SESSION 4
Paper (d)

THE MAN IN THE LOGGING SYSTEM - RESEARCH NEEDS

R.N. O'Reilly,
Lecturer, Forest Engineering
School of Forestry,
University of Canterbury

What do we know of the N.Z. Logging Labour Force?

Most of us would agree that the human element is the most important aspect of any logging operation. With this as the starting point, let's look at what we know about this most important aspect of New Zealand logging.

Remarkably, very little research has been done!

We do know how many people are employed in logging - around 3,000 (Fig.1) - and how much wood they produce each year - now around 10,000 cubic metres (Fig.2). We can also find out that they work in a very unsafe industry and lose a great deal of time through accidents (Table 1). If deaths are combined with accidents, (Table 2), the picture is more startling!

But what about the men themselves? Two studies by students from the School of Forestry (Hennessy, 1976, and Fielder, 1979), give an indication of some of the characteristics of the logging workforce. Fielder's work is presented and discussed in LIRA Project Report 11 (Wells, 1980), and I would recommend it to anyone interested in logging manpower. There are some interesting findings :

- for most workers surveyed, logging was not their first job after school;
- most workers had learned their job through experience or with the help of an experienced bushman;
- most felt they would benefit from more training, again aided by more experienced bushmen;
- most loggers sampled were multi-skilled, having some experience in most aspects of logging;
- most workers were attracted to logging because of the nature of the work (out of doors, a variety of jobs), with pay being the third most commonly stated reason;
- most workers explained that the pace of work was something that they set, and that working hard came naturally to them. The enjoyment of work, and meeting the day's tally, were equally-ranked second reasons, as was the pay factor;
- only 40% said they would encourage their sons or friends into logging.

These findings were based on approximately 10% of the work force in logging in the Bay of Plenty. A more detailed study of labour turnover in a large integrated forestry complex (Smith, 1982)

confirms the high turnover rate for logging, although it appears that most other aspects of the industry suffers from the same problem.

We do know that, in the early 1990's, there will be a greater demand for more loggers, although the forecasts vary greatly (Table 3). Do we know where these loggers will come from? How will they be trained and how long will they stay in the industry? Do we have to attract them into logging somehow?

This simple overview of the logging labour force implies that much more work should be carried out on manpower planning, on attracting and training labour, on finding out more about the individuals in the industry, and on extension of method and ergonomic research results.

What do we know from other Studies?

Of the great many studies of logging operations and the human element, I have chosen only a few to illustrate where further research should be directed.

1. From studies specifically designed to determine the important factors which influence logging productivity, it has been found that 40% (or more) of productivity variation is related to something other than the physical working conditions (stand, terrain, climate, operational factors). This something is the human factor - the training, motivation, supervision, and managment of the workers (Aird, 1970; Cottell, 1975; Winer, 1967).

2. Strongly motivated and properly organised logging crews, working in adverse conditions (smaller trees, longer hauls) can out-produce poorly motivated and poorly organised crews working in favourable conditions of larger trees and shorter haul distances (Hamilton, 1966). Management of logging crews should provide conditions that permit these "aggressive" crews to be effective.

3. Technical skills and technology account for the greatest part of variances in productivity only when work team output is low. For high producing teams, most of the incremental improvement is established through the social system - i.e. through good team functioning (Fig.3). A model of a system which includes both the technical and the social aspects is shown in Figure 4 (Kolodny, 1979). From this viewpoint, it is the organisational arrangement, leadership and management, that contribute most to the effectiveness of the logging crews.

The implications here are that certain aspects of management and supervision are very effective in assisting the achievement of gang satisfaction and higher productivity. What are these aspects? Can they be taught?

Research Needs

Based on the above points, the main areas for action can be identified as :

1. The acceptance by a body of the responsibility to undertake manpower planning for the logging (forestry?) industry;

EMPLOYMENT TREND - LOGGING IN NEW ZEALAND

FIGURE 1

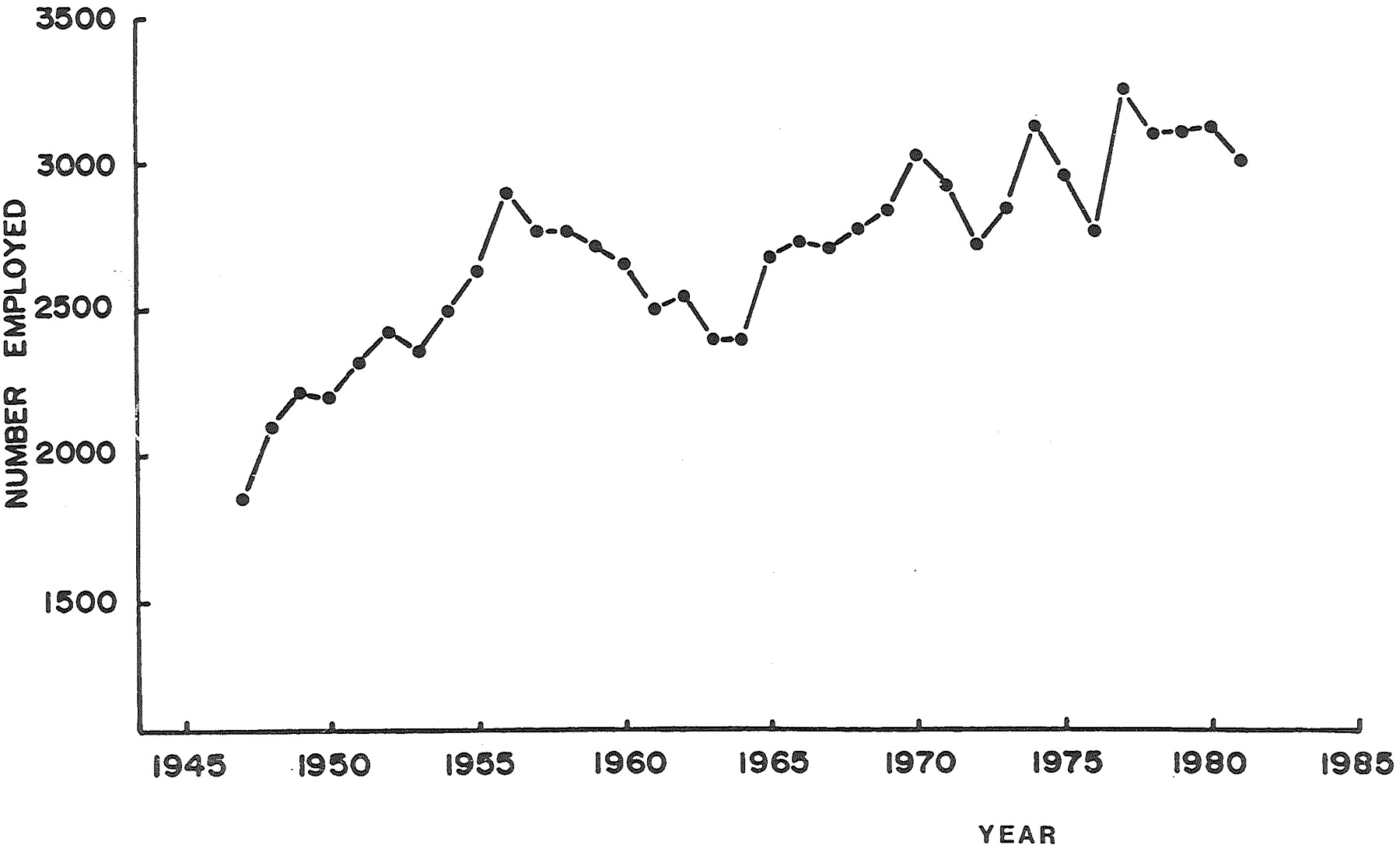


Figure 2

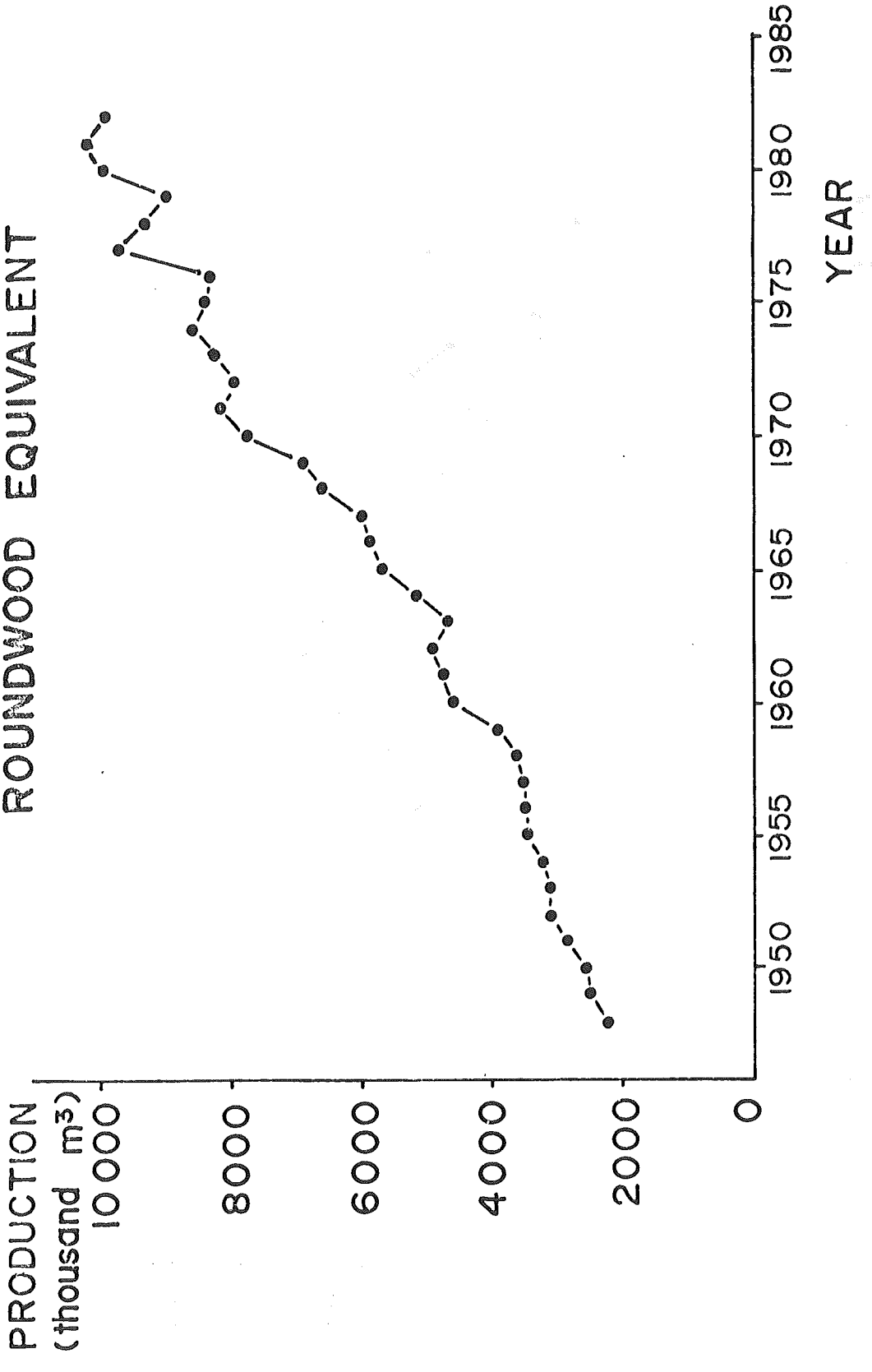
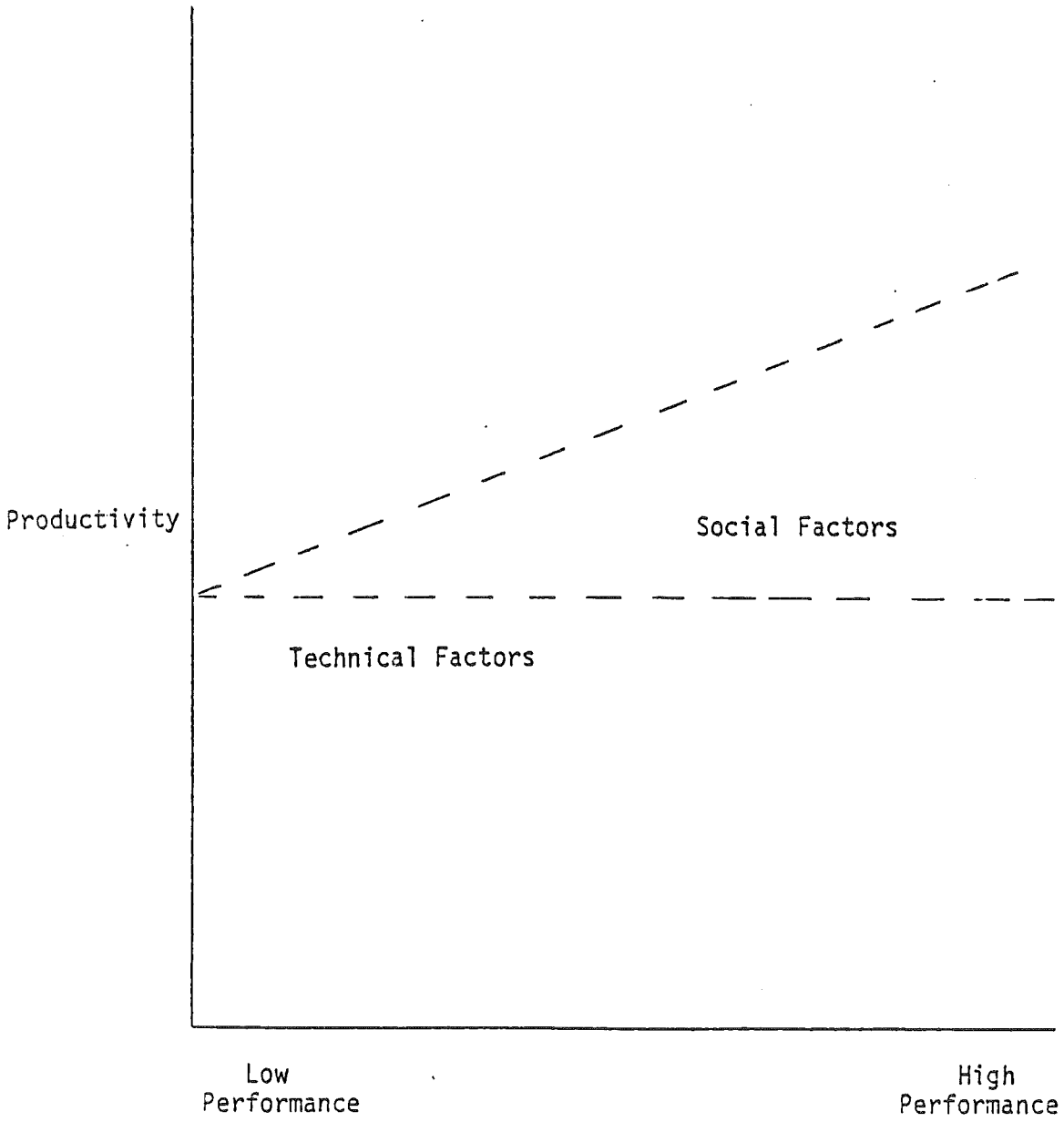

PRODUCTION OF FOREST PRODUCTS IN ROUNDWOOD EQUIVALENT
PRODUCTION (thousand m³)
10000
8000
6000
4000
2000
0
1950
1955
1960
1965
1970
1975
1980
1985
YEAR

FIGURE 3

INFLUENCE OF TECHNICAL AND SOCIAL FACTORS ON PRODUCTIVITY



2. Research concerned with identifying those managerial and supervisory traits which lead to increased worker satisfaction and productivity;

3. Further research into the characteristics, motives and aspirations of those already in the industry;

4. The extension of existing training schemes to cover all of New Zealand and to include a recruitment programme; and the training of supervisors to allow them to be most effective;

5. Extension services to encourage the application of method and ergonomic studies to make the job safer and easier. Labour stability and productivity gains will follow.

References

1. Aird, P.L. 1970 Evaluating the productivity of logging machines: studies of Beloit Harvesters. Pulp and Paper Research Institute of Canada, Woodlands Review 22, 19 pp.

2. Cottell, P.L. 1975 Human factors in logging productivity. IN Manpower - forest industry's key resource. Yale University School of Forestry and Environmental Studies. Bulletin No.86. New Haven, Connecticut.

3. Fielder, M.R. 1979 A study of the logging labour force. Dissertation, School of Forestry, University of Canterbury.

4. Hamilton, H.R. 1966 Highlights of the Battelle Study of southeastern pulpwood harvesting. APA Technical Release, 66-R-10. American Pulpwood Association, New York. 25 pages.

5. Hennessy, M. 1976 Aspects of labour supply in logging. Dissertation, School of Forestry, University of Canterbury.

6. Kolodny, H.F. 1979 A sociotechnical study of productivity and social organisation in mechanical harvesting operations in the Canadian woodlands. Research Report, Technical Innovation Studies Program, Industry, Trade and Commerce Canada. 35 pages.

7. Smith, B. and Wilson, P. 1982 Labour relationships in the forest industries. Forest Industries, December, pg.10-12.

8. Winer, H.I. 1967 Factors affecting productivity in skidding. TREND, September, pg.4-7.

9. Wells, G.C. 1980 A survey of the N.Z. logging labour force. LIRA Project Report P.R.11, 27 pages.

Table 1

COMPARISON OF ACCIDENTS BY INDUSTRY

INDUSTRY	CALENDAR DAYS LOST			FREQUENCY RATE*		
	1968	1969	1970	1968	1969	1970
Logging	100,713	132,159	177,882	16.1	14.5	17.9
Meat Freezing and Preserving	253,634	280,844	224,251	13.7	14.0	14.3
Forestry	9,347	11,303	16,173	8.7	7.2	7.0
Building and Construction	765,588	707,313	681,751	6.4	6.7	6.7
Sawmilling	83,102	68,425	72,751	5.5	6.0	6.4
Electrical, Gas and Steam	95,716	32,428	79,149	4.7	4.6	5.1

* Number of accidents per 100,000 man-hours worked.

Table 2

ECONOMIC SEVERITY RATE OF INDUSTRY 1970

INDUSTRY	MAN HOURS LOST PER 100,000 MAN HOURS WORKED
Coalmining	3,366
Forestry	946
Logging	21,316
Sawmilling	1,432
Meat Freezing	2,228
Building and Construction	2,975
Electrical, Gas, Steam	1,894

Table 3

FORECAST OF LOGGING LABOUR REQUIREMENTS

(1)

Years	Number
1976	2613
1981	2524
1986	2649
1991	4045
1995	6025
2001	7990
2006	10753
2011	11450

(2)

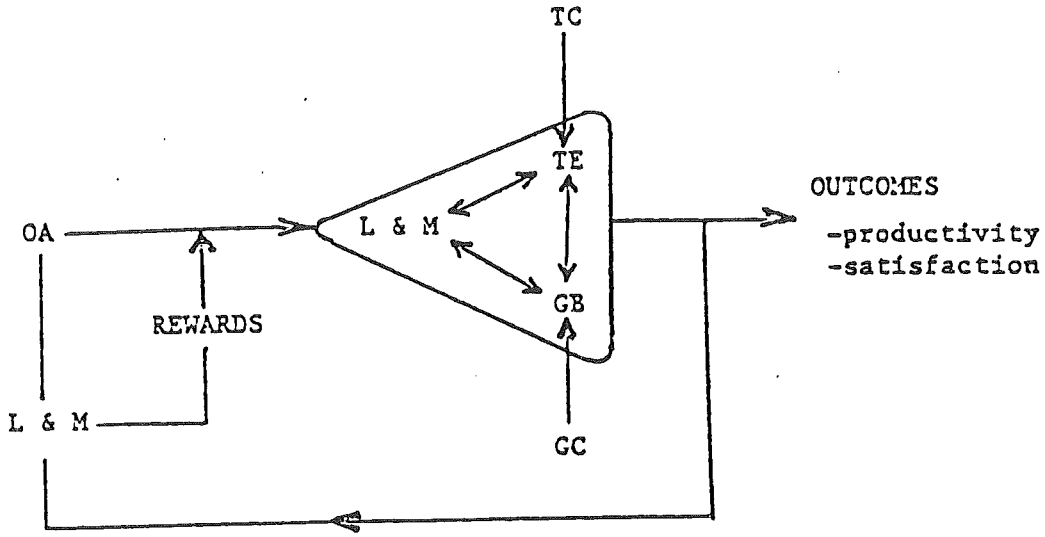
Years	Number
1981-1985	2856
1986-1990	2460
1991-1995	2954
1996-2000	3546
2001-2005	4390

(3)

UPPER LEVEL		LOWER LEVEL	
Year	Number	Year	Number
1985	2444	1985	2155
1990	2545	1990	2083
1995	3278	1995	2673

(1) and (2) from Wells (1980)

(3) from 1981 N.Z. Forestry Conference Report of the Working Party on Training and Employment.



GROUP CHARACTERISTICS (GC) : demographic and socio-cultural characteristics of group members as well as experience as individuals and as members of the work group;

TASK CONDITIONS (TC) : terrain, tree size and species mix, weather, equipment status;

GROUP BEHAVIOURS (GB) : group cohesiveness and interactions between mechanics, operators and supervisors;

TECHNICAL EFFECTIVENESS (TE) : how well a shift (mechanics, operators and supervisors) carries out its basic technical tasks;

LEADERSHIP AND MANAGEMENT (L & M) : technical, administrative and social skills of phase supervision; formal and informal leadership style and quality;

ORGANISATIONAL ARRANGEMENTS (OA) : ways in which men and machines are combined, including transportation systems and reward and information feedback systems.

Figure 4 : A Sociotechnical Systems Model in Woodlands Harvesting