (contract planter, personal communication).

Worker sabotage seems to be more common, or at least more discussed. In the planting context, this usually comes in the form of "stashing" trees. One story related to me by two crew members was that on one contract the price per tree was bid low. The workers felt that this was an especially low price per tree considering that they had to carry the trees for a mile to the site. Their reaction was to "charge mileage" by stashing 200 trees each on their way into the site each day. Another planter told me that much as he disliked it, he had found that it saved him time to carry 10-15 plants in one hand instead of going into his bag each time. He only did this before 9:00 a.m. when the Company checkers arrived at the site, but he planted more trees in the available time and met his daily production which provided him with what he considered an acceptable daily payment. The handling of the seedling in this manner is bad handling practice, the exposure of the roots to air and sunlight has been shown to influence survival rates of planted stock in a negative way (Cleary 1983).

With MoF cutbacks in 1982-1984, extra supervision to ensure that corners are not cut is not assured. For example, one silviculture officer with the BCFS, supervising an interior area which annually plants 4 million seedlings, commented on the upcoming (1983) season in this way:

"It's going to be hell this year. All the contractors have minimal planting experience. They don't know anything about organizing a crew. They have green planters, paid low wages, and I haven't got the staff to supervise them. The bids were low. I don't know how they are even going to cover gas to the site. I'm expecting a lot of defaults and that means more work. It also costs more. They should do away with the low bid practice but they can't. Governments are too scared that favoritism will start. You know, that insults me as a professional forester" (BCFS Forester, personal communication).

Any changes in reforestation labour costs within the context of the reforestation labour industry must be evaluated on the assumed objectives of the MoF. If their objective is to obtain a higher number of seedlings planted each year on their finite budget, then the least expensive labour possible will be one of the means to reach this objective. With this objective, the most rational course to follow would be to adopt policy which would force labour costs as low as possible, disregarding the long-term consequences of lower survival rates. If the objective of the government is a long term commitment to forest renewal (again, on a finite budget) then survival rates will be the criteria for judging which labour group is most likely to deliver a high quality product and ensure adequate survival. With a long term commitment, choices about costs must include quality of planting and survival rates in addition to the number of seedlings planted. What the MoF may have wanted to effect in their change in Section 88 policy was to decrease the cost of reforestation. What may not have been anticipated was that the contract planters would bear the brunt of this cost reduction and react in ways which could be counterproductive to the goals of forest renewal.

The Section 88 policy changes, in conjunction with labour market changes, ease of entry into contracting, and the new tensions between the contractors and planters may each contribute to the disintegration of worker participation in contract planting. This will especially be the case if the positive attributes of worker participation in this labour group are not recognized.

4.2 THE EUGENE EXPERIENCE

While the situation regarding contract reforestation labour in British Columbia is in many ways unique, it does share a commonality with other areas in the Pacific Northwest. According to the contractors, foresters and planters in British Columbia, many of the ideas about contract tree planting developed in the Eugene area. There were many parallels between Oregon and British Columbia, which were apparent when I interviewed Foresters and Contractors from the Eugene, Oregon area, where many reforestation industries are centred. In May of 1984, I met with the Director and the Treasurer of Hoedad Reforestation, a large reforestation contracting firm based in Eugene, and the subject of the study by Gunn (1980). I also met with the Directors of Second Growth Forest Management, another reforestation contracting firm; a forester from the Bureau of Land Management (BLM) and the co-ordinator of the Northwest Reforestation Workers Association (NWRWA). Persons at each of these meetings contributed examples of what had happened to contract tree planting under conditions of competition which favor low-bid awards, along with ease of entry of new contractors, and high unemployment.

Although there are differences between contract planters in Oregon and in British Columbia, there are many similarities. The most obvious differences are in the labour legislation requiring bonding of contractors in Oregon, but not in British Columbia. Another apparent difference is that bids are on a "per acre" basis in Oregon, while in British Columbia we bid on a "per tree" basis.

According to the sources I spoke with in Oregon, a combination of changes have reduced the costs of planting, but also created new problems with survival of seedlings and planting supervision costs. One of the most obvious changes has been the influx of labour from outside Oregon, which has reduced the price of planting labour. The lower wage expectations of labour from outside the state, as well as a relaxing of the labour legislation which restricted labour from migrating between

States,¹⁹ has encouraged lower planting costs, and lower bid prices. Bid prices have gone from \$180.00/acre in 1970 to \$135.00/acre in 1984 (BLM Forester, personal communication). There have been a large number of new entrants to the labour contracting field, especially Mexican contractors with immigrant Mexican labour who have lower wage expectations than the local populations. The NWRWA representative told me that the 1983 wage expectations were \$2-3.00 per hour for immigrant workers, and \$10-12.00/hour for local labour. This higher wage for local labour, in part reflects the higher cost of living in this area. The lower wage expectations of immigrant labour has meant that the Mexican contractors have underbid the local contractors and captured a large share of the available contracts. The share of the market taken by the Mexican contractors has grown from 15 percent in 1980 to 60 percent in 1984 (BLM Forester, personal communication).

Recent changes in the situation in British Columbia contract planting parallel some of the changes that Oregon has undergone. Planters from out of province with lower wage expectations, and new planters have become more commonplace, and contractors who hire these planters can underbid contractors who use local or experienced planters with higher wage expectations. In a labour group with little protection, this forces "fair wage" contractors out of the contracting market.

Problems of poor survival and ultimately higher costs as a result of these changes were experienced to the degree that the Bureau of Land Management began to explore alternatives to the contract system of reforestation. Some of the problems were that as lower quality and lower survival rates were experienced, the costs began

¹⁹These two pieces of legislation regarding labour movement between States were the Davis-Bacon Act, and the Prevailing Wage Act. The objective of this legislation was to maintain local wage standards by requiring subcontractors and contractors on federally financed projects to pay employees wage rates established by private industry in the locality. This legislation was enacted in response to a situation in which federal construction contracts to help offset unemployment in depressed areas were being won by contractors from other areas who were underbidding local builders by importing low-wage workers (Gould 1971).

to increase elsewhere. The BLM had to increase their supervision, and instead of costs of planting going down, the costs were simply being transferred to another budget. Replanting of areas which had poor survival were more costly than the initial planting, and overall planting costs increased. Many of the contractors had bid so low that they could not cover their costs, and there were many defaults of contracts, causing extra expense for the BLM. One of the responses by the BLM to these new problems has been to initiate a Stewardship Program on a trial basis.

4.3 THE CONCEPT OF STEWARDSHIP

In 1982, the Bureau of Land Management entered into Stewardship contracts with two of the local planting contractors in Eugene, Oregon. One of these that I observed was a pilot project of 541 acres contracted to Second Growth Forest Management, Inc.. The contract was for three years, the first year planting, and the next two protecting the plantation from animal damage or brush encroachment and any necessary replanting. The \$236,000 contract provides for progressive payments dependent upon seedling survival to the 3rd year "free to grow" stage. Both Second Growth Forest Management and the Bureau of Land Management consider the Stewardship Program successful. The Second Growth staff forester that I spoke with was happy with the project, and stated that the planters were really behind it. The forester for the Bureau of Land Management expressed similar sentiments:

"Last year, in a hot spell, they (Second Growth) were out there on the site with old fire fighting equipment they dug up somewhere, and they were watering the seedlings. That's what I call personal attention" (Forester, BLM, personal communication).

Some of the innovations which Second Growth planters have initiated on their Stewardship contract have been the installation of 23,000 budcaps (folded cards placed on top of the seedling to reduce animal damage); 50,000 shade cards for protection from the sun; plastic mesh tubes to protect seedlings from animal browse, and at one

site, perches were constructed to encourage owls to prey on the mice which were burrowing under the mulched seedlings and affecting seedling survival. Both the director of Second Growth and the forester from the BLM stressed that it was the planters who made the decisions regarding the workplace, and that the planters were using the professional resources available at the BLM and Second Growth when they needed input or confirmation on any new ideas.

It is difficult to say what will happen to the contract labour group in British Columbia as they undergo change, or if the changes will parallel the Oregon experience. Similarities already noted between Oregon and British Columbia reforestation labour forces have been a drop in bid prices; the attempted unionization of planters by the IWA; planters associations developing, with a large membership, and then membership falling, with the co-operatives maintaining the majority of support and; the development of new contractors on an established market.

In British Columbia, it seems to my mind that implementing alternative labour strategies such as the Stewardship program on an experimental basis is a pragmatic alternative. There may well be further parallels between Oregon and British Columbia, (ie: quality and survival could go down, and supervision costs rise). It would be wise to explore and have available as many alternatives as possible should this be the case.

The Stewardship program takes into account many of the worker participation concepts that I found present in the contract labour group. Workers, with the capacity to be innovative and imaginative in performing the job of reforestation can assist forest managers in important ways to deal with the critical task of forest renewal. Supplying the most optimum labour force is one of the challenges that we must face in the future task of forest renewal.

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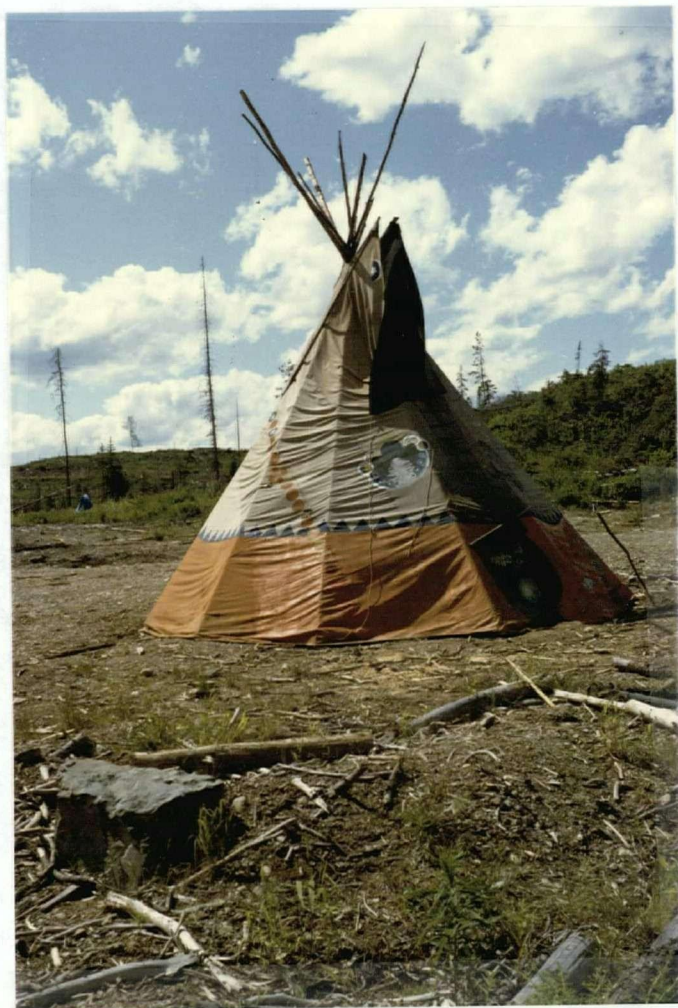
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APPENDIX A

1. CENTRE OF CAMP LIFE (COOKSHACK, DRYING TENT, DINING ROOM). (1981)



2. TENT CAMP AT THE EDGE OF A PLANTATION. (1981)



3. CONTRACT PLANTER'S
"HOME". (1984)

4. CONTRACT PLANTER'S
"HOME". (1984)



5. LOADING BOXES AT
6:00 A.M. (1984)

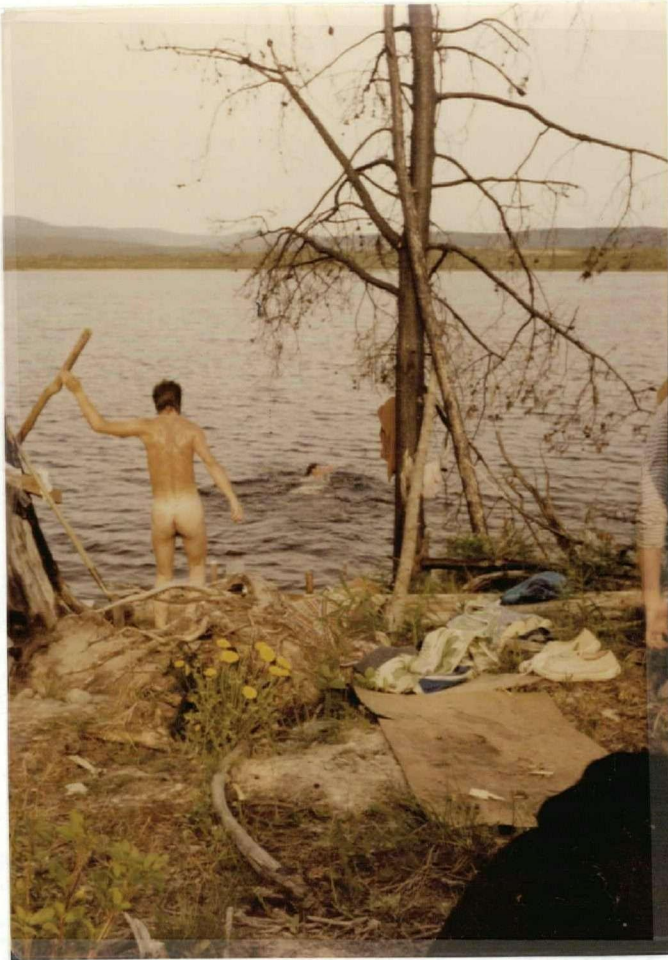


6. PLANTING BURNED SITE.
(1981)



7. CAMP MEETING TO
DISCUSS REPLANTS.
(1981)

8. WELCOME SAUNNA
BEFORE DINNER.
(1981)



9. POST SAUNNA
SWIM. (1981)

10. COMMUNAL DINNER
OF 21 PLANTERS.
(1981)



APPENDIX B

NAME	OCCUPATION	CORRESPONDENCE	INTERVIEW
BAHEN, ALLEN	CONTRACTOR		X
BARBOUR, D.L.	FORESTER, BC MOF	X	
BARTEAUX, M.K.	FORESTER, DNR NEW BRUNSWICK	X	
BASKERVILLE, G.	FORESTRY PROFESSOR UNIV. NEW BRUNSWICK	X	
BEAUMONT, R.	FORESTER, WHONNOCK		X
BEAUVOIR, CLAUDE	CONTRACTOR		X
BETTS, JOHN	CONTRACTOR		X
BLACKHALL, CHARLES	CONTRACTOR		X
BLUMENSTAAT, CARL	FORESTER, MACBLO		X
BRANDT, DAVID	FORESTRY GRAD STUDENT		X
BROWN, ROBIN	BC MOF SILVICULTURE		X
BROWNRIGG, HENRI	PLANTER		X
CARTER, M.	PLANTER		X
CARTER, ODE	PLANTER		X
CHINLOY, PETER	PROFESSOR, ECONOMICS UNIV. BRITISH COLUMBIA		X
CHRIS -	PLANTER		X
CLEARY, BRIAN	PROFESSOR, SILVICULTURE UNIV. OF OREGON	X	
CONNOLLY, M.	PLANTER		X
CONSTANT, B.C.	CONTRACTOR		X
COUSENS, GREGG	FORESTER, BC MOF	X	
DANIEL, MIKE	FORESTER, MACBLO	X	
DAVIS, INGRID	FORESTER, BC MOF		X
DAVIS, K.	NON-CONTRACT PLANTER	X	
DERMOTT, C.A.	FORESTER, ALBERTA FOREST SERVICE	X	
DEVITT, BRUCE	FORESTER, PFP	X	X
DITCHBURN, P.	PLANTER, PRWA		X
DOUG	PLANTER		X

NAME	OCCUPATION	CORRESPONDENCE	INTERVIEW
FRASER, G.ALEC	ECONOMIST, CAN. FORESTRY SERVICE	X	
FORGET, M.	PLANTER		X
HOWARD, W.G.(BILL)	ECONOMIST, BC MoF		X
HARRISON, DAVE	FORESTER, BC MoF		X
HACKETT, JIM	FORESTRY GRAD STUDENT		X
HUSSEY, TOM	SILVICULTALIST BLM		X
JIM	PLANTER		X
KENNEDY, DOUG	PLANTER, HOEDAD REF., EUGENE		X
KLOSS, BOB	FOREMAN, MACBLO		X
KLEIN, RICK	PLANTER		X
KEENA, JERRY	FORESTER, BC MoF		X
LITTLE, M.T.	SILVICULTURALIST, DRR SASKATCHEWAN	X	
LLOYD-SMITH, J.	REFORESTATION CO-ORDINATOR, MoF	X	
LAVIS, JACK	FORESTER, MACBLO		X
LUSCOMBE, BILL	BC MoF	X	
McMULLAN, BILL	FORESTER, MACBLO		X
MACKIE, JERRY	NWRWA, EUGENE	X	X
MAEDERER, BRUCE	REFORESTATION CO-ORDINATOR, (HOEDADS)	X	X
MAUCH, ANNE M.	FORESTRY GRAD STUDENT		X
MUELLER, REINHART	SILVICULTURE, BC MoF		X
MULLENS, ANN	CONTRACTOR		X
PERKINS, JIM	FORESTER, PAPPCO	X	
PERRY, CLAY	IWA OFFICIAL		X
PUTTOCK, DAVE	PROFESSOR, FORESTRY UNIV. OF TORONTO	X	
REID, DALE	DEP. DIRECTOR, BC MIN. OF LABOUR		X
SAUNDERS, PETER	FORESTER, UBC RESEARCH FOREST		X

NAME	OCCUPATION	CORRESPONDENCE	INTERVIEW
SELSING, J.	REFORESTATION COORDINATOR BC MoF	x	
SMITH, STEVE	FORESTER, PAPPCO	x	
SMYTH, J.H.	SOCIO-ECONOMIC ANALYSIS CAN. FORESTRY SERVICE	x	
STALKER, CLARE	PLANTER		x
THIESSEN, CARLA	PLANTER		x
THOMPSON, GLEN	FORESTER, BC MoF		x
THOMPSON, J.D.	SILVICULTURE, DRR SASKATCHEWAN	x	
TODD, A.M.D.	SILVICULTURE BC MoF	x	
VAN DORSTEN, CHRISTINA	FORESTRY GRAD STUDENT N. CAROLINA STATE UNIV.	x	
WALLINGER, DICK	SILVICULTURE BC MoF		x
WALLIS, BRYAN	FORESTER, BCFP		x
WICKMAN, MARICE	FORESTRY GRAD STUDENT		x
WYETH, MIKE	SILVICULTURE BC MoF		x
YARN, LLOYD	SILVICULTURE, DNR, MANITOBA	x	