An Application of
Soft Systems Methodology
in the On-Farm Labour Situation
in the New Zealand Dairy Industry

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Janet I Reid

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ABSTRACT

The Farmer First Research (FFR) programme at Massey University has the primary aim of researching and adapting the application of soft systems approaches to ill-defined and complex problem situations in the New Zealand dairy industry. The labour situation on many New Zealand dairy farms was identified as problematic for a large number of people in the dairy industry. A number of poorly understood, interrelated problems comprise the situation that is viewed differently by people in the situation. A soft systems approach was applied to the on-farm labour situation to obtain an understanding of the situation that would assist people to define action to improve the situation.

From a review of six soft systems approaches, Soft Systems Methodology (SSM) was selected for application in the on-farm labour situation. A partial iteration of the most recent articulation of SSM (Checkland and Scholes 1990) was undertaken. A rich description of the problem situation was developed from problem-owner interviews and secondary data sources. The information obtained was analysed to identify the elements of structure, process and climate in the situation. Also, an analysis of the intervention and analyses of the social and political aspects of the situation was made.

Livestock Improvement Advisory, the farm management group within Livestock Improvement Corporation in the New Zealand dairy industry, are strongly involved in servicing the needs of dairy farmers. This group have the resources and ability to improving components of the on-farm labour situation and were allocated the role of primary-decision taker for the SSM inquiry. On the basis of their role and influence in the problem situation five relevant human activity systems were selected from the rich description. The five relevant systems were modelled to assist Livestock Improvement Advisory to debate and define action to improve the on-farm labour situation.

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CHAPTER ONE

The Research and Problem Context

1.1   Introduction

The identification of a problem situation in the New Zealand dairy industry combined with an interest in researching the application of systems approaches in the same context was the basis for the initiation of this research project. The on-farm labour situation was identified as a situation of concern to a large number of people in the New Zealand dairy industry. On-farm labour has been a recurring problem situation in the New Zealand dairy industry for over 50 years and although the industry has made dramatic advances over that period the on-farm labour situation has remained unresolved. The problem situation comprises a number of different problem areas that are not well understood. A soft systems approach was applied to the on-farm labour situation in the New Zealand dairy industry.

This chapter introduces the research project and describes the context in which the project is set. Aspects of the dairy industry relevant to the problem situation are summarised. The research objectives, and the research strategy that guided this project, are presented along with a summary of the structure of the thesis.

1.2   The Research Context

The research project presented in this thesis is part of the broader Farmer First Research (FFR) programme, based in the Department of Agribusiness and Resource Management at Massey University. Livestock Improvement Corporation (LIC) and Massey University jointly fund this research programme. LIC is a wholly owned subsidiary of the New Zealand Dairy Board. The primary relationship between the FFR programme and LIC is through the staff of Livestock Improvement Advisory, the farm management group within LIC. The primary aim of the FFR programme is to develop and adapt systems approaches for the benefit and use of people involved in the dairy farming sector of the New Zealand dairy industry. In particular, it is the aim of this programme to complement and enhance the activities of Livestock Improvement Advisory field staff.

1.2.1 The New Zealand Dairy Industry

The New Zealand dairy industry is primarily concerned with the production, processing and sale of milk-based products (NZDB 1991). It is a vertically integrated industry that has operated as a farmer owned cooperative since the early 1900s. The industry is a core sector of the New Zealand economy (ACIL 1992). In 1993, dairy products contributed 26% to total agricultural output in New Zealand (Statistics New Zealand 1995). Of the milk solids produced on New Zealand dairy farms, 95% is exported and this accounts for some 25% of the world trade in dairy products (NZDB 1991).

In 1997, the New Zealand dairy industry includes more than 14600 dairy farm businesses, 13 dairy processing companies, the New Zealand Dairy Board (NZDB) and its associated and subsidiary companies and research institutions. The NZDB's subsidiary companies and research institutions include Livestock Improvement Corporation, Dairy Research Corporation and the Dairy Research Institute (NZDB 1996a). The NZDB, with input from the dairy industry, articulated a vision that defined the purpose for, and the manner in which the industry undertook its primary task. The vision of the New Zealand dairy industry is:

> ... to be the most profitable unsubsidised dairy industry in the world, providing dairy farmers with increasing wealth and secure returns superior to other land uses by:

- retaining the industry's integrated marketing and processing structure, cooperatively owned and controlled by farmers;
- ensuring the NZDB is the world's best dairy marketing organisation, achieving superior and sustainable returns from New Zealand milk products;
- ensuring the Board [NZDB] takes the responsibility to market all milk offered, supplemented by appropriate pricing and investment signals (New Zealand Dairy Exporter 1995b: 74).

Although the dairy industry is tied together by a common interest, articulated in the vision and primary task of the industry, it comprises many separate entities with different goals that relate to the different activities each entity undertakes. The business goals that direct the activities of the NZDB, Dairy Companies (Bay Milk Products (N.Z.) 1996; N.Z. Dairy Group of Companies 1996; Tui Milk Products 1996), LIC (Livestock Improvement 1995b, 1996b) and other business entities

within the dairy industry are well defined and documented. Most of the dairy farming sector's 14600 dairy farm businesses are family owned and operated (ACIL 1992). Interrelated family and business goals, which are often not clearly articulated, guide the decision making and activities undertaken on these farms (Fairweather and Keating 1990; Laws A. 1990; Coulson 1996). The degree to which the range of activities undertaken by the individuals and organisations within the dairy industry, defines the problem situations that exist in the industry, is unclear. However, problem situations will be viewed differently by the various entities in the industry in relation to their activities and goals. Therefore, it follows that changes that constitute an improvement in a problem situation will be defined differently by the entities that comprise the industry.

1.2.2 Livestock Improvement Advisory

The primary focus of Livestock Improvement Advisory, a group within LIC, is the activities of the industry-funded Consultancy Officer (CO) Service and the user-pays FarmWise consultancy (Livestock Improvement 1995b). The Consultancy Officer service is primarily involved with mass extension activities within the dairy farming sector, achieved predominantly through farmer discussion groups (Livestock Improvement 1996b). FarmWise consultants offer an agricultural consultation service to the dairy farming sector and work to a large extent with individual farm businesses.

Livestock Improvement Advisory staff identified the on-farm labour situation in the dairy sector as an issue of importance to dairy farmers and the industry as a whole. The situation was initially described as problematic for dairy farmer employers who were having difficulty recruiting and retaining the calibre and number of staff required to fill available employment positions. Although primarily a farm level problem, the potential longer term repercussions of this situation were considered problematic for the industry as a whole.

1.3 The On-farm Labour Situation in the New Zealand Dairy Industry

Many aspects of the on-farm labour situation cannot clearly be defined. The magnitude of the problem situation, the people currently affected and the improvements, if any, which could be made to the situation and by whom are some of the aspects of the situation that are not well understood. A number of factors are considered to have contributed to the current situation in the dairy industry. The demand for on-farm labour has been influenced by the long term trend of

increasing farm and herd size combined with a recent increase in the total number of dairy farms. These changes in the structure of the dairy sector are in part the result of the introduction of improved technology and farm management practices (Livestock Improvement 1996a). However, the changes also reflect the dairy farming community's response to the general decline in the real value of payout farmers have received for the milk they produce (Livestock Improvement 1995a, 1996a). The increase in the number of dairy farms reflects the relative economic advantage of dairy farming compared to other agricultural farming enterprises (MAF 1997). At an industry level, these factors give some explanation for the current problem situation. However, these factors do not explain the variation in the problem situation at a regional and a farm business level. Employment issues on-farm are not a new concern for the New Zealand dairy industry. On-farm labour issues have been an inherent part of dairy farming for the last 50 to 60 years (Hamilton 1944). However, the relationship between employers and employees is again being highlighted as an important component of the larger on-farm labour situation. The factors that define the employment issues on dairy farms and in dairy farming regions differ between farms and between regions. Therefore, the changes required to address the issues will be specific to each region and each farm business.

The problem situation comprises a number of interrelated issues that occur at an on-farm, regional and industry level. Livestock Improvement Advisory along with a number of other organisations, groups and individuals within, and associated with, the industry (eg farmer employers, Dairy Section of Federated Farmers and Dairy Farm Training Institutes such as Polytechs) have identified the on-farm labour situation as problematic. However, the exact nature of the problem and how the situation can be improved is unclear.

1.4   Soft Systems Approaches

Soft systems approaches were developed for problem situations where the people involved in purposeful activity have different views of the situation (Churchman 1971; Checkland 1981a, 1989a). The approaches are useful in situations that are poorly understood and comprise a number of interrelated problems (Checkland 1981a). Soft systems approaches are used to gain an understanding of the situation and to help define action to improve the situation (Checkland and Scholes 1990; Wilson and Morren 1990; Davies and Ledington 1991). Numerous examples of the successful application of these approaches in agricultural situations in countries other than New Zealand do exist (see for example, Macadam, Britton, Russell, Potts, Baillie and Shaw 1990; Frank, Norcott and McIntosh 1994). However, soft systems approaches have been used to a limited extent

in the New Zealand agricultural sector (see for example, Saunders and Townsley 1991; Valentine, Hurley and Glass 1992; Timms 1993; Macadam and Lundie-Jenkins 1996). The work undertaken in New Zealand and overseas using soft systems approaches suggests that these approaches may be appropriate for use in the on-farm labour situation in the New Zealand dairy industry.

1.5   Problem Statement

People in the New Zealand dairy industry have concerns about the current on-farm labour situation. The ill-defined problem situation was initially identified as comprising several different interconnected problem areas that were perceived differently by people in the situation. Action to improve the situation could be better defined if the situation were more clearly understood. Soft systems approaches were developed to help understand ill-defined problem situations so that action to improve them could be defined. Although used successfully in agricultural contexts overseas, there is limited documented evidence to assess the appropriateness of these approaches to a New Zealand dairy industry context.

1.6   Research Objectives and Strategy

Two research objectives were developed from the problem statement. The research objectives are given below and a three phase research strategy formulated to achieve these objectives is also outlined.

1.6.1   Research Project Objectives

The objectives of the research project are twofold:

- To gain an understanding of the on-farm labour situation in the New Zealand dairy industry to help define action to improve the situation.

- To investigate the appropriateness of using a soft systems approach in a problem situation in the New Zealand dairy industry.

1.6.2   Research Strategy

The research strategy to achieve these two interlinked objectives is:

1.   To gain an understanding of soft systems approaches from the literature and to select an appropriate approach to use in the on-farm labour situation in the New Zealand dairy industry.

2.   To review the literature on the selected approach and to describe the approach in detail.

3.   To use the selected soft systems approach to gain an understanding of the on-farm labour situation and to assess the appropriateness of the approach to this problem situation.

1.7   Research Thesis Structure

A review of the literature on soft systems thinking and approaches is presented in Chapter Two. Factors contributing to the development of soft systems thinking are outlined and hard, soft and critical systems approaches are described. Fundamental ideas that underpin soft systems thinking are outlined and the practical application of these ideas is illustrated in an outline of six soft systems approaches: Social Systems Design (Churchman 1971, 1979), Strategic Assumption Surfacing Technique (Mitroff and Emshoff 1979), Social Systems Sciences (Ackoff 1981), Strategic Options Development and Analysis (Eden 1989, Eden and Simpson 1989), Soft Systems Methodology (Checkland 1981a, 1989a) and Strategic Choice (Friend and Hickling 1987; Friend 1989). Different views from the literature on the selection and use of systems approaches are reviewed. This material is the basis for the selection of Soft Systems Methodology as an appropriate approach to obtain an understanding of the on-farm labour situation.

The SSM process of inquiry is reviewed in Chapter Three. The central focus of this review is the most recent articulation of SSM (Checkland and Scholes 1990), as it is this version of SSM used in this research project. The review of SSM is structured in line with the three main phases of the methodology 'Finding out', 'Modelling purposeful human activity' and 'Taking action to improve the

situation'. The Constitutive Rules for SSM (Checkland and Scholes 1990), which were the main framework that guided the use of SSM in this project, are presented.

The use of SSM in this project is described in Chapter Four. The research design, a single partial iteration of SSM is justified in relation to the research project and problem situation. Models of human activity systems are used to describe the research project and the use of SSM in the project. The methods used to obtain information from problem-owners and secondary data sources are explained and the analysis of the information and construction of the rich description described. The naming of primary task and issue-based systems and the process used to select the relevant systems is explained. The method used to construct the relevant systems as root definitions and conceptual models is described.

The rich description and the five models of relevant systems developed for Livestock Improvement Advisory to debate are presented in Chapter Five. Included as part of the rich description are outcomes from the analysis of the intervention and the preliminary findings from the analyses of the social and political aspects of the situation. A rich picture is included that represents the main outcomes from the analyses, including the structure, process and climate elements identified as important to the problem situation. The main aspects of the situation that are represented in the rich-picture are explained. The rich description provides the background for the presentation of the five models of relevant systems that were selected and modelled for debate by Livestock Improvement Advisory. The selection of the models is justified in relation to Livestock Improvement Advisory's role in the industry and the models are expressed as root definitions and conceptual models. The component activities comprising the conceptual models are described.

Conclusions drawn from the research project are discussed in Chapter Six. The use of SSM in this project is reflected on and discussed in relation to the research project objectives. The legitimacy of the claim that SSM was used is assessed in line with the Constitutive Rules for SSM (Checkland and Scholes 1990). An evaluation of the research method and a consideration of the methodological lessons obtained from the use of SSM in the dairy industry context are outlined. Recommendations are made for future research activities that were identified as a result of this project.

CHAPTER TWO

Systems Thinking and Approaches[1]

2.1   Introduction

S oft systems thinking is the intellectual framework that has guided this research project. This chapter outlines the fundamental components of systems thinking. Soft systems thinking is defined and differentiated from hard and critical systems thinking. The relationship between systems approaches and different types of problem situations is considered in relation to the choice of a soft systems approach to use in the on-farm labour situation. The practical application of soft systems thinking has been embodied in a number of different soft systems approaches. Six soft systems approaches are summarised to provide an appreciation of the range of ways in which systems thinking can be used. The reason for the selection of Soft Systems Methodology as the soft systems approach that was applied to the on-farm labour situation in the New Zealand dairy industry is outlined.

2.2   Systems Thinking and the Concept of a System

T he way that people act and deal with situations that confront them in the world is determined by the theories and intellectual framework that they have constructed from their experiences in the world (Figure 2.1) (Dewey 1933; Wilson and Morren 1990; Bawden 1991). An individual's theories about the world are influenced and adapted through learning and by the unique way in which they interpret and give meaning to their experiences (Wilson and Morren 1990; Bawden 1991). Purposeful activity is action that is taken by a person deliberately, decidedly and for a reason (Checkland 1981a; Checkland and Scholes 1990). An individual's intellectual framework and theories are realised in purposeful activity. This is achieved through a process or methodology by which their ideas are applied in an organised way to the situation in which they find themselves (Checkland 1981a, 1985).

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[1] 'Approach' and 'methodology' are used synonymously in this thesis.
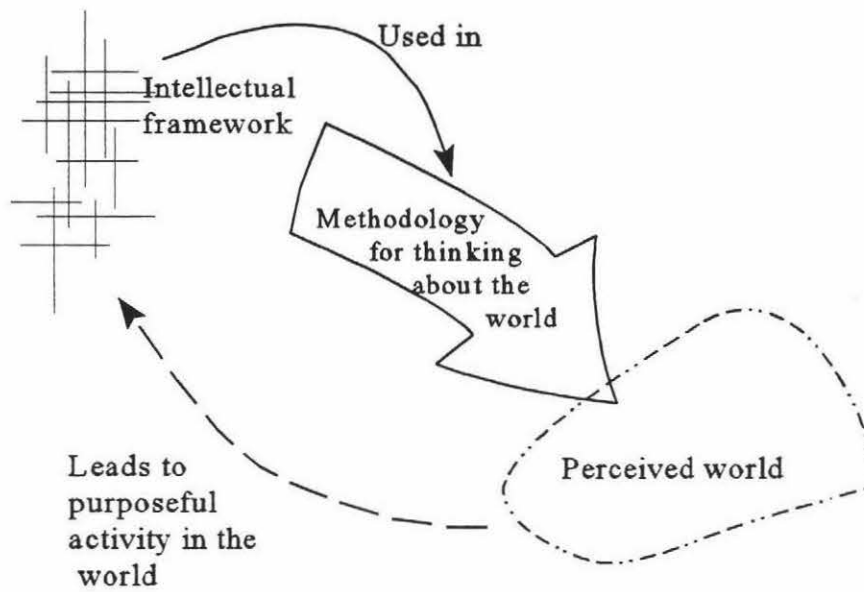
Figure 2.1   The use of methodology to guide thinking about the world that leads to purposeful action by people in the world (adapted from Checkland 1985: 758).

Systems thinking is a particular way of thinking about and making sense of the world. The thinking is based on an intellectual framework of which the idea of a system is a core concept. The formal recognition and documentation of systems ideas emerged in a number of different areas during the 1920s (Smuts 1926), but the 'organismic biologists', and in particular Ludwig von Bertalanffy (1956), are recognised for the significant contribution they made to the development and articulation of systems thinking (Checkland 1981b).

The concept of a system was found by the biologists to be a more useful framework for investigating and understanding biological organisms than the predominant thinking of the time that was based on ideas of reductionism and mechanism (Bertalanffy 1968). Reductionism implies that an understanding of a portion of the world can be gained by reducing it to its most basic parts. Combining an understanding of these parts, analysed as independent entities, leads to an understanding of the whole. Mechanism is based on the assumption that living systems can be meaningfully understood by thinking of them as complex machines. The relationship of their parts being simple cause and effect relationships (Ackoff 1974; Dillon 1976; Checkland 1981b). Systemic thinking was better able to capture the complex interrelationships that exist within and between biological organisms, than reductionist or mechanistic thinking.

The concept of a system is defined by a number of fundamental properties that relate to the process, structure and behaviour of an entity (Checkland 1981a; Davies and Ledington 1991; Daellenbach 1994). These properties are:

components:

> a system is made up of a number of organised components or parts that may be abstract or physical;

relationships:

> the way in which the components of a system are organised is the result of the relationships that exist between the components. The properties of the components when part of a system are different to the properties they possess when not part of the system;

boundary and environment:

> the scope and components that comprise a system are delineated by a boundary that separates the system from its environment;

transformation process:

> the purpose for which a system is created and designed is to undertake a specific process of transformation;

inputs and outputs:

> inputs and outputs are those entities that cross the boundary between the system and the environment of the system. The entities that enter the system, the inputs, are transformed by the system into outputs from the system. The entities that are transformed may be physical (e.g. money, milk, grass) or abstract (e.g. power, conflict, information);

emergence:

> the system possesses properties as a whole that are different to the properties of any one, or a number, of its components. An understanding of the properties of the system cannot be gained through an understanding of its separate components. The behaviour of the system as a whole emerges from the properties of its components and that of the relationships that organise the components into the system;

hierarchy:

> a system may contain subsystems and may itself be a subsystem of a wider system. Each level of organisation in the hierarchy of subsystems and systems is increasingly complex;

communication and control:

> a system is an entity that is able to adapt its behaviour through processes
> of communication and control. The components within and between the
> levels of organisation of a system, influence and adapt to the influence of
> other parts as a result of these processes. Likewise, the system as a whole
> responds and adapts to changes in its environment through these same
> processes.

Since its emergence, systems thinking has led to the development of a number of different systems approaches through which systems thinking can be applied to different real-world situations. The concept of a system has not changed, but the way in which the concept is used in the process of inquiry has changed and is the basis of the distinction between hard and soft systems thinking.

2.2.1 Hard Systems Thinking

The application of systems thinking to practical real-world problems was the basis of the earliest developed systems-based approaches of operational research (OR) (Churchman, Ackoff and Arnoff 1957; Hillier and Lieberman 1967), systems engineering (Hall 1962; Jenkins 1969) and systems analysis (Optner 1973). Operational research and systems analysis utilise techniques to appraise the relative implications of alternative options for achieving a particular goal (Findiesen and Quade 1985). These approaches originated in wartime military operations planning and have been adapted and developed for application in nonmilitary, organisational management settings (Checkland 1978; Majone 1985). Systems engineering was developed in the 1950s from work undertaken at the Bell Telephone Laboratories. It involves ascertaining the organisation and design of component subsystems such that the defined purpose of the overall system is attained most efficiently (Hunt 1954). With the emergence of soft systems thinking, these approaches and the thinking that underpin them were referred to as hard systems.

One fundamental idea on which hard systems thinking is based relates to the nature of problems and the manner in which they can be solved. The idea is described by Checkland (1978: 22, emphasis as in the original):

> ... there is a desired state S_1, and a present state S_0, and alternative ways of
> getting from S_0 to S_1. Problem solving according to this [hard systems] view,
> consists of defining S_1 and S_0 and selecting the best means of reducing the

difference between them. Thus in SE [systems engineering] (S_1-S_0) defines the 'need', or the objective to be attained, and [aids to decision making] provides an ordered way of selecting the systems which could fulfil that need. *The belief that real-world problems can be formulated in this way is the distinguishing characteristic of all 'hard' systems thinking.*

Hard systems thinking was criticised initially for assuming that all problem situations could be formulated and addressed in this way. The definition of what was problematic was dictated by the parameters of the problem solving approach and not the needs of the situation (Ackoff 1979; Open University 1984). Problems were perceived as comprising a number of parts, and the parts and relationships between the parts were able to be clearly defined, measured quantitatively, and modelled (Open University 1984). Also implicit within hard systems thinking was the view that, the world is in reality made up of systems. Therefore it followed that, provided the parts of the system in the real-world were accurately identified and measured, the world could be modelled and improved within the systems framework. This prevailing view was central to the criticism of hard systems thinking (Churchman 1970; Checkland 1978, 1981a; Ackoff 1979).

In accepting that all problem situations could not meaningfully be thought of as a system, nor improved through the hard systems problem-solving process, soft systems thinkers challenged the traditional use of systems concepts in problematic situations. In rejecting the idea that the world was made up of systems, they argued that systems thinking and systems approaches were useful frameworks to help analyse and define actions to improve situations that were perceived to be problematic (Checkland 1989a; Checkland and Scholes 1990; Jackson 1991a).

Hard systems approaches are useful for problem solving in problem situations for which the assumptions on which the problem solving approach is based match those that exist in the problem situation. Many of the traditional hard systems approaches, along with the thinking which guides their use, have been developed and adapted to a point where many of the original criticisms directed at those using hard systems approaches no longer apply (Quade and Miser 1985). The perceived failure of hard systems approaches to address situations that did not fit the criteria assumed by the approaches led, in part, to the development of soft systems approaches (Ackoff 1979; Checkland 1981a).

2.2.2   Soft Systems Thinking

S oft systems thinking was developed for problem situations of frequent concern to decision makers in organisational and social settings, which were not being satisfactorily addressed through the use of hard systems approaches (Churchman 1970; Ackoff 1979; Checkland 1981a). Soft systems thinking is complementary to hard systems thinking, but it does not assume that the world comprises systems (Checkland 1985).

Situations that lend themselves to soft systems analysis are those that Ackoff (1979) termed messes; these are dynamic situations in which there are a number of interrelated problems and people have different views on the problem situation. Accordingly, people have varying perspectives on what an improvement to the situation would be. Such unstructured and ill-defined situations frequently exist in organisational and social settings (Churchman 1970; Ackoff 1979; Checkland 1981a). In these cases, thinking of the problem situation as a system is neither meaningful nor useful. This is because the parts in the situation that would comprise the system and the relationships between the parts, are unclear and difficult to measure quantitatively. Correspondingly, the type of change that would constitute an improvement to the situation is also difficult to define. In such a problem situation, representing faithfully the true nature of the situation as a systems model, for the purpose of improving the situation, is almost impossible (Ackoff 1979).

The concept of a 'problem', and consequently a 'solution', is defined by soft systems thinkers in relation to organisational and social contexts, as a product of the people involved in the problem situation. That is, problems exist because people are part of the situation. Problems, and their solutions, are perceived to be 'intellectual constructs' of people's perception of the situation, for which they hold some concern (Checkland 1981a; Open University 1984; Checkland and Scholes 1990). People's understanding of a situation will be different because their intellectual frameworks are uniquely their own. This idea is embodied in the concept of Weltanschauung[2], or world-view, which is fundamental to all soft systems approaches (Churchman 1971; Ackoff 1979). People view the world differently; 'reality' is filtered and shaped by past experiences, personal beliefs and values that make up an individual's Weltanschauung (Churchman 1971). Thus, individual beliefs about what is, and what ought to be, will be different (Open University 1984). The need to understand and incorporate the different world-views of people in the definition of a problem situation and, thus, the

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[2] 'Weltanschauung' and 'world-view' are used synonymously in this thesis.

definition of action to improve the problem situation, is the aim of soft systems approaches (Churchman 1970; Ackoff 1979; Checkland 1981a).

> Systems designers must accept that completely different evaluations of social
> systems, their purpose, and their performance can and do exist (Jackson 1991a:
> 137).

A further characteristic of the concept of a 'problem' in social settings is that they tend not to exist as a single isolated problem but, rather, as a system of interrelated problems, or a 'mess' (Ackoff 1979). In applying the term 'system of problems' to the problem situation, Ackoff (1979: 100, emphasis as in original) defined, through systems concepts, the nature of the solution to the situation:

> Because messes are systems of problems, the sum of the optimal solutions to
> each component problem taken separately is *not* an optimal solution to the mess.
> The behaviour of a mess depends more on how the solution to its parts interact
> than on how they act independently of each other.

An aspect of the thinking embodied in soft systems thinking was the value placed on the process (the means) by which the end point was reached, as well as the attainment of the end point itself. Ackoff (1979) argued that in an organisational and social setting where people were involved in change in order to improve a situation, there was intrinsic value, not only in attaining the desired end point, but also in the way that the end point was reached. The focus of hard systems analysis, as documented by Ackoff (1979) and Churchman (1970) with respect to Operations Research, was on the attainment of an optimal solution to the problem. The value of solving a problem was judged solely on the satisfaction gained through the attainment of the solution. The value placed on the process by which the end point was reached depended only on the efficiency with which the 'end' was attained relative to other options (Ackoff 1979). The products of soft systems approaches that are valued, are to a large extent 'invisible' outcomes (Rosenhead 1989b). Problem situations that are suited to soft system approaches tend to be characterised by people holding different views on a situation and improvement in the situation will be attained when there is a clearer understanding by these different people of others' perspectives. The value of the improvement, however, is more a function of the learning and communication that occurred during the process of reaching a greater level of shared understanding, than the shared understanding itself.

Hard systems thinkers perceive the world to be constructed of systems. Therefore, a model of the system is considered a useful basis for defining change to improve the system that exists in the real-world. On the other hand, soft systems thinkers take a system's model to be a representation of only one perception of 'reality' (Figure 2.2). To design a system's model that is relevant to a situation, for which there were multiple views of 'reality', the participation of all the people involved is a requirement of the design process (Churchman 1971; Checkland 1981a).

A   Observer/analyst

B   Model of system

C   Idea of system

D   A part of the world

B is a model of C,
which is relevant to D
as it helps A to understand or change D.
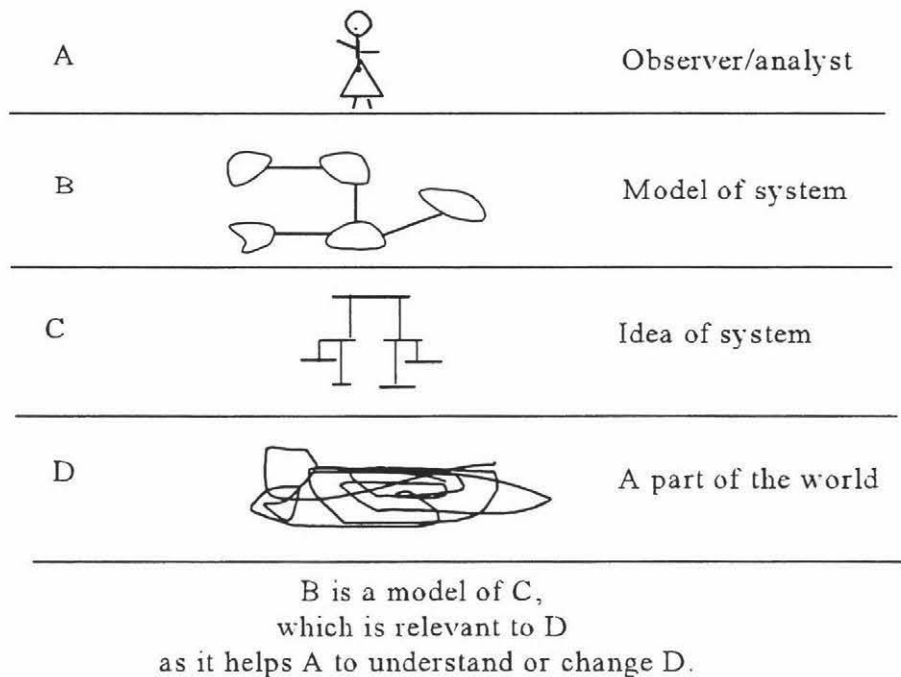
Figure 2.2   The soft systems use of a model of a system (source Woodburn 1988: 51).

Churchman (1970) and Ackoff (1979) argued also that modellers of systems need to attribute the role of 'client' (the people for whom the system is being designed) not only to the decision maker, who employed the designer, but to all the stakeholders[3] who are likely to be affected if the system design is realised in the real-world.

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[3] Stakeholder: individuals or groups of individuals having an affect of affected by a situation (Ackoff 1979).

The inclusion of all stakeholders' objectives into the system's design was deemed essential if a 'whole system' improvement was to be attained:

> ... the role of managers and their researchers is to try to dissolve or resolve conflicts and serve all of an organisation's stakeholders in a way that reflects the relative importance of the organisation to them, not their relative importance to the organisation ... this cannot be done without involving them or their representatives in the organisation's decision making (Ackoff 1979: 103).

As soft systems thinkers' view social reality as a function of the perceptions of the individuals affected by and affecting that reality, participation is fundamental to soft systems approaches (Churchman 1971; Ackoff 1979; Eden, Jones and Sims 1979). Participation is also a basis for validation of these approaches. Soft systems approaches are valid if the process and the actions defined through the process have been generated by the stakeholders (Ackoff 1979; Jackson 1985).

The idea that a model represents only one view of 'reality' marked a fundamental shift for systems thinkers. Models were no longer used as a means of modelling the real world, but as a means of structuring open and free debate about the value, or otherwise, of existing and proposed systems designs (Eden *et al.* 1979; Checkland 1981a). Soft systems thinking accepts the value of modelling parts of the real world as a means of guiding the exchange of alternative views of 'reality', because 'reality' it is acknowledged, is perceived differently by different people:

> ... the most important point to be remembered by all work in the systems area. This is that 'system' is not the name of something which exists in the real world. 'System' is a means of notating the real world in a way which may or may not map onto reality: above all it is a notation *chosen by an observer* ... (Chapman 1977, cited Checkland 1979a: 135, emphasis as in citation).

Therefore, a fundamental tenet of soft systems approaches is that improvement to a problem situation will most likely occur through sharing and negotiated modification of perceptions (Churchman 1971; Checkland 1981a; Open University 1984). Learning can be described as: "... *a conscious or subconscious process of developing or adapting perspectives to make better sense of the world*" (Grundy 1994: 5). Soft systems approaches do this in several ways using a variety of techniques, but the aim in each case is to encourage learning so that an accommodation can be reached among participants involved in a problem situation (Checkland 1985; Wilson and Morren 1990).

Soft systems approaches use methods designed to make explicit, to challenge and to change people's perceptions of reality so that meaningful and purposeful action is defined. As a result of this, the inquiry process also provides a learning environment for participants (Eden *et al.* 1979; Checkland 1985; Wilson and Morren 1990). The link between soft systems thinking and the theory and practice of learning have been articulated in the literature in relation to soft systems approaches such as Strategic Options Data Analysis (Eden *et al.* 1979; Eden 1989) and in particular to Checkland's Soft Systems Methodology (Checkland 1985; Bawden, Ison, Macadam, Packham and Valentine 1985; Checkland and Scholes 1990; Wilson and Morren 1990; Bawden 1991).

Consistent with the emphasis on process and participation of stakeholders in soft systems approaches, the soft systems researcher's[4] role in the inquiry process differs from the traditional systems researcher's role (Churchman 1970; Ackoff 1979). The researcher no longer assumes the role of problem solving expert. She/he is the manager of a process in which participants define actions, or prioritise decisions, to improve the situation (Eden 1989; Wilson and Morren 1990). The researcher's task is also to facilitate and encourage learning amongst participants (Checkland 1985).

Hard systems thinking led, in part, to the development of soft systems thinking and, likewise, critical systems thinking emerged, in part, from soft systems thinking. On a continuum, soft systems can be thought of as sitting between hard and critical systems thinking. For completeness, an outline of critical systems thinking is provided below as it incorporates a component of the ongoing development and refinement of systems thinking

2.2.3 Critical Systems Thinking and the Critique of Soft Systems Thinking

A large body of the critical debate that led to the development of soft systems thinking was directed at the limitations of 'hard' systems thinking (Churchman 1970; Checkland 1978, 1981b). The criticism that is directed at 'soft' systems thinking is not from the defenders of 'hard' systems thinking, but from a more radical 'critical systems' perspective that is seeking to 'revolutionise' systems thinking and practice (Jackson 1991a). Critical systems thinking emerged in the 1970s and 1980s (Wood and Kelly 1978; Thomas and Lockett 1979; Mingers 1980; Jackson 1982; Ulrich 1983; Jackson and Keys 1984).

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[4] Systems researcher is taken to be an individual who employs systems approaches and thinking to inquire into, and facilitate change in problem situations. The term researcher is used synonymously with analyst and manager in this thesis.

The major principles fundamental to critical systems thinking and practice are embodied in a number of commitments. These commitments are made to:

- critique:

  critical assessment of systems theories, techniques and approaches and the assumptions and values that underpin them;

- analyses of objective social reality:

  an awareness of, and allowance for, the political and societal pressures that influence social reality and the appropriateness of systems methodologies in any given situation;

- emancipation:

  the empowerment of individuals through critical self-reflection and awareness of their own situations, leading to the fulfilment of their full potential;

- pluralism:

  the complementary and informed use and development of all systems approaches (Jackson 1991b; Schecter 1991; Mingers 1992; Ellis 1995).

As with the hard-soft divide in systems thinking, the definition of social reality is central to the debate between soft and critical systems thinking. 'Hard' systems thinking was framed by systems concepts and the belief that social reality was a system. Therefore, social reality could be understood as a system and improved within this same framework (Checkland 1978, 1981a). Soft systems thinkers went a step further and recognised the influence of people in problem situations. For the majority of situations involving people, it was accepted that social reality was not a system, but a negotiated construct of people's world-views and perceptions of reality. Soft systems approaches use systems thinking and systems concepts to make sense and inquire into socially constructed reality. The focus of the soft systems approaches was on a process of debate and negotiation of social reality by the participants of that reality (Churchman 1971; Ackoff 1979; Checkland 1981a).

Critical systems thinkers argue that social reality is a function of more than people's perceptions of reality, it is also a product of 'objective' social realities which influence the subjective realities of individuals in the social setting (Jackson 1985). Objective social reality refers to the economic, social and political structures that impose constraints, roles and conditions on people within those social settings. These factors in society create classes of social elite's and the social under classes. Objective social reality that imposes, on sectors of communities, unequal access to such things as resources, power, and information may mean that the economic, political and social forces that

support this situation need to be changed before soft systems approaches will be useful. Critical systems thinkers also propose that people are often unaware of the impact such factors have on their world-view. Empowerment of disadvantaged people lies, it is argued, in individuals' critical reflection and analysis of social reality (Thomas and Lockett 1979; Jackson 1985). Soft systems approaches disregard for objective social reality, and hence power structures, is seen by critical systems thinkers as one of the reasons that soft systems approaches apparently support the structural social status quo in organisational and other settings in which it has been applied (Jackson 1991a; Flood 1993).

Critical systems thinkers also challenge the assumption, on which they argue soft systems approaches are based, that people's perceptions and Weltanschauungen can be modified with relative ease and surety through negotiation and debate (Mingers 1980; Rosenhead 1984; Jackson 1985). Critical systems thinkers argue that a person's Weltanschauung is much more deeply embedded in an individual than purely at the level of 'ideas' that they voice and support. A person's values and fundamental beliefs are also components of their Weltanschauung, and these characteristics are much more intransigent, and unlikely to be influenced purely through debate and negotiation. To ignore these aspects of 'objective social reality' when attempting to contribute to social change is perceived by the critical systems thinkers to be a 'serious' weakness of the soft systems approaches (Jackson 1991a, 1993; Schecter 1991; Mingers 1992).

A measure of the validity of the outcome of a soft systems approach is the degree to which the process of inquiry, which led to the outcome, was based on free and open debate amongst stakeholders (Ackoff 1979; Checkland 1981a). This requirement for participation in soft systems approaches, and the assumption that consensus can be reached in all situations, is viewed with scepticism by critical systems thinkers. The existence of true democracy and 'genuine' participation in any organisational, institutional or community setting is thought unlikely (Jackson 1991a; Schecter 1991). The application of an approach that is constructed on the assumption of genuine and open participation in a coercive problem-context (one in which there are unresolvable conflict and imbalances in power and influence) is considered likely to lead to 'consensus' that reflects the position and world-view of the dominant groups (Jackson and Keys 1984).

It is beyond the scope of this thesis to explore and consider these criticisms of soft systems approaches in any detail. There are, however, a number of apparent inconsistencies between the criticism directed at soft systems approaches and the soft systems literature. Churchman (1970) drawing on Hegel's ideas (1807, 1816) accepts that a person's Weltanschauung will never be completely changed, but it may be modified:

The Hegelian idea is that one's "world view" (Weltanschauung) shapes the information one uses to reach conclusions. No data can ever fatally destroy a Weltanschauung, although it may produce modifications in the basic story (Churchman 1970: B-47).

Checkland (1982: 34) argues that from his personal experience of SSM, people's Weltanschauungen are amenable to modification "*sometimes incrementally and sometimes radically*". Ackoff (1982) described the critical systems thinkers' view that some stakeholders are not able to identify their own interests and situation as elitist. Even if participation was not full and equal, he perceived it a poor reason not to attempt to make what progress could be made to improve the situation.

The idea of a genuine consensus is not explicitly articulated in the soft systems literature. However, genuine consensus is a component of the critical systems argument against soft systems approaches. The real issue seems to be with the lack of accounting for the power relationships within a situation by soft systems approaches. Checkland (1982) acknowledged that SSM had been used in a managerialist and conservative manner within some organisations. However, he argued there is no apparent reason why the methodology can not be used by critical thinkers to bring about the manner of change they were advocating.

In summary, critical systems thinkers argued for the need to recognise that different problem situations require the application of different systems approaches (Jackson 1991a). Critical systems thinkers advocate that hard and soft systems approaches are not appropriate for some social problems. The situations soft systems approaches are not suited are those characterised by power inequities and social constraints which limit the ability of all stakeholders to contribute equally to defining the problem or contributing to the decision making in that situation.

Soft systems thinking led to change and development in hard systems approaches (Quade and Miser 1985). Likewise, soft systems thinking appears to have been influenced by critical systems thinking, for example in encouraging a more comprehensive articulation of the approaches. Developments and refinements to soft systems approaches has meant that elements of the criticism directed at them in the 1980s can no longer be justified. The analyses of the political and social aspects of the problem situation that was implicit in SSM is made explicit in the latest version of SSM through the specific inclusion of an analysis of culture (Checkland and Scholes 1990). The cultural stream of analysis in this version includes an analysis of the intervention, and the analyses of the political and social aspects of the problem situation. A consideration of the ethical implications of using a soft systems

approach and the proposed action defined by the study is also a recognised component of, for example, SSM (Checkland 1981a; Atkinson 1989; Checkland and Scholes 1990).

2.3 A Framework for Considering Systems Approaches

An outcome of the development of hard, soft and critical systems thinking is a selection of different systems approaches. This thesis is concerned with applying a soft systems approach to the on-farm labour situation in the New Zealand dairy industry. This demanded that consideration be given to the implications of choosing a soft systems approach to address this situation and the factors on which the choice of a specific soft systems approach would depend. A number of authors have attempted to develop frameworks for matching a systems approach to a problem situation. However, the rationale for attempting to do this has been challenged (Jackson 1990; Mingers 1992; Brocklesby 1995). With reference to the literature, this section outlines the development of the debate and presents the perspective adopted for this research project.

2.3.1 The System of Systems Methodologies and Beyond

One of the criticisms of classical Operations Research (OR) that led to the development of soft systems thinking was the tendency for problem situations to be shaped to fit the skills of the OR consultant (Ackoff 1979). Soft systems thinkers initially argued for a situation in which the nature of the problem context defined the choice of problem solving approach to be used in that context, rather than the other way round (Churchman 1970; Ackoff 1979). In taking this stance, soft systems thinkers did not reject the place for hard systems approaches, but argued for the need to recognise that not all problem situations were 'best' addressed using only these approaches. Critical systems thinkers similarly criticised soft systems approaches. The type of problem situations soft systems approaches could be useful in were those in which objective social reality was not an important component of the problem situation (Jackson 1991a).

A number of authors developed frameworks for classifying problem situations in order to match them to an appropriate systems approach (Jackson and Keys 1984; Banathy 1987; Oliga 1988; Flood and Jackson 1991). *The System of Systems Methodologies* was constructed by Jackson and Keys (1984) as such a framework. This scheme was based on two component classifications; the degree of commonality in goals held by multiple decision makers, and the degree of complexity of the systems in which the problem was located (Jackson and Keys 1984). Each component of the classification

was differentiated into two distinct types. Problem contexts were classified based on whether there were multiple decision makers with a common goal [unitary] or different goals [plurality]. In combination with these, problem contexts were classified on whether they contained relatively easy problems; and, therefore, were able to be represented by simple systems [mechanical], or difficult problems; and, therefore, able to be represented as complex systems [systemic] (Jackson and Keys 1984; Oliga 1988). This scheme defined four possible problem contexts: mechanical-unitary, mechanical-pluralist, systemic-unitary, systemic-pluralist (Jackson and Keys 1984).

In addition to these four problem contexts, Jackson and Keys (1984) also proposed an additional categorisation for the problem contexts in which the relationship between the different parties was not equal. These situations were termed 'coercive' and were described as: *"characterised by contradictions between different political and economic interests"* and situations that *"constrain human development"* (Jackson and Keys 1984: 483). In these situations, because of the inequities in power, resources and ability to influence decision making, the possibility of attaining 'genuine' consensus between the relevant parties arguably could not be achieved.

Incorporating Jackson and Keys' (1984) scheme, Oliga (1988) developed a matrix (Figure 2.3) that matched systems approaches with the problem context classification criteria.

Participants' relationships	System Type	
	Mechanical	Systemic
Unitary	Mechanical-unitary - hard systems approaches	Systemic-unitary. - cybernetics - General systems theory
Pluralist	Mechanical-pluralist - soft systems approaches	Systemic-pluralist - soft systems approaches
Coercive	Mechanical-Coercive: - critical systems approaches	Systemic-Coercive - no approaches so far developed

Figure 2.3   Problem situations and systems methodologies (adapted from Jackson and Keys 1984; Oliga 1988; Jackson 1990).

Jackson and Keys (1984) System of Systems Methodologies (SOSM) was based on the idea that there are a range of problem situations and certain systems methodologies are better suited to particular problem situations. At the time of its initial construction, Jackson and Keys (1984) thought the key to the further development of the SOSM lay in the identification of relevant criteria by which problem situations could be categorised. This would enable the refinement of the process of matching a systems methodology to a problem situation (Jackson and Keys 1984).

Since the development of the SOSM, a number of the ideas on which it is based have been challenged and the proposal for its use modified (Jackson 1990; Schecter 1991: Mingers 1992). An element of the criticism related to the apparent discrepancy between the idea that people involved in the problem situation will perceive 'reality' differently, and the SOSM assumption that a problem context could be categorised meaningfully into one of only six possible categories (Jackson 1990; Mingers 1992). In accepting one definition of the problem situation, the idea of a negotiated social reality was ignored. Likewise, the single view of reality embodied in the one definition was likely to reflect the views of people dominant in the situation, an idea that also ran counter to the ideas underpinning the SOSM (Mingers 1992).

Imposing a framework to guide a researcher's selection of an approach ignores the influence the 'researcher' has on the process of inquiry. Although the categorisation of hard, soft and critical systems thinking is useful in terms of describing approaches and differentiating thinking, in practice, these are only conceptual distinctions (Brocklesby 1995). The delineation of an individual's thinking and practice will not necessarily fall neatly nor consistently into one of these categories (Brocklesby 1995: 1297):

> Just because someone is 'using' SSM [soft systems methodology] does not mean
> that they may fit neatly into the category 'soft systems'. Just because someone
> uses the viable systems model [hard systems approach] does not mean that they
> are operating in a 'hard systems' mode.

A systems researcher's Weltanschauung will influence their view of the world and the way in which they interact with, and intervene in, situations in the world. It is likely that the approaches they choose will reflect their Weltanschauung and, hence, their beliefs and values (Brocklesby 1995). Individual systems researchers who are not comfortable in people centred problem situations will choose problem situations that can be improved through the application of hard systems approaches.

Likewise, researchers with expertise in people-centred processes will choose problem-situations that are suited to the use of soft or critical systems approaches (Brocklesby 1995).

In line with this debate, the SOSM was revisited by Jackson (1990). Rather than classifying problem contexts, he proposed that the SOSM be used as a framework for classifying systems methodologies and for considering the implications of using a particular systems methodology in any problem context (Jackson 1990: 664):

> The aim is not to establish the exact nature of some real-world problem context so that an appropriate problem-solving methodology can be used. Rather, it is to reveal the particular strengths and weaknesses of available systems approaches and to make explicit the consequences, because of the assumptions each makes about systems and the relationship between participants, of using any of these.

This rationale is further supported by the experiences of systems researchers such as Brocklesby (1993: 37-38), a New Zealand-based researcher:

> This [Jackson's revised use of the SOSM] is more in keeping with this author's [Brocklesby] use of various methodologies over the last few years. For example: Beer's viable systems model has been used in a number of diverse organisational settings which range from large finance, postal, and telecommunications companies, and medium sized businesses. ... None of these research projects followed the manifest logic of the original SOSM, through analysing the problem situation and then making an assessment about its unitary or non-unitary character. A recognition of the inappropriateness of making such an assessment, precluded building this into the methodological process. The methodology itself, and its assumptions about the system of concern and the various participants, was the primary focus in these studies.

In a sense, the debate has come a full circle. In the early criticism of Operations Research, Churchman (1970) and Ackoff (1979) lamented the demise of OR. They placed the blame for this demise with operational researchers who relied on the techniques they had skill and confidence in to define the nature of the problem in a problem situation. Jackson (1990), in arguing for a return to a focus on systems methodologies, is advocating a return to this traditional focus. Importantly

different, however, is Jackson's (1990) conditional demand for the adoption of a critical perspective in the application of any systems methodology. Researchers are asked to question and challenge the methods, practice and theory of the approaches they use. Also, they are asked to account for the assumptions on which the approaches are built, and the implications of the approach and the researcher on the problem situation (Jackson 1985; Schecter 1991). There is a demand for researchers to seek to empower the people in the problem situation to take action to improve the situation themselves (Jackson 1990). A number of factors that are likely to be worthy of consideration in relation to the application of any systems approach are suggested by Mingers (1992):

- the skills and resources available to the problem solver(s);
- the relationship of the problem solver to the problem-context;
- the characteristics of the problem and task as first presented;
- the underlying assumptions and theories which underpin the approach by which the nature of reality and knowledge will be defined;
- the specific methods and techniques employed by the approach.

Therefore, in considering the appropriateness of particular soft systems approaches to address the on-farm labour issue, the question is not whether it is the 'best' choice but, rather, what are the implications of making this choice in relation to the aims and outcomes sought in the research project. Mingers' (1992) list provides some factors to consider in relation to the choice and use of a systems approach. A need also exists to establish, as a component of the research project, a process whereby the researcher continually questions and reflects on the approach that is being used (Brocklesby 1995).

2.4   Soft Systems Approaches and the Choice of an Approach

The fundamental ideas that define soft systems thinking are outlined in this chapter. The practical application of these ideas has contributed to and is incorporated into a number of soft systems approaches. An appreciation of soft systems thinking and its application in the New Zealand dairy industry context was gained in this research project through the application of one such approach to the on-farm labour situation. This section provides an overview of six soft systems approaches including Soft Systems Methodology (Checkland 1981a), which is the approach that was used in the study. The rationale for the selection of SSM concludes this chapter.

2.4.1   Six Soft Systems Approaches

C. West Churchman, Russell L. Ackoff and Peter B. Checkland are the individuals most widely acknowledged in the literature as the fathers of soft systems thinking (Jackson 1982, 1991a; Oliga 1988; Ormerod 1996). The approaches that each of these individuals had a major role in developing are: Social Systems Design (Churchman 1971, 1979), Social Systems Sciences (S^3) (Ackoff 1981) and Soft Systems Methodology (SSM) (Checkland 1981a). Strategic Assumption Surfacing Technique (SAST) (Mitroff and Emshoff 1979) is included as it represents the practical development of Churchman's (1979) more theoretical Social Systems Design. Several approaches have been developed which, although not based on systems thinking, cannot be differentiated from soft systems approaches (Rosenhead 1989a). These approaches are generally termed 'soft' and have emerged, as with the other approaches, from the disciplines of Operations Research and Management Science (Rosenhead 1989a). Strategic Options Development and Analysis (SODA) (Eden 1989) and Strategic Choice (Friend and Hickling 1987; Friend 1989) are two approaches that are outlined in this chapter as they are acknowledged in the literature as falling within a broad category of 'soft' approaches.

The Systems of Systems Methodologies (SOSM) (Jackson and Keys 1984) provides one framework in which to identify the six approaches (Figure 2.4) that are outlined in the following section.

Participants' relationship	System Type	
	Mechanical	Systemic
Unitary	Mechanical-unitary	Systemic-unitary - Strategic Choice*
Pluralist	Mechanical-pluralist - Strategic Assumption Surfacing Technique (SAST); - Strategic Options Development and Analysis (SODA).	Systemic-pluralist - Social Systems Sciences (S^3) - Soft Systems Methodology (SSM).
Coercive	Mechanical coercive.	Systemic-coercive

(*) placed in a framework by author.

Figure 2.4   Problem contexts and systems methodologies (adapted from Oliga 1988; Jackson 1988; Flood and Jackson 1991).

Social Systems Design (Churchman 1970) is not included in this table. It is primarily a theoretical framework for debate and discussion and, although central to all the other soft systems approaches, cannot be meaningfully classified within the SOSM framework. Strategic Assumption Surfacing Technique (SAST) and Strategic Options Development and Analysis (SODA) are approaches that aim to resolve the differences in the assumptions and world views of people involved in the problem situation (Jackson and Keys 1984; Jackson 1988). Both, SAST and SODA are classified as mechanical-pluralist and do not attempt to address the complexity of the situation. In contrast, SSM and Social Systems Sciences are defined as systemic-pluralist and are approaches that address both the different world views of people in the situation and the complexity of the components that comprise the problem situation (Jackson and Keys 1984; Jackson 1988). Defined as systemic-unitary, Strategic Choice stands on its own in the classification matrix. It is a tool to assist decision makers structure the complexity of a situation so that decisions can be made, given that a common goal and understanding exists (Rosenhead 1989b).

2.4.2   Social Systems Design

S ocial Systems Design (Churchman 1971), also known as Dialectical Inquiring Systems, is not so much a systems approach, but a systems thinking perspective. It has contributed to the theoretical building blocks of many of the soft systems approaches and critical systems approaches such as 'Critical Systems Heuristics' (Ulrich 1983, 1987). Social Systems Design is based on the fundamental argument for a process of 'dialectical debate' in the design of social systems (Churchman 1970). That is a design process based around discussion that critically examines the truth of opinion (Oxford Illustrated Dictionary 1962).

Churchman built his approach on the principle that people's world-views are not easily changed (Churchman 1970, 1971). He argued that, to gain an understanding of the whole system and define action that led to an improvement in the 'whole system', as many views of the system as possible had to be appreciated. The systems designer's task was to make decision makers, responsible for social systems, aware of their own world views through 'dialectical debate'. The term 'social' inferred that the systems design took into account the three-way relationship between the decision makers, the people who are supposed to benefit from the system, and the analyst or researcher (Churchman 1970).

The process of debate advocated by Churchman (1971), as summarised by Jackson (1991a), is:

Theses	understand decision makers' proposals; understand the Weltanschauung (W) that makes these proposals meaningful;
Antitheses	develop an alternative W (a 'deadly enemy'); make proposals on the basis of this W;
Synthesis	evaluate data on the basis of both Ws and arrive at a richer appreciation of the situation.

On investigation, Social Systems Design is not a systems approach. Rather, it provides a philosophical and theoretical framework on which to base practical action to improve a situation. It offers a fundamental process for challenging and exploring the assumptions and Weltanschauung which influence peoples perceptions of reality (Jackson 1991a). Therefore, Social System's Design is not included in the SOSM matrix above. However, the idea of 'dialectical debate' is a component of all soft systems approaches and it is felt that Social Systems Design contributes usefully to the overall appreciation of soft systems applications.

2.4.3   Strategic Assumption Surfacing and Testing (SAST)

D rawing strongly on Churchman's (1970, 1979) ideas, Strategic Assumption Surfacing and Testing (SAST) was developed in the United States by James Mason, Iain Mitroff and Jim Emshoff (Eden 1992). It is a dialectical approach designed to be used to assist decision makers to manage problematic situations that require an understanding of the range of views that exist across all levels of an organisation (Mason 1969; Mitroff and Emshoff 1979; Mitroff, Emshoff and Kilmann 1979).

The focus of the approach is not on the formal organisational groupings within an organisation, such as departments or sections, which are in fact ignored, but on the human and political aspects of the organisation and the relationships between the participants in the problem situation. Conflict and tensions between groups of individuals who hold different world-views are assumed to be a natural part of organisations. The aim of the approach is to gain a degree of consensus from which meaningful action to address the problem can be generated. This is achieved by making explicit, through debate and analysis, people's assumptions that underpin their different perceptions of the problem, and their preferred strategies for addressing the problem.

SAST methodology comprises four general stages:

Group formation: Participants in the process are separated into groups with the aim of maximising the convergence of views within groups and maximising the divergence of views between groups. A variety of techniques such as personality-type technology and vested-interests technology may be used to define these groupings.

Assumption surfacing: In these groups, participants identify the assumptions that underpin both their view of the problem and their preferred strategy to improve the situation. This process is assisted by the completion of, first, a 'stakeholder analysis' in which the group identifies individuals or groups that will influence the success or failure of their preferred strategy and the assumptions associated with those choices. Second, the group completes an 'assumption rating' in which assumptions are sorted on the basis of their relative importance as to the success or failure of the preferred strategy, and the degree of certainty the group has that the assumption is justified.

Dialectic debate: Debate takes place after the disparate groups have come together and stated a case for their preferred strategy, backed by a clear articulation of the assumptions on which it is based The debate focuses on clarifying and challenging the assumptions and continues for as long as progress towards assumption clarity occurs and as long as assumptions continue to be negotiated and modified.

Synthesis: Synthesis occurs when all participants agree to a list of assumptions, these will then be used by management and decision makers to inform the design of a new strategy.

SAST is defined within the SOSM matrix as mechanical-pluralist. The approach addresses the component of a situation that is problematic because people view the situation differently (Jackson and Keys 1984; Jackson 1990). The problem content is treated as being simple and well defined.

Limited information about the practical application of SAST was found in the literature. Therefore, the time and resources required to use SAST are not clear. Eden (1992) described SAST as analytical rather than negotiative and the process as complicated. He also commented that, experience in using the approach is crucial to its success (Eden 1992).

2.4.4   Social Systems Sciences (S³)

Social Systems Sciences (S³) is an approach to planning that Ackoff (1981) developed to assist decision makers manage the 'messes' (systems of problems) that they confront in organisational and social settings. Fundamental to the approach is the idea that organisations are required, and in fact, have a responsibility, to serve three different sets of goal seeking components: the organisation itself, the individuals that comprise the organisation and the wider environment in which the organisation operates.

Interactive planning is an important component of S³ and was representative of a new approach to planning that challenged the so-called 'predict and prepare' approach (Ackoff 1974). Perceiving the future as predefined and inevitable requires a planning process that attempts to predict and prepare for the future. In contrast, Ackoff viewed the future as something that can be influenced and shaped, and that individuals and organisations can plan and act now, in a way that will assist the attainment of that future (Ackoff 1974, 1979, 1981).

Three principles underpin interactive planning: participation, continuity and holism (Ackoff 1981). The participation of stakeholders in the planning process is fundamental to the approach. A high degree of importance is placed in the process itself, as opposed to the final plan, since it is through discussion and interaction between people in the planning process that people gain insights into the organisation and their roles within it (Ackoff 1974, 1981). As a principle of interactive planning, continuity recognises the need for a responsive planning process that enables constant revision of the plan over time as changes occur in individuals, the organisation and the wider environment. Lastly, the holistic principle of interactive planning means the behaviour of an organisation is assumed to be that of a system, that is, decisions taken by one component of a level within an organisation will impact on other components of that level and other levels. Consequently, interactive planning aims to coordinate planning such that as many components and levels of the organisation plan together and at the same time.

The interactive planning methodology comprises five phases:

Formulating the mess: The situation is analysed to identify the systemic properties of the mess. The analysis in particular, focuses on predicting the future the systems would have if the system and the environment were to remain unchanged. The result is what Ackoff defined as a 'reference scenario', a formulation of the mess in which the organisation currently finds itself.

End planning: Ideals, objectives and goals of the organisation are formulated. The process involves the formulation by all stakeholders of an 'idealised design' for the organisation with which, if they were able, they would replace the existing organisational design. The guidelines placed on the formulation of the ideal design for the organisation are that it must be technologically and operationally feasible. Financial, political and other potential constraints are not considered as relevant in the process. The remaining three phases of the interactive planning process are concerned with realising the idealised design.

Means planning: Policies and procedures are generated and assessed as to their usefulness and relevance to assist the organisation to move towards the 'idealised design'. The factors and environment they are unable to alter in the 'reference scenario', formulated earlier in the process, are considered.

Resource planning: Requirements for inputs, facilities and equipment, personnel and money are considered in relation to the 'means' chosen for the organisation. This involves determining and assessing the amount of resources, the time specifications for the resource, and the availability of, and access to, resources.

Design of implementation
and control: During this phase, the concern is with identifying and putting in place procedures to ensure the strategy will be implemented. This involves defining who will undertake which parts of the strategy, and when,

where and how it will be undertaken. Procedures for monitoring the process of implementation are decided upon and operationalised. Specific procedures are used that facilitate feedback from the process to improve the process on an ongoing basis. Emphasis is placed on developing a process that allows for learning and adaptation of ideas and strategies.

Social Systems Sciences is classified in the SOSM matrix as systemic-pluralist (Jackson and Keys 1984; Jackson 1990). The approach assumes that both the problem content and people's differing views of the situation are problematic. Therefore, the focus is directed at structuring and defining the components of the problem and, through debate, seeking an accommodation of views of the situation.

Limited information on the practical implications of resource and time use were provided on S^3 in the literature. However, the description of the approach indicates that the use of S^3 is heavily reliant on the skills of the facilitator to guide the participants through the five stages of the planning process.

2.4.5   Soft Systems Methodology (SSM)

Soft Systems Methodology (SSM) is a soft systems approach that was developed in response to the apparent failure of systems engineering in messy and ill-structured real-world problems (Checkland 1985). Developed by Peter Checkland and his colleagues at Lancaster University, SSM emerged from a number of action research projects that were undertaken in unstructured problem situations (Checkland 1981a). The approach strongly reflects the characteristics of soft systems approaches outlined earlier in this chapter, and is one of the most widely documented soft systems approaches in terms of theoretical underpinning and practical application.

The main purpose of SSM is to provide a forum and a framework for dialectic debate for the sharing of peoples perceptions of the problem situation. The debate is directed towards defining positive action to improve the situation (Checkland and Scholes 1990). SSM is a systemic process of inquiry that also uses models of systems as part of the process of inquiry (Checkland and Scholes 1990). The aim of SSM is to represent the problem situation as a number of different models that reflect a number of different, but relevant, perceptions of the situation. The models are constructed to represent a situation that is relevant to debate about possible improvement to the situation. At the core of SSM is the concept of a 'human activity system'. This is an intellectual construct that represents a possible ideal model of human activity that would, if it were in place, contribute to an

improvement in the problem situation (Checkland 1981a; Checkland and Scholes 1990; Davies and Ledington 1991). The design of a human activity system is based on a rich description of the current situation from the perspective of all stakeholders, and on the issues that are considered to be relevant to the situation.

Soft Systems Methodology has been represented in a number of ways during its ongoing development. The version that is outlined here is the seven-stage model, represented in Figure 2.5 (Checkland 1981a). This is not the most recent version of the methodology, but it usefully represents the components of the process of inquiry. In practice, SSM is not a step-wise process but a cyclical process that is iterative within and across the stages of the inquiry (Checkland and Scholes 1990).
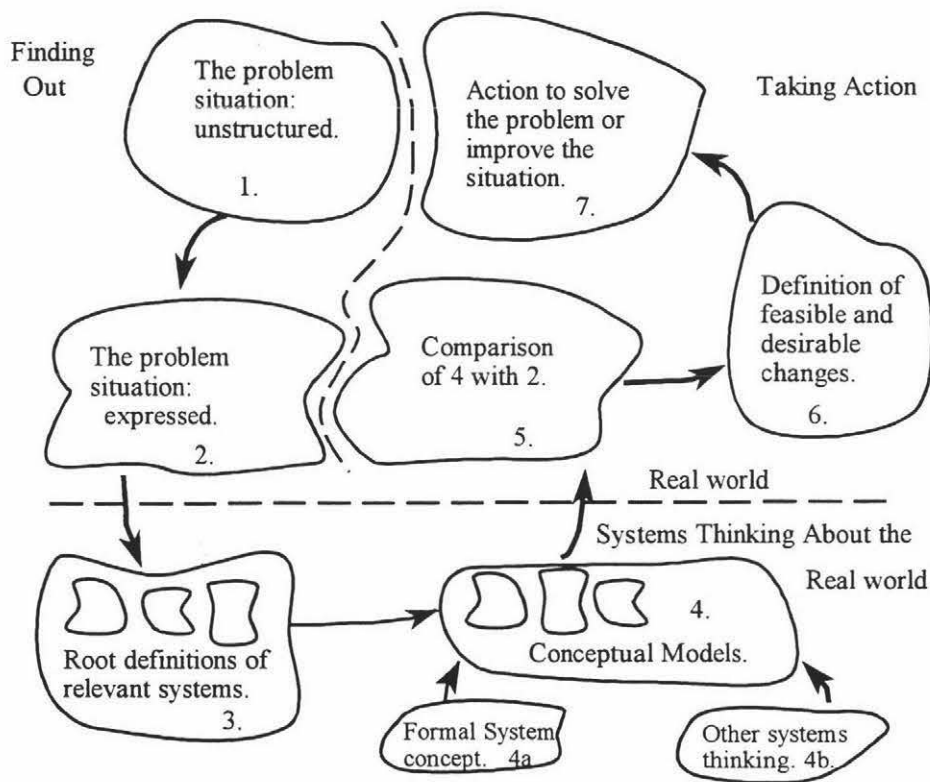
Figure 2.5   The seven-stage model of Soft Systems Methodology (Checkland 1981a: 163).

The seven stages that are represented as comprising SSM (Figure 2.5) fall into two types of activity, real-world and systems thinking about the real-world. Real-world activities include the collection of information pertaining to the situation from interviews and secondary data sources, and debate with people in the problem situation to bring about action to improve the situation (Stages 1, 2, 5, 6, and 7). The second type of activity is the application of systems concepts to the analysis and structuring

of the problem situation (Stages 3 and 4) (Checkland 1981a). The two types of activity are sometimes referred to as the 'above' and 'below' the line activities.

The seven stages of SSM are outlined below (Checkland 1981a; Open University 1984; Wilson and Morren 1990):

Stage 1 and 2:   The primary tasks and issues characteristics of the situation are the basis for structuring and expressing the problem situation as a rich-description. The information for the description is gained through a variety of techniques, including one-on-one and group interviews and the analysis of secondary data relevant to the situation.

Stage 3:   Systems thinking guides the analysis of the problem situation. The aim of stage 3 is to formulate clear statements that define, in detail, 'human activity systems' that may be relevant to improving the problem situation. The relevant systems are defined by constructing a 'root definition' for that system, based on a CATWOE analysis undertaken in relation to the rich-description from stages 1 and 2. A root definition is a concise statement of the transformation process, for which the system is being constructed, and from which a conceptual model of the system can be built. CATWOE is a mnemonic that defines the components of the root definition that must be defined to ensure the root definition, and the resulting conceptual model, are rigorously constructed:

Customers:- beneficiaries and/or victims of the relevant system;

Actors:- people who would carry out the activities included in the relevant system;

Transformation:- the transformation of inputs to outputs that the system would perform;

Weltanschauung:- the world-view that makes the system relevant and meaningful to the process of inquiry;

Owners:- those people with the power to cause the system to cease to exist;

Environment:- the environmental constraints that the system, if it was to operate, would have to accommodate.

Stage 4:   Conceptual models are constructed from the root definitions. The models represent the human activity systems that are named in stage 3 and defined by the root definitions. A conceputal model is constructed using systems concepts to represent how the parts of the relevant system may function. The components of conceptual models are activities that combine to form human activity systems that have been identified as relevant in stage 3.

Stage 5:   Conceptual models are compared and contrasted with reality through a process of debate among people in the problem situation.

Stage 6 and 7: Feasible and desirable change is defined on the basis of the comparison of the conceptual models with the real world. The process for implementing change is then defined, possibly through a new cycle of SSM inquiry.

Classified as systemic - pluralist on the SOSM matrix (Jackson and Keys 1984; Jackson 1990), SSM addresses both the problem content and the differing views people have of the situation. SSM is regarded as appropriate for addressing personal, organisational and publicly owned problems, and has been used in a range of organisational and institutional settings (Checkland and Scholes 1990; Eden 1992). The application of the approach requires no particular tools, such as computer software packages, other than those normally used to facilitate and record people's perceptions and comments (Eden 1990). A facilitator or analyst who has knowledge and experience in applying systems thinking is usually required. However, groups have facilitated themselves through the stages of the process. The CATWOE and construction of a root definition are identified as useful components that are easily used by people not experienced in the methodology (Eden 1990, 1992).

The time required to complete the individual meetings, interviews and group debates are dependant on the problem situation. Some of the projects undertaken by Checkland have involved three years of ongoing contact with organisations (Checkland and Scholes 1990). However, in the postgraduate teaching programme in which SSM is taught at the University of Lancaster, students learn SSM and complete real-world projects in the time frame of a year (Checkland and Jenkins 1974).

2.4.6   Strategic Options Development and Analysis (SODA)

S trategic Options Development and Analysis is an approach designed to assist with the planning and tackling of complex unstructured problems (messes) (Eden, Jones and Sims 1979; Eden and Simpson 1989). The unit of focus for decision making in an organisation is the individuals that comprise the organisation, not the organisation itself, nor the departments or groups that form the structure of the organisation. Eden and Simpson (1989) support and adopt the view presented by Strauss, Schatzman, Ehrlich, Bucher and Sabshin (1963) that 'organisations are a negotiated enterprise' whose individual participants are continuously negotiating and renegotiating their roles within the organisation. The process is considered to be as important as the issues that are being addressed (Eden and Huxham 1988) and the approach adopts the principles of participation expressed by other soft systems thinkers, including Ackoff (1979) and Churchman (1970, 1971).

As with other soft systems approaches, the 'problem' in SODA is taken to be differently perceived by different people. Kelly's (1955) 'Theory of Personal Constructs' guides the focus on the individual in the approach (Eden *et al.* 1979). The theory argues that human beings are continually striving to make sense of the world in order to 'manage and control' that world, and individuals use concepts to guide action to solve problems. A concept is a short phrase that represents a number of ideas, and the meaning of a concept is gained by understanding the relationship of that concept with other concepts relevant to the problem situation that is being investigated (Eden and Simpson 1989). Construct theory is practically applied in SODA through the use of cognitive mapping. A 'cognitive map' is a model of the 'system of concepts' used by an individual to communicate the nature of the problem from their perspective. A cognitive map is a model designed to represent the way in which an individual defines an issue and it is constructed with a focus on defining activities associated with the problem (Eden *et al.* 1979).

The aim of the SODA approach is to reach a level of understanding and agreement among participants such that a course of action can be defined by them. This is achieved by a process that facilitates negotiation of people's perceptions of the issue. The process comprises three phases:

Generation of individual's cognitive maps:

> In an interview setting, a facilitator constructs a 'cognitive map' to represent the individual's perception of the problem situation. During the process of map construction, the individual is challenged to look at the problem differently, to critically reflect on the assumptions that underpin their view

and to negotiate with the consultant, the final perspective that is represented by the map.

Aggregation of maps:

> The individual cognitive maps are merged by the facilitator to form an aggregated 'strategic map'. The process of aggregation can be assisted by the use of a computer software package, COPE (Strategic Decision Support Research Unit 1988). It generally involves a process of clustering 'like' concepts from different people's cognitive maps into general problem areas. These areas provide the basis for the construction of a map of the overall larger problem situation.

SODA workshop:

> A strategic map is constructed with the aim of providing a basis for negotiation by all participants in the process. Negotiation occurs in a workshop setting, the agenda for which is defined by the facilitator following an initial analysis of the merged strategic map in which key issues are identified. Initially, an aim is for the group to negotiate a joint definition of the problem. This is achieved in a process in which the facilitator 'walks' the group through the aggregated model with limited discussion. An important aim of this 'first pass' through the data is to encourage individuals to 'feel ownership' of the model by seeing their contribution placed within the context of the wider situation. Participants' 'second pass' through the data is undertaken in facilitated discussion in which participants are encouraged again to challenge their view of the situation and to negotiate a degree of consensus that will meaningfully inform action for the group.

Critical to the success of SODA is the role of the facilitator. The facilitator is required to guide individuals through a process of reflection on their view of the problem and then challenge this view. The cognitive map is the basis for challenging and renegotiating the client's perspective of the problem situation (Eden and Simpson 1989, Eden 1990). The use of SODA is reliant on the facilitator having the skills to facilitate a group to work together effectively and efficiently. In addition, the facilitator also requires the skills to construct a model of, and analyse, the content of the situation that is relevant to the members of the group (Eden and Simpson 1989). To ensure both

these parts of the process are undertaken effectively, two facilitators are involved with the process, one to concentrate on managing the process and the other to manage the content analysis (Eden 1990; Mayon-White 1990).

Although SODA has been used primarily in the private sector, it has also been used in government departments to address policy issues in the public sector (Eden 1990). SODA is used within organisations for ongoing strategic development and review as well as for one-off strategic issue workshops for large organisations and community groups (Eden 1990). The approach is "very facilitator dependant" and requires at least one facilitator with expertise in the use of the computer decision support package, COPE (Eden 1992). The approach is based around a workshop format, and typically demands two, ninety minute interviews with each participant and a one to two day workshop. In situations in which the approach is part of an ongoing strategic development process, the use of the approach coincides with a number of the strategic planning workshops that are undertaken during a year (Eden 1990).

SAST is classified as mechanical-pluralist on the SOSM matrix (Jackson and Keys 1984; Jackson 1988, 1990). As with SODA, SAST assumes the situation is problematic, not because of the interrelated ill-defined nature of the component issues, but because of the different ways in which the situation is viewed. Therefore, the primary aims of the activities in SAST are to challenge and bring to the surface the assumptions that define these different views, and through debate find accommodation amongst the people in the situation.

2.4.7 Strategic Choice.

S trategic choice, also described as 'planning under pressure', is a method designed to assist decision-makers deal strategically with the interconnectedness of decision problems (Friend and Hickling 1987). The approach is the product of extensive experience in the areas of decision making in the construction industry and city government. In these types of contexts, decision making depended on the use of participative negotiation and debate (Friend 1989).

The Strategic Choice approach assumes decision processes in organisations are influenced by the degree to which relative importance is placed on uncertainty by decision makers. Three types of uncertainty are assumed to be relevant; that pertaining to the 'working environment' (UE), 'guiding values' (UV) and 'related decision fields' (UR) (Friend 1989). Uncertainty relating to the 'working environment' identifies a need for more information about the implications and components of a

particular decision. This type of uncertainty can generally be addressed by additional research into the situation. Uncertainty associated with the 'guiding values' of individuals and the organisation indicates a need for a more political response. These uncertainties are seen to relate to a lack of clarity in the objectives, priorities and final direction needed to be taken with the decisions. Lastly, uncertainty in relation to 'related decision fields' indicates concerns with the interconnectedness of decisions and identifies a need for greater understanding of the relationships between the decisions being considered (Friend 1989).

The framework that guides Strategic Choice identifies four complementary modes of decision-making activity that correspond to stages in the process (Friend and Hickling 1987; Friend 1989):

Shaping mode: Participants structure the problem issues through a process of negotiation. This starts with the definition of 'decision areas', which are general areas in which alternative decisions for action could be taken. A decision map is constructed in which decision areas are grouped, and linkages between decision areas drawn. These linkages indicate interconnections between the decision areas; that is, if considered together, the linked decision areas are likely to lead to different outcomes than if they are considered separately. The resultant map assists with the identification of clusters of interconnected decision areas as well as those that are relatively isolated. Based on a consideration of the clustering and on the relative importance and urgency of the decision areas, a 'problem focus' is chosen from the map for more in-depth investigation.

Design Mode: In this mode, decision makers explore the possible courses of action available to them in relation to the decision areas specified within the 'problem focus'. Analysis of Interconnected Decision Areas (AIDA) is a computer-aided method widely utilised at this stage. Alternative courses of action for each decision area are represented as a set of mutually exclusive options along with the assumptions on whether options relating to different decision areas can be combined. Analysis of these relationships generates a number of 'decision schemes' that represent feasible and logical combinations of options. The aim of the analysis is to generate a set of alternatives for action that can then be considered in terms of uncertainty and suitability under a range of circumstances.

Compare mode: The main aim of the comparison mode is to clarify uncertainties related to the alternative options so that the uncertainties can be managed as part of the process. A multi-criteria approach is used to evaluate the options. Decision makers start by generating a list of 'comparison areas' (evaluation criteria) relevant to assessing the relative implications of the alternative options; they may consider economic, social and other criteria. Analysis of the alternative decision options is then undertaken on the basis of the comparative advantage and the uncertainties associated with each option.

Choosing mode: The areas of uncertainty most salient to the available option are classified, by the decision makers, in terms of the categories of uncertainty defined earlier, UE, UV and UR. The degree to which these areas of uncertainty could be reduced by, for example, further research or discussion is explored and assessed in terms of likely cost and effectiveness. Action schemes are formulated taking into account the urgency with which the range of decision options needs to be made and acted on. A synthesis of action schemes and options for reducing or managing uncertainty is completed and this is then the basis for informing the strategic choice of the decision makers.

Strategic Choice is an approach that has been used in public sector planning by central and local Government in a number of countries (Eden 1992). Groups in both developed and lesser developed countries also have successfully used Strategic Choice to formulate policy on public planning and environmental issues (Eden 1990). Groups are involved from the start of the process, rather than after the completion of individual interviews. Strategic Choice is well documented and, although it normally requires a strong facilitator, can be used by groups without facilitation (Eden 1992). The time frame of a study using Strategic Choice is dependant on the issues and the context, but can take from several hours to several months (Friend and Hickling 1987).

An SOSM matrix (Jackson and Keys 1984; Jackson 1990) classification of systemic - unitary has been given to Strategic Choice. The approach assumes that a common goal exists and the problematic nature of the situation is due to the uncertainties in selecting a course of action to achieve that goal. Therefore, the use of Strategic Choice is directed, not to bringing together divergent views on the situation but, to gaining an understanding of the interconnectedness of the components of the situation.

2.5   The Selection of a Soft Systems Approach

From the six soft systems approaches reviewed, the selection of one approach to use in the on-farm labour situation was based on the consideration of a number of factors, including those proposed by Mingers (1992). The final basis on which the selection was made involved a consideration of:

- the initial understanding of the problem situation in line with the research aims of the study;
- the underlying assumptions which underpin the approaches;
- the skills and resources available to undertake the study;
- the specific methods employed by the approach;
- the level of documentation describing the use of the approach.

As initially understood, the on-farm labour situation was perceived differently by people and comprised a number of interrelated component problems. An objective of this project was to develop an understanding of the situation so that action could be defined for improvement. For on-farm labour situation, it was likely that an understanding of the situation could be obtained from the use of any one of the six soft systems approaches. However, it was considered that an understanding of, both, the components and, people's different perspectives of the problem situation would provide an understanding that would more likely lead to improvement to the situation being defined. In accordance with the categorisation of systems approaches by the SOSM framework, this corresponds to approaches that are systemic-pluralist, that is SSM and S^3. Defined as mechanical-pluralist approaches, SODA and SAST address only the different perspectives people have of the situation. In contrast, Strategic Choice is categorised as systemic-unitary and is used to address the complexity of situations assuming that the people involved have a single clearly defined purpose.

One researcher was to undertake the study. SODA requires two facilitators to run a workshop as part of the process. In addition both, SODA and SAST involve the use of specifically designed computer software to assist the analysis and presentation of information. The purchase cost and time required to gain familiarity with these techniques was seen to be a disadvantage. Eden (1992) stated that experience in the use of the 'complicated process' of SAST was essential to its successful use. Likewise, the description of S^3 as a facilitator dependant approach (Eden 1990) implied that the successful use of this approach would depend on the experience of the researcher with S^3. Therefore,

it was considered more likely that the research objectives would be attained if an approach was selected that was not dependant on an 'expert' user.

The researchers limited experience in the use of all the approaches demanded that the approach that was chosen was documented and described by a number of authors. Limited documentation on the practical use of SAST, S^3 and Social Systems Design counted against the choice of these approaches. Based on the consideration of the factor mentioned and the resultant elimination of SAST, SODA, S^3 and Strategic Choice, SSM was ultimately selected as the approach that would be used in the on-farm labour situation.

SSM is an approach designed to address, both, the complexity of a situation and the different perspectives held of that situation. Application of SSM to a problem situation does not require the use of specific software or more than one facilitator. In addition, SSM is an approach that inexperienced groups have used successfully (Eden 1990, 1992). The use of SSM by single year masterate students at Lancaster University indicated that the scope of an SSM study could be adapted to the time frame available for this project. Also, the ideas that underpin SSM and the process of SSM is described by a number of authors in the literature (Checkland 1981a; Open University 1984; Checkland and Scholes 1990; Wilson and Morren 1990; Davies and Ledington 1991). Although SSM has had limited application in the New Zealand agricultural context (Timms 1993; Macadam and Lundie-Jenkins 1996), SSM has been applied in a range of organisational and broader community contexts, including agriculture and resource management, in other countries (Wilson and Morren 1990; Mingers and Taylor 1992; Kreher 1994; Macadam 1996). This further supported the use of SSM in the problem situation in the dairy industry context.

2.6   Summary

Systems thinking and the hard, soft and critical systems appraoches have been outlined in this chapter. Six soft systems approahces were described and the basis for the selection of one approach for use in the on-farm labour situation was explained. Soft Systems Methodology was selected on the basis of a consideration of the research objectives of this project, the problem context and the practicalities of using the approach in this project.

An understanding of the on-farm labour situation will be obtained through the use of SSM. The use of SSM in this problem situation in the New Zealand dairy industry will also enable an investigation

of the appropriateness of a soft systems approach in this context. Chapter Three describes the fundamental ideas that underpin SSM, the process of SSM and how to use the methodology. The seven stage version of SSM that is presented in this chapter is a useful framework from which to gain an initial understanding of the methodology. However, the description outlined in Chapter Three is primarily based on a later more developed version of SSM.

CHAPTER THREE

Soft Systems Methodology

3.1   Introduction

This chapter outlines 'SSM's framework of ideas', the SSM process and how it can be used. The ideas underlying soft systems thinking are central to SSM. A number of these ideas, social reality, Weltanschauung and learning, are described in the context of SSM. Furthermore, human activity systems, an idea fundamental to SSM, are also explained.

The version of SSM presented by Checkland and Scholes (1990) is the basis of the description of SSM in this chapter. This version comprises a cultural-based and a logic-based stream of analysis that encompasses the seven stage version of SSM presented in Chapter Two. The description of SSM, although based on the Checkland and Scholes (1990) version, is supplemented by information from a range of other published sources. The 'Constitutive Rules' for the use of SSM are presented as a summary of the description of SSM and a guide to the use of SSM.

3.2   Soft Systems Methodology: Some Fundamental Ideas

3.2.1   Social Reality

Soft Systems Methodology is based on the premise that the way people perceive and make sense of the world in which they live is influenced by their own knowledge, learning and experience. As a consequence, people's perceptions of reality are different (Checkland 1989a; Checkland and Scholes 1990). No single 'social reality' exists. Social reality is assumed to be the negotiated product of people's perceptions of reality.

> ... social reality is the ever-changing outcome of the social process in which human beings, the product of their genetic inheritance and previous experiences, continually negotiate and re-negotiate with others their perceptions and interpretations of the world outside themselves (Checkland 1981a: 283-284).

Accepting this, SSM assumes that many complex and ill-defined problem situations are the result of people's different, and sometimes conflicting, perceptions of the situation (Checkland 1981a).

Improvement in a problem situation may be dependant on the joint purposeful action of a group of people. SSM assumes that in such situations, improvement is more likely to be attained when there is a common understanding of the problem and a common view of what would constitute an improvement (Checkland 1989a). In accordance with these ideas, SSM uses systems models to represent different views of a problem situation and to structure debate between people involved in the situation. The aim is to facilitate a process through which people involved in a problem situation can reach some level of agreement on action to improve the situation (Checkland and Scholes 1990). In the early versions of SSM, the aim was to reach consensus; however, experience has shown that true consensus is, in practice, rarely attained. More often, the outcome is an accommodation of people's views so that an agreement for action is reached (Checkland and Scholes 1990).

3.2.2   Weltanschauung

SM's assumptions about social reality are strongly linked with the concept of Weltanschauung. People have different ways of looking at and interpreting the world of which they are a part. The way that reality is perceived by human beings is embodied in their Weltanschauung, which is a product of people's beliefs, values, ideas and experience (Churchman 1971). An individual's Weltanschauung will be unique to them, but there will be common elements and ideas that will be evident in the way individuals behave and the opinions they express.

> It is a difference in *Weltanschauung* which causes the Government of Nicaragua
> in the 1980s to describe the guerillas known as the Contras as 'terrorists' while
> the president of the United States refers to them as 'freedom fighters' (Checkland
> 1989a: 81, emphasis as in original).

This example illustrates two different views of one situation, each a valid view of the situation from the perspective of a group of people. Weltanschauung in SSM is a term that an observer (researcher) can use to help understand and structure the elements of a social situation (Checkland and Davies 1986).

Checkland and Davies (1986: 111, emphasis as in original) propose that Weltanschauung be taken as:

> ... a term an observer can use to help understanding of a social situation. In saying that, we are arguing that notions of a social reality, created by group membership and communication, can be expressed through a stated *Weltanschauung*, or set of assumptions which enable a rational account of that example of social reality to be given.

There are three 'senses' in which the concept of Weltanschauung can be used within SSM: W_1, W_2 and W_3 and these are represented in Figure 3.1 (Checkland and Davies 1986).
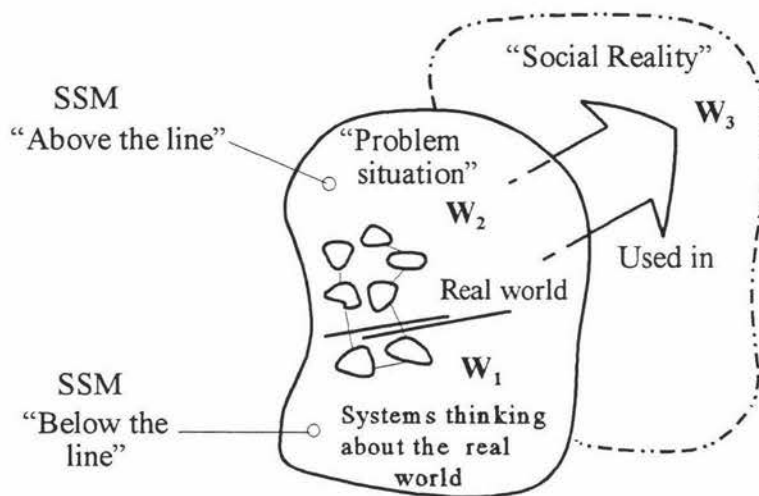
Figure 3.1   Three uses of the concept Weltanschauung in SSM (Checkland and Davies 1986: 112).

Weltanschauung (W_1) is the expression of that 'taken-as-given set of assumptions' about the world that gives meaning and relevance to a particular human activity system, in the context of the SSM inquiry into a problem situation (Checkland and Davies 1986). W_1 is the 'W' that is part of the mnemonic CATWOE, which is the basis for constructing the root definition of the human activity system in the systems thinking phase of the methodology. A number of human activity systems will be relevant to inquiry and debate in any problem situation. However, for each human activity system there will be only one relevant W_1 and it's sole use is in modelling the root definition and conceptual model (Checkland and Davies 1986).

W_2 are those 'taken-as-given assumptions' about the problem situation that make certain real-world purposeful activities relevant to improving the situation. W_3 is the Weltanschauung that is relevant to the broader 'social reality' in which the problem situation is set. It is an expression of those 'taken-as-given assumptions' that make meaningful and relevant the purposeful activities in the broader social reality. Versions of W_3 will be more complex and richer in description than W_2, and likewise, W_2 will be more complex and richer in description than W_1. Checkland and Davies (1986) argue that these distinctions between W_1, W_2 and W_3 are real and should be made explicit in the use of SSM.

3.2.3   Human Activity Systems

Hard systems thinking accepted that it was useful to perceive the world as comprising systems. Soft systems thinking and SSM accept the concept of a system as being useful, not as a component of the world but as a conceptual framework to help understand the world. The majority of ill-defined, ill-structured problem situations faced by managers and individuals in business, organisational and other social settings are characterised by a group of people trying to act in a purposeful, thoughtful way (Checkland 1985). The elements of human activity systems are human activities. From these elements a model of purposeful activity is constructed that is relevant to further questioning, learning and debate about the situation (Open University 1984: 36):

> [A human activity system] is not a system to 'solve' the problems inherent in the situation from which it stems. Nor is it a system which anyone is going to design and implement in the real world. Its function is simply to provide an alternative way of viewing the problem situation which, when developed further ... will provide the analyst with a sharp comparison between it and what is observed to go on in the real world situation.

Human activity systems do not exist in reality nor is anyone ever going to build them (Open University 1984). They are conceptual frameworks for representing purposeful human activity that is relevant to the problem situation as perceived by people involved in that situation (Checkland 1981a; Checkland and Scholes 1990). Human activity systems are 'relevant systems' because they are perceived, by people in the problem situation, as representing purposeful activity that is important to their view of the problem situation. In any situation, there will be a number of different relevant systems as people will perceive the nature of the purposeful activity differently according to their Weltanschauung. An example of a range of purposeful human activities that may be perceived, by

different groups of people, as relevant to a prison, a newspaper publishing firm and a band of guerillas is shown in Figure 3.2.
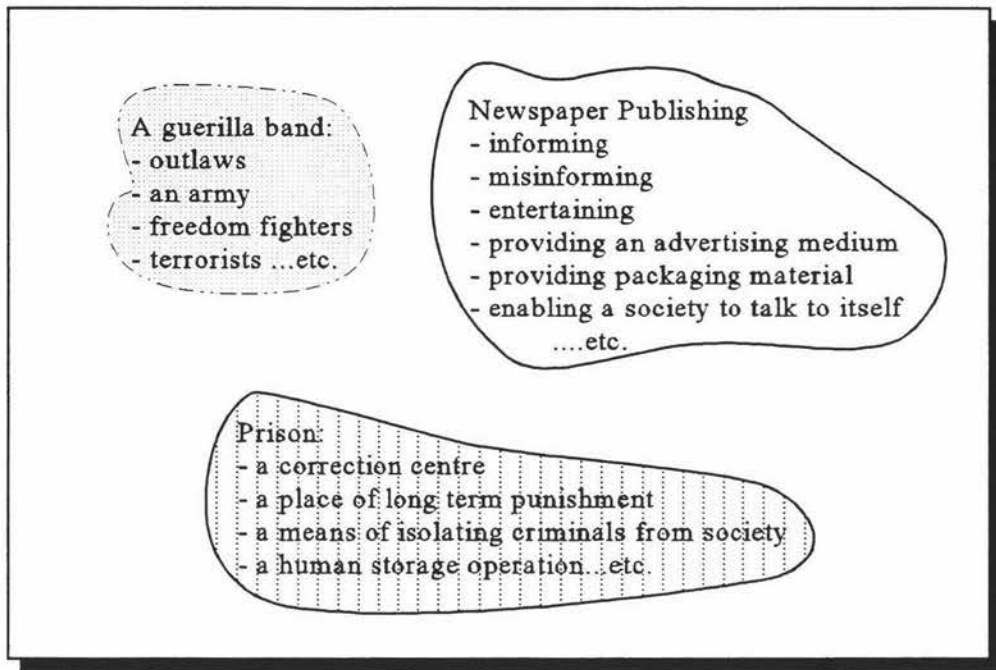
Figure 3.2   Possible human activity systems that may be relevant to the purposeful activity involved in a Guerilla band, Newspaper publishing and a Prison (adapted from Open University 1984; Checkland and Scholes 1990: 26).

3.2.4   Learning

Learning is a process by which people's perceptions of reality, their Weltanschauung and their knowledge can be modified or changed (Checkland 1985). SSM assumes that combined action to improve a situation is more likely to occur in a process that facilitates joint learning and the sharing of people's views. Learning is people's active adaptation of their existing knowledge in response to their experiences with other people and their environment (Revans 1984). Implicit within this definition is the idea that there are a number of potentially different procedures by which people shape their existing knowledge and deal with situations that arise in their lives (Revans 1984; Zuber-Skerritt 1993). The concept of a system and soft systems thinking are accepted by SSM as a useful framework to inquire into, learn about and manage situations of concern that arise in the world (Figure 3.3) (Checkland and Scholes 1990).
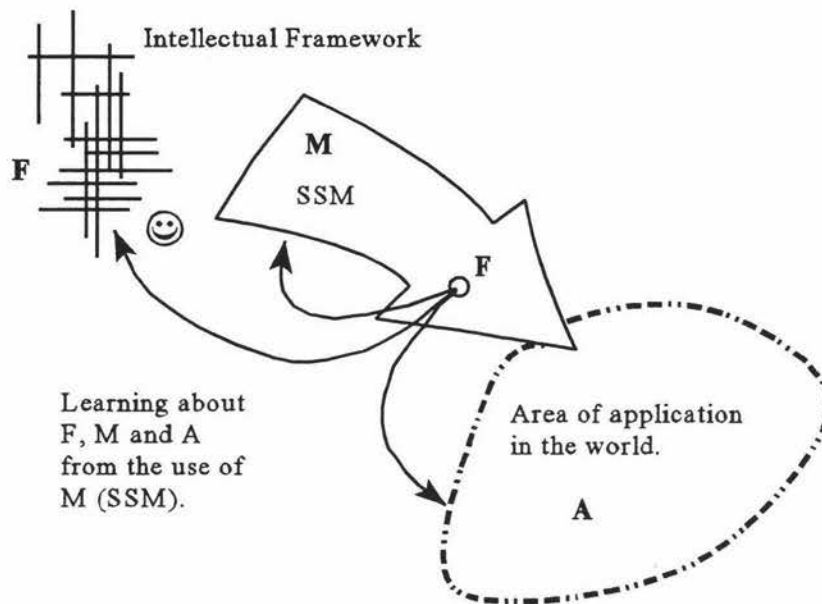
Figure 3.3   The idea of rational thought and action, organised by systems methodologies such as SSM (adapted from Checkland 1985: 758).

SSM is an inquiry system and a learning system (Checkland 1985; Checkland and Scholes 1990). Through the application of SSM (the methodology 'M') to a real-world situation 'A', an individual will learn about the methodology and its use. Learning about the situation to which the methodology has been applied and their own intellectual framework 'F', will also occur.

The fundamental ideas about social reality, Weltanschauung, human activity systems and learning, that have been outlined, underpin SSM and the use of SSM. A description of the process of SSM and how to use it is described in the following sections of this chapter.

3.3   The SSM Process of Inquiry: An Overview

SSM was developed by Peter B. Checkland and his colleagues in the late 1960s. The methodology was developed within an action research framework (see Appendix I); a process of learning by doing. Systems engineering and systems analysis approaches were applied to 'messy' problem situations. The lessons that were learnt, and the modifications made to improve the appropriateness of these approaches, led to the development of SSM (Checkland 1972; Checkland 1981a).

... the intention was simply to try to apply the hard methodology to soft problems and to observe how the methodology had to adapt or change if successful problem-solving were to be achieved (Checkland 1981a: 148).

When SSM was first developed, the representation and documentation of the process of SSM as a nine stage process (Checkland 1972) was based on the experience gained by Checkland and his colleagues up to that time. The nine stage process is reproduced diagrammatically in Appendix II. As experience in the use of SSM grew, the methodology was modified and articulated in greater detail and depth. The results of this process were the seven stage representation of SSM (Checkland 1981a: as summarised and represented in Chapter Two, Figure 2.5), and then the more recent version, the so-called 'developed' version of SSM, represented in Figure 3.4 (Checkland and Scholes 1990).

Regardless of how SSM is represented, in practice it not a rigid prescription for action but a methodology or framework for action. SSM is used differently in different problem situations, and in any one situation will be used differently by different people (Checkland 1988b). In practice, the techniques used as a component of the methodological framework of SSM, in particular for the real-world inquiry stages, have been drawn from a range of disciplines and other approaches (Mingers and Taylor 1992; Ormerod 1995). Likewise, the structure of the inquiry process and the order in which the stages of the process are used are modified to reflect the particular context in which it is being employed (for example, see Cornock 1977, 1980; Atkinson 1986; Rennie 1989; Brocklesby 1995).

> When SSM was ... described as a seven-stage enquiring or learning system, the standard form of expression of it was the seven stage model ... It is not by chance that this model is of a connected set of *entities* rather than *activities*. Those who developed SSM were very conscious of its status as a mouldable methodology rather than a technique, and they wished to leave 'how, exactly, to do it' as a strategic choice for the user to make. Gradually, however, as experience has built up, the degree of attention given to 'how to use SSM' has increased (Checkland and Scholes 1990: 291, emphasis as in original).

The seven-stage model represents SSM as a process comprising seven discrete steps (Checkland 1978). However, in practice the process of inquiry is less structured and likely to involve several iterations within each step of the cycle, and several complete iterations of the whole SSM cycle. This

is part of the reason for the modified representation, presented by Checkland (1988b, 1988c) and Checkland and Scholes (1990), in the 'developed' version of SSM (Figure 3.4). To illustrate how the seven stage version of SSM fits with this new representation of SSM, the seven stages are included as part of the diagram. The structure, process and climate analysis, although not included in the original articulation and representation of this version of SSM, is described as a component of the process of SSM outlined in this chapter. For this reason the structure, process and climate analysis is included in Figure 3.4. Checkland and Scholes (1990) representation of the 'developed' version of SSM is reproduced in Appendix III.
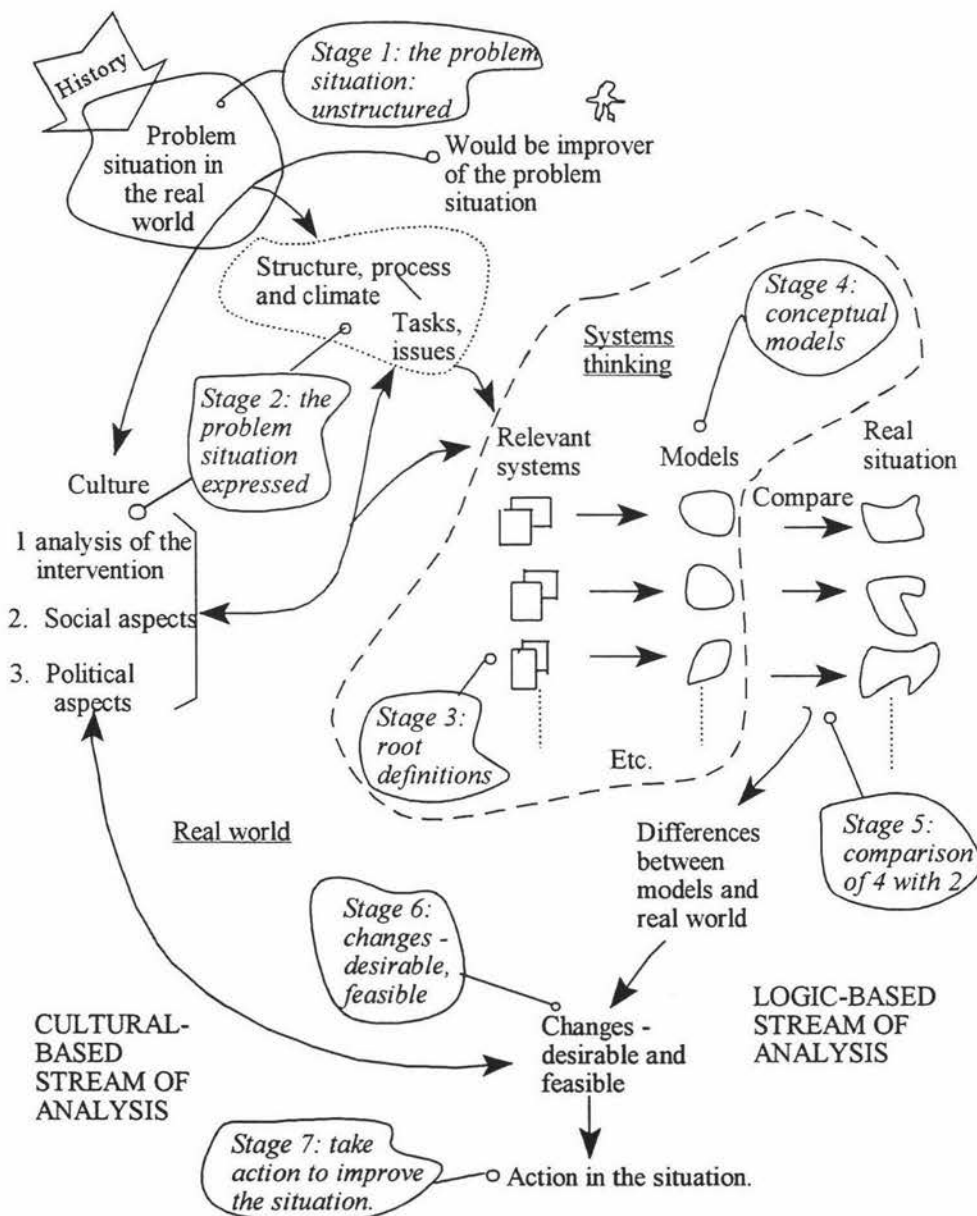
Figure 3.4   The 'developed' representation of SSM (adapted from Davies 1989: 23, after Checkland 1981a: 163 and 1988c: 29; Checkland and Scholes 1990: 29).

The 'developed' version of SSM identifies two streams of analysis: a cultural-based and a logic-based stream. Both streams of analysis are linked with and contribute to the structured understanding of the problem situation. The two streams of analysis are interlinked and are undertaken concurrently as part of the inquiry process.

> Working with SSM, in the 'ideal type' methodology being described here, entails carrying out simultaneously the two streams of thinking and action set out in [Figure 3.4]. They complement each other and should unfold through time interactively. It is especially important never to regard Analysis One, Two and Three as finished; and delicate judgements are usually required concerning the public visibility of Analysis Three (Checkland and Scholes 1990: 51).

The logic-based stream of analysis is the component of the process of inquiry that leads to the modelling of the problem situation as a number of relevant human activity systems. These logic-based models are a tool to question and explore the real-world situation (Checkland 1989a). The cultural-stream of analysis is an acknowledgement of the cultural aspects of a problem situation. These may not be immediately evident or explicit, but are important elements of some problem situations (Checkland and Scholes 1990; Davies and Ledington 1991). The aspects of a real-world situation that are appreciated through the cultural stream of analysis will generate ideas for purposeful human activities that are also relevant to the situation. Thus, the cultural analysis also channels into the logic-based component of the SSM process of inquiry (Checkland 1989a; Checkland and Scholes 1990).

> Given the situation and the would be improvers of it, there follow two interacting streams of structured enquiry which together lead to the implementation of changes to improve the situation. Both may be regarded as stemming from both the perception of various purposeful actions in the situation ('tasks') and various things about which there are disagreement ('issues') (Checkland and Scholes 1990: 28).

The cultural stream of inquiry recognises that there are three important areas of consideration: the impact of the intervention of the SSM inquiry on the situation, and the social and political aspects of the situation (Checkland 1989a). An appreciation of these aspects is important, also, in defining the type of change that is likely to be accepted by people in the problem situation. This essential link is indicated in Figure 3.4 by the arrow that joins the cultural aspects with the changes (culturally

feasible) (Checkland and Scholes 1990). The definition of change is also dependent on an appreciation of what is systemically desirable and this is dependent on the systems thinking stage of the logic-based stream of analysis (Checkland 1981a; Checkland and Scholes 1990).

The description of SSM that follows is presented within three broad headings that refer to three basic structural components of SSM: Finding-out, modelling purposeful human activity systems and taking action to improve the situation (Figure 3.5). A diagrammatic link between each of these three phases is made with the developed version represented in Figure 3.4. At the introduction of each of the three sections, the portion of the SSM process of inquiry described in that section is reproduced diagrammatically. The diagrams are adapted from Checkland and Scholes (1990) representation of SSM (Appendix III).
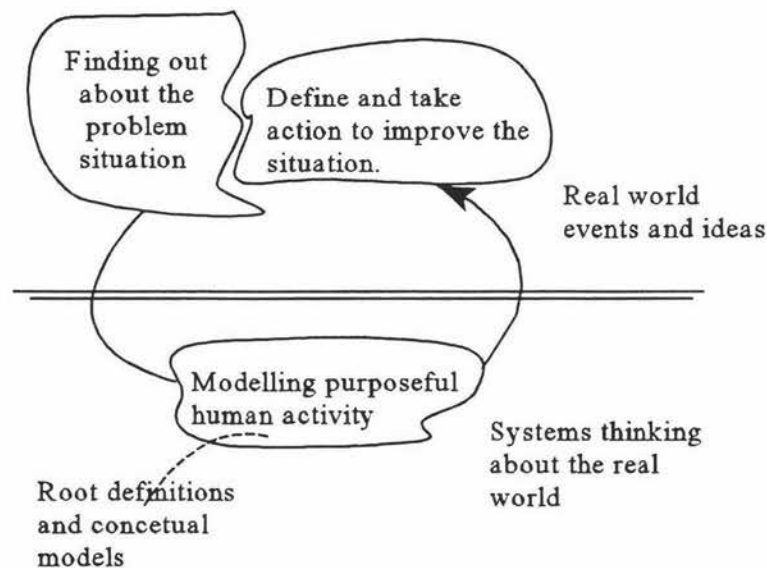
Figure 3.5   The basic structure of SSM (adapted from Checkland 1989a: 83).

'Finding-out' (stages 1 and 2 of the seven stage version of SSM) includes the component of the logic-based and cultural-based streams of analysis that contributes to structuring and expressing the problem situation. Modelling purposeful human activity systems (stages 3 and 4) includes the selection of relevant systems and the construction of these systems as root definitions and conceptual models, all part of the logic-based stream of analysis. Taking action to improve the situation (stages 5, 6 and 7) is a real-world stage of SSM in which models are compared with the problem situation and action to improve the situation is defined.

3.4   Finding-out

The 'finding-out' phase of SSM leads to the identification of purposeful human activity that is relevant to the problem situation. This is achieved by structuring the problem situation using the concepts of structure, process and climate and expressing the situation in terms of tasks and issues. It also includes the analysis of the situation as a culture.
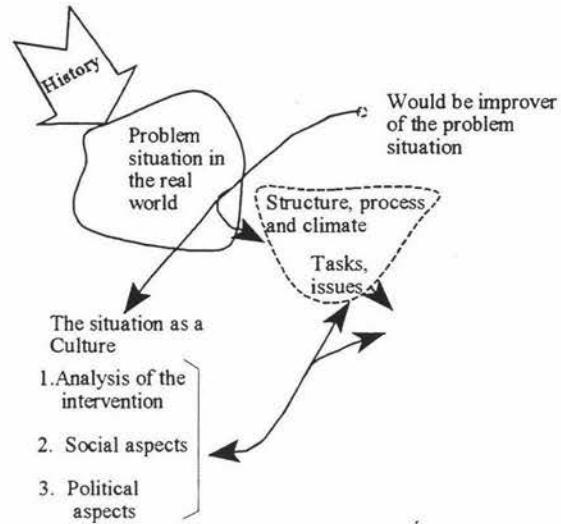
3.4.1   Structuring the Unstructured Problem Situation

Real-world situations are characterised by people involved in purposeful human activity. Associated with the purposeful activity will be the tasks by which the purposeful activity is performed, and the issues that are elements of the situation that are causing concern or conflict. Finding-out about the problem situation is directed towards attaining a 'rich description' of the situation such that the tasks and issues that define the situation are understood from the different perspectives of those people involved in the situation (Checkland 1981a). The construction of the rich description continues throughout the SSM process as each stage generates new insights into the situation. A good starting point for the inquiry is the history of the problem situation (Checkland and Scholes 1990). Current perceptions of the situation and the relationships between individuals in the situation are likely to have been shaped by historical events. In practice, historical aspects of the situation that are relevant to the rich description will also come to the fore as the inquiry progresses (Davies and Ledington 1991).

Identifying the structure, process and climate of the problem situation is one way of structuring the situation (Checkland 1981a; Open University 1984; Wilson and Morren 1990). In Checkland and Scholes' (1990) description of SSM, the structuring of the problem situation using the elements of structure, process and climate receives very little attention and is not included in their representation of the methodology (see Appendix III). The finding-out stage is described by them as comprising simply the three types of analyses that make up the broader cultural-based stream of inquiry. Part

of the reason given for this is that, many people found the three structural concepts too abstract *"when faced with the specific, often alarming, energy and emotion in a human situation regarded as problematic"* (Checkland 1989a: 85). However, Checkland and Scholes (1990) acknowledge that, although less structured and requiring a more confident user, using structure/process/climate and the cultural based stream of analysis is the intellectually richer way of completing the finding-out phase. It is also the process normally followed by Checkland and Scholes (1990: 66):

> Many people, including usually the authors, now carry out the 'finding-out' phase
> by making use of such guidelines as 'structure/process/climate', assembling rich
> pictures and doing Analysis One, Two, Three. The strategy is to allow that
> process to throw up problem themes[5], or suggest relevant systems.

For this reason, Figure 3.4 has been adapted to show structure, process and climate and a description of these components of the process are included in this section. Structure is the physical, biological and social patterns, and organisations relevant to the situation, which are durable and slow-to-change (Wilson and Morren 1990). Process is the activities and tasks that are undertaken within the structure and includes a description of who undertakes the process (Open University 1984; Checkland 1989a; Wilson and Morren 1990). Climate is the relationship between structure and process, that is, the apparent match or mismatch between the two and/or how effectively the process is achieved within the structure in the actual situation (Checkland 1989a).

The literature recommends that structuring and expressing the problem-situation should be undertaken independently of systems thinking (Open University 1984). The aim is to represent and gain an appreciation of the situation not influenced by a systems framework. Use of the concept of a system implies a certain type of organisation and inter-connection that may not be appropriate to the true nature of the problem situation. By assuming the situation represents a system, a researcher is also likely to define improvement in terms of criteria relating to the performance of the system, rather than the situation itself (Open University 1984).

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[5]Problem themes: one or two sentence blunt statements - used to focus attention on interesting and/or problematic aspects of the situation (Checkland 1981a: 253).

3.4.2   Cultural Stream of Inquiry

An important aspect of any situation involving people is the often unspoken, but accepted rules and norms that shape the way people behave and the perceptions they have of a situation. It is a feature of the more recently articulated versions of SSM that the analysis of the so-called 'cultural' aspects of the situation are expanded and formally described (Checkland 1989a; Checkland and Scholes 1990; Davies and Ledington 1991).

> Cultures are imperceptible influencers of everyday behaviour and values. They
> create a consensus of thought without the reflective debate of useful consensus.
> They construct the framework whereby everyday social life is constructed
> (Davies and Ledington 1991: 39).

The cultural-stream of analysis demands that the situation be considered and understood in a way that is distinctly different to the view that would normally be taken (Checkland 1989b). Normally unexamined, accepted behaviours and assumptions, can be questioned through this semi-formal framework (Checkland 1989b).

One: Analysis of the Intervention.

The purpose of this analysis is to define the impact that a SSM process of inquiry will have on the problem situation (Checkland and Scholes 1990). This is achieved by identifying the people who hold certain roles in the situation and their perceptions of the situation. In any problem situation in which SSM is to be used, an individual or group of individuals will always assume the role of client, the role of problem-solver and the role of problem-owner (Checkland 1989a; Checkland and Scholes 1990). The individual or individuals who fit each of the roles may change during the inquiry process, but the role will always be taken (Checkland 1981a).

The client is the role attributed to the individual(s) who has acknowledged the need for a process of inquiry and has been instrumental in the study taking place (Checkland and Scholes 1990). Problem-solver is the role attributed to the individual(s) who believes there to be a problem situation and hopes to do something to improve it (Checkland 1981a; Open University 1984; Davies and Ledington 1991). Problem-owners are those people, including the client, who have an interest (stake) in the situation or have an affect or are affected by

the problem situation (Checkland 1981a; Open University 1984; Checkland and Scholes 1990). A problem-owner may or may not perceive the situation as problematic or themselves as affected by the situation (Checkland and Scholes 1990). This role analysis is relatively easy to do and very productive (Checkland and Scholes 1990).

The literature is consistent in defining the role of client, and problem-owner. However, the definition of the role of problem-solver is some what contradictory and unclear. The problem-solver defines the problem-owners and the boundary for the problem situation (Checkland 1981a; Open University 1984; Checkland and Scholes 1990). Checkland (1981a), Checkland and Scholes (1990) and Davies and Ledington (1991) assume that the problem-solver uses SSM to help define improvement in the situation. Therefore, the systems researcher is automatically cast in the role of problem-solver, as are those people in the situation who are involved actively in the SSM inquiry with the researcher. In contrast to this, assuming an inherent aim of SSM is to facilitate people to help themselves to improve the situation, Open University (1984) argues that the analyst using SSM is unlikely to be a problem-solver.

> Given the general therapeutic orientation of soft systems approach, the problem-solver is unlikely to be the analyst. (Think of a marriage guidance councillor) (Open University 1984: 20).

As an added confusion, the role of 'would-be-problem-solver' is also mentioned by Checkland and Scholes (1990) in the following context:

> In the role 'would-be problem-solver' (and it could be whoever is also client) will be whoever wishes to do something about the situation in question, and the intervention had better be defined in terms of their perceptions, knowledge and readiness to make resources available (Checkland and Scholes (1990: 47).

A further departure is the identification by Davies and Ledington (1991) of the role of decision-taker. This is a role also identified as important by Checkland (1981a: 294) in starting the systems study. It is the role of the individual(s) capable of taking or authorising action to improve the situation (Checkland 1981a; Davies and Ledington 1991).

In any problem situation action must be capable of being taken to improve that problem situation. This means that someone must have the power and/or authority to decide on appropriate forms of action. This is fundamental to the role of the decision-taker (Davies and Ledington 1991: 37).

In this thesis the role of decision-taker is assumed to be 'a would-be-problem-solver' (Checkland and Scholes 1990) who is capable of taking or authorising action to improve the situation. The decision-taker can also be a problem-solver, a problem-owner and/or the client (Davies and Ledington 1991).

Two: Analysis of the 'Social System'.

The foci of this component of the analysis are the social aspects that characterise the problem situation from the perspective of the problem-owners. Three elements of the situation: roles, norms and values, and the interaction among them, are the basis of the 'social system' of the problem situation (Figure 3.6). A role is a social position that is perceived as relevant to the problem situation by the problem-owners
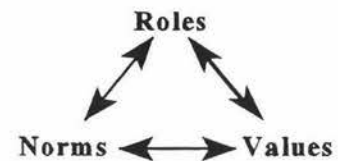
Figure 3.6 The model used in analysis two (Checkland and Scholes 1990: 49).

(Checkland and Scholes 1990). Roles may be defined by industry or organisational hierarchies or behaviour; for example: '*shop steward*', '*solid citizen*', '*nutter*', '*team captain*' (Checkland and Scholes 1990: 49). Norms are the socially accepted format for behaviour and often characterise different roles. They are the often-hidden protocols of behaviour which are inclusive of those who know the rules and exclusive of those who do not (Davies 1989; Davies and Ledington 1991). Values are implicit characteristics held by individuals that define the criteria by which social behaviour is judged as acceptable or not (Davies and Ledington 1991).

An understanding of the social system is unlikely to be obtained through direct questioning. Recommended practice for undertaking this analysis, is to open a mental or actual file labelled 'Analysis Two' and to add elements of roles, values and norms to the file as they arise through the course of the inquiry (Checkland and Scholes 1990).

Three: Analysis of the 'Political System'.

Politics are accepted as being an important component of any social situation, and are analysed in the third part of the cultural steam of analysis. The aim of the political analysis is to identify those relationships that are relevant to the problem situation. The politics of a situation are characterised by relationships of power. This is the ability to make decisions that can and will be acted upon (Davies and Ledington 1991). Authority is an expression of the power attributed to a particular individual or group in relation to a particular attribute of that individual or group. The attribute may be a particular role, reputation or position in the decision making hierarchy, or a level of intellect, personal charisma, access to information or resources, or a degree of influence in a certain social setting (Checkland and Scholes 1990; Davies and Ledington 1991). It may be that people are reluctant and unwilling for these relationships to be made explicit, and it may be counter-productive to do so. Judgement calls of this kind are a component of the inquiry process for which it is obviously impossible to provide guidelines. The experience and confidence of the problem-solvers must be relied upon. However, it is important to consider the influence of political relationships as part of the analysis of the situation (Checkland 1989a; Checkland and Scholes 1990; Davies and Ledington 1991).

3.4.3   Expressing the Rich Description

The 'rich description' of the problem situation, which is generated from the finding-out stage of SSM, is the understanding of the situation from which relevant human activity systems are identified. Systems are relevant if they are assessed likely to contribute to further learning and debate about the situation that will lead to action being defined to improve the situation (Checkland and Scholes 1990). Therefore, SSM emphasises the need to present the 'emerging rich description' in a manner that captures and succinctly conveys all the aspects of the situation that are considered relevant to the situation by all the problem-owners. Traditionally this has been accomplished through the drawing of a 'rich picture'. This is a cartoon-type representation (Figure 3.7) of the problem situation that employs diagrams, simplistic drawings and icons to portray the structure, process and interrelationships of the situation and the social and political aspects (Open University 1984; Wilson and Morren 1990; Daellenbach 1994).
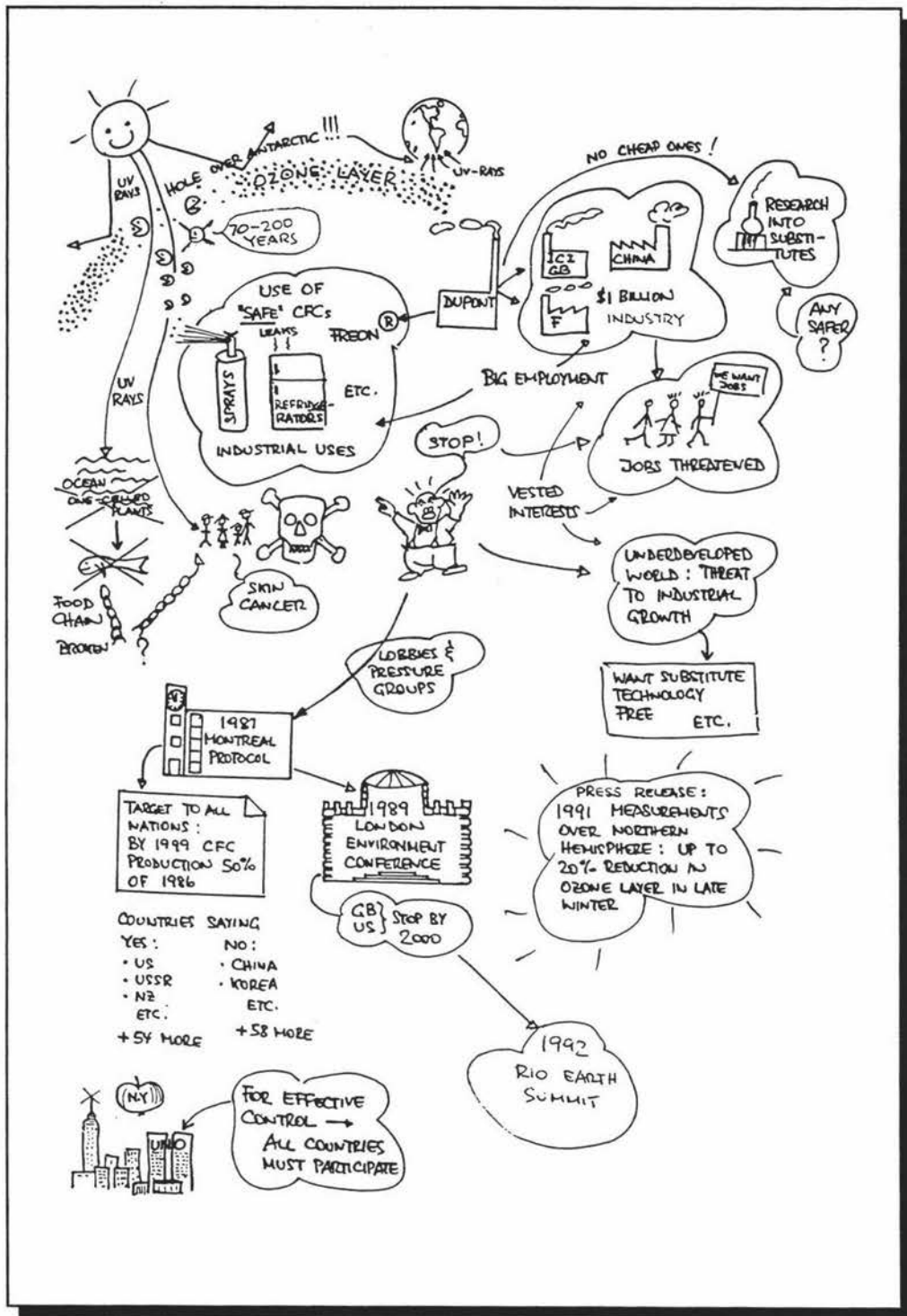
Figure 3.7   An example of a rich picture diagram for the ozone hole (source Daellenbach 1994: 55).

Papers have been written and computer soft-ware packages developed to assist the expeditious completion of drawing rich pictures (Avison, Golder and Shah 1991; Lewis 1992). However, the drawing of rich pictures is only one means of representing, storing and conveying the characteristics and subtleties of a problem situation (Lewis 1992). One view on the matter is as follows:

> It [the rich picture] is an efficacious way of recording the finding-out phase because relationships and interactions are more briskly captured in pictures than in linear prose. However, the fundamental requirement is to gain a discussable appreciation of a problem situation; pictorial representation is simply one means of doing that which has been found useful. But it is not an axiomatic requirement. The guideline is: do what you find to be insightful and comfortable (Checkland and Scholes 1990: 156-157).

The methods by which people's perceptions and information relevant to describing the problem situation are sought and captured is addressed to a very limited degree by the SSM literature. The primary means of gaining people's input into the rich description is through individual and group interviews (Checkland and Scholes 1990). Secondary data sources also provide a body of relevant information for the construction of the rich description. It seems to follow that the guideline offered by Checkland and Scholes (1990) as to the use of rich pictures also applies to the acquisition and analysis of perceptions and information: '*do what you find to be insightful and comfortable*' (Checkland and Scholes 1990: 156-157). The methods that have been used by people involved in the construction of the rich description vary with the problem context and the individual skills of the person using the methodology (Wilson and Morren 1990; Mingers and Taylor 1992; Ormerod 1995). Some of the more commonly used methods are mind mapping (Wilson and Morren 1990), flow diagrams (Wilson and Morren 1990) and cognitive mapping (Eden 1989).

The outcome of the finding-out phase of SSM will be a problem situation that is structured and expressed as a rich description. From an appreciation of tasks and issues included in the rich description, a number of purposeful human activities are identified. The next phase of SSM is guided by systems thinking and involves the naming and selection of relevant systems[6] and the construction of these relevant systems as root definitions and conceptual models.

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[6]   Relevant systems are used synonymously with relevant human activity systems in this thesis.

3.5   Modelling Purposeful Human Activity Systems

LOGIC-BASED STREAM
OF ANALYSIS
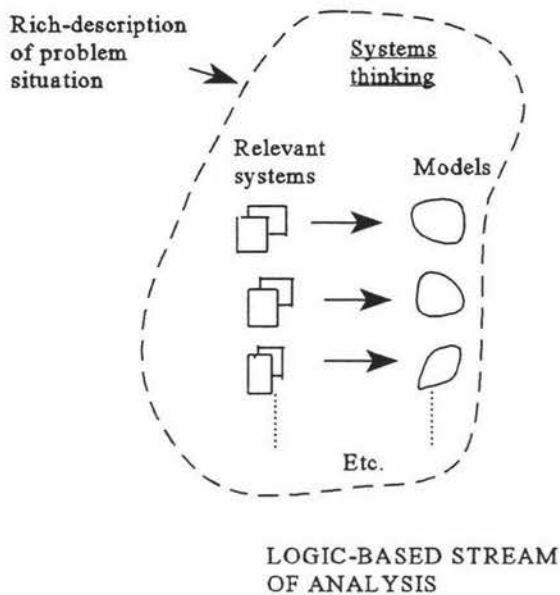
Systems thinking is the intellectual framework that is utilised within SSM to represent coherently, a range of alternative perspectives of purposeful human activity relevant to the situation (Checkland 1985). The component of the methodology described in this section is that which is depicted in the earlier representations of SSM as 'under the line' (Figures 2.5 and 3.5) and in the latest representation as a component of the logic-based stream of inquiry (Figure 3.4). This is the phase that is guided by systems-thinking.

The process involves the selection of relevant systems and the construction of root definitions and conceptual models.

3.5.1   Selecting Relevant Systems

A relevant system is a human activity system that is considered relevant to the process of inquiry and debate into the problem situation. The 'rich-description' generated as part of the finding-out phase of SSM is the source of ideas for human activity systems that are perceived by the problem-solver(s) as potentially relevant to the inquiry process (Checkland 1981a; Open University 1984). There will always be a number of different relevant human activity systems, and the relevance of any chosen system will only become clear once the model of a system has been compared with the real-world situation and debated.

> ... even if you can never be absolutely sure that your chosen system is 'relevant', you can usually be sure when it is not. For you can declare it irrelevant if, having gone through your analysis and held debate with the people involved in the situation, they reject the ideas for change suggested by the analysis. What such a rejection implies is that the actors in the situation did not regard your system

as relevant - in which case you have to go back and choose another, hopefully 'relevant', system and go through the process again (Open University 1984: 32).

The human activity systems that are chosen will not necessarily be systems that represent an 'ideal type' of activity, which if in place in the real-world would constitute an improvement to the situation (Davies and Ledington 1991). In the early stages of the inquiry process, human activity systems will be selected because a consideration of them, within the systems thinking framework, will lead to further insight into the problem situation (Open University 1984). It is also the case that, the relevance of a number of chosen human activity systems will have been realised well before a conceptual model has been constructed for the system (Davies and Ledington 1991). The thinking framework imposed by the task of describing a root definition and then building a conceptual model demands that the problem situation be looked at and thought about in a totally different way. This will generate new insight into the problem situation, and may result in the identification of new, more relevant human activity systems and the modification or expansion of the rich description (Checkland 1985; Checkland and Scholes 1990).

Guidelines are provided in the SSM literature to assist in the choice of relevant systems (Checkland and Wilson 1980; Davies and Ledington 1991). The aim is to select and try out as broad a range of potentially useful relevant systems as possible. Two ways to categorise relevant systems are outlined in the literature (Checkland and Wilson 1980; Davies and Ledington 1991). Selecting a number of relevant systems from each category will ensure as full a range of possible systems have been explored and considered (Checkland and Wilson 1980; Checkland 1981a; Davies and Ledington 1991).

Relevant systems can be categorised in two ways. Mandatory in SSM is the differentiation and identification of primary-task and issue-based relevant systems (Figure 3.8) (Checkland and Wilson 1980). Primary-task systems are those systems that are relevant to the operational tasks in which the organisation is involved. They are constructed on the basis of, firstly, the operational task that is publicly presented and promoted by the organisation, and secondly, the operational tasks that the problem-owners in the situation perceive the organisation to be involved in (Checkland and Wilson 1980; Davies and Ledington 1991). The boundaries of these systems generally fit with real-world organisational structures, such as departments, sections or institutions, and describe apparently non-contentious real-world tasks (Checkland and Scholes 1990).

To illustrate the point, let's take a contentious problem situation - a major prison like Strangeways in Manchester or Wormwood Scrubs in London.

Issues that might arise in relation to such a situation could be: the fact that prisons are sometimes used as dumping grounds for people who are mentally unstable or socially inadequate or who fall in some other way outside the category of 'normal' people.

An issue-based relevant system for this might be **"a system for categorising new arrivals into criminal and non-criminal categories."** Or it could be **"a system to lobby for curbs on the powers of magistrates to detain or remand tramps, vagrants and those who are mentally unstable."**

In contrast to all this, a primary-task system might take as its starting point the fact that, whether prisons are 'dumping grounds' or not, they are all systems for **"admitting, detaining, feeding, clothing and rehabilitating people who have been classified by the legal system in certain ways."**

Figure 3.8   An example of the generation of a primary-task and issue-based root definition relevant to a prison (Open University 1984: 33).

Issue-based relevant systems are those systems that are relevant to the issues, problems and areas of conflict and concern that are a characteristic of the problem situation. These relevant systems are unlikely to be explicit in an operational sense in the organisation, and the boundaries of these systems generally ignore those real world boundaries that structure and define organisations (Checkland and Scholes 1990; Davies and Ledington 1991).

Relevant systems can also be categorised as 'service' or 'non-service' systems (Davies and Ledington 1991). This categorisation is based on a fundamental procedural law of systems design, which states that if System B serves Systems A, then System B can only be designed and created once there is a clear understanding of the nature of System A (Checkland 1981a). Davies and Ledington (1991) represent the four categories as a typology of relevant systems (Figure 3.9).

	service	non-service
primary-task		
issue-based		

Figure 3.9   A system's typology to guide relevant system selection (Davies and Ledington 1991: 65).

To ensure the selection of relevant systems is not limited, Davies and Ledington (1991) recommend that in the first iteration of the SSM process, at least five relevant systems for each of the four cross-types be generated. From each of these cross-type categories, at least one relevant system should then be modelled for comparison and debate (Davies and Ledington 1991).

The concept of a system implies organisation, interrelationships and hierarchies of systems and subsystems. These are sometimes referred to as higher-order and lower-order systems. Checkland and Wilson (1980) state that it does not matter if high-level systems are chosen, and then broken down into subsystems, or if lower-order subsystems are selected and then combined into higher order systems. Although the literature does not describe in a definitive manner how to undertake the process of selecting relevant systems, it does offer reassurance as to the usefulness of the task:

> However you arrive at them, it must be conceded that Relevant Systems are still rather vague and general ideas. To make use of them, they must be refined and developed - sharpened up - to the point where they can really shed some comparative light on the problem situation (Open University 1984: 36).

The 'sharpening up' of the relevant systems is what takes place when the relevant systems are modelled as descriptive root definitions and then conceptual models.

3.5.2   Naming the Relevant Systems in Root Definitions

A root definition of a relevant system is a concise statement of the core purpose or transformation for which the relevant system has been selected (Open University 1984). The basic expression of this transformation takes the form of:

a system to do X, by means of Y, in order to achieve Z

(Checkland and Scholes 1990; Davies and Ledington 1991).

The system operationalises the doing of X, by the means Y, and the Z provides a meaningful explanation for the appropriateness of the means (Y) for doing X.

There are a number of key elements that when included in the root definition ensure an acceptable level of rigour in the root definition (Checkland and Scholes 1990). The process of transformation (T), for which the system is constructed, and the W_1 (Weltanschauung W_1) that gives meaning to the transformation are two key elements of a root definition (Checkland and Davies 1986). A transformation is a process that changes a particular entity [input] into a transformed state of that same entity [output] (Smyth and Checkland 1976). A transformation must yield a physical output from a physical input and an abstract output from an abstract input (Checkland 1981a; Open University 1984; Checkland and Scholes 1990). An example of the idea of a transformation is reproduced from Checkland and Scholes (1990) in Figure 3.10.
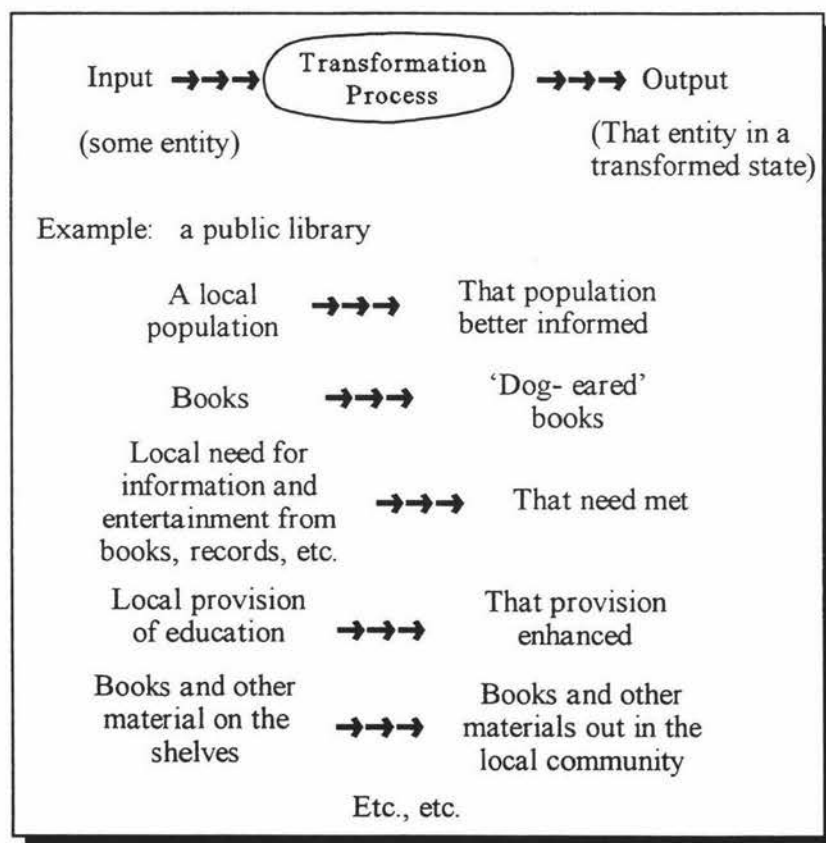
Figure 3.10   The idea of a 'transformation process' applied to a public library (Checkland and Scholes 1990: 34)

To complete a root definition, four other elements in addition to 'T' and 'W' need to be considered. The first letter of the word representing each of the six elements forms the mnemonic CATWOE. The

elements in CATWOE were derived from a review of well-constructed root definitions undertaken as part of the on-going active development of SSM (Smyth and Checkland 1976):

'C' :   the customers, those individuals who will be the beneficiaries or victims of the purposeful activity;

'A':   actors, those who will undertake the purposeful activity;

'T':   transformation;

'W':   Weltanschauung;

'O' :   owners, those who are in a position to stop the activity; and

'E':   the environmental constraints within which the activity will be undertaken.

The formulation of a root definition is a process of trial and error (Open University 1984). The aim is to capture the major elements involved in the system and these are embodied by the components of the mnemonic CATWOE. An example of a root definition constructed for a 'generic' manufacturing company is presented in Figure 3.11.

ROOT DEFINITION

A professionally-manned system in a manufacturing company which, in the light of market forecasts and raw material availability, makes detailed production plans for a defined period.

CATWOE ANALYSIS:

C   - people in the production function.

A   - professional planners.

T   - need for production plan   →→   need met; or
            information   →→   plan.

W   - rational planning of production is desirable and is
            a possibility; there is the degree of stability needed to
            make rational planning feasible.

O   - the company.

E   - staff and line roles; information availability.

Figure 3.11   Example formulation of a root definition (Checkland 1989a: 87).

Root definitions should be a concise description of the processes implied by the relevant system. The processes may involve a small or a large number of activities. The recommendation is to aim for a 'pithy' definition, but they may not always be short and sweet (Open University 1984). Whatever the

final form of the root definition of a relevant system, the activities defined within it will be represented in the conceptual model of the same relevant system.

3.5.3   Constructing the Root Definition as a Conceptual Model

Mutually adjusting the root definition and conceptual model such that the two support each other is the core process involved in modelling (Davies and Ledington 1991). A conceptual model of a root definition will contain all those main activities that are described in the root definition, and the activities upon which these main activities will be contingent or logically dependant. Likewise, the root definition will contain all the main activities that arise in the conceptual model (Checkland 1981a; Checkland and Scholes 1990; Davies and Ledington 1991). The task of completing both is iterative and likely to generate new insights into the problem situation and modifications to the rich description (Checkland and Scholes 1990).

The building blocks of the conceptual model are the verbs included in the root definition that define the activities undertaken by the system, and the relationship between these activities (Checkland 1979b; Checkland, Forbes and Martin 1990). For a particular activity to be undertaken there will be a number of other activities that will also need to be completed. Consequently, an activity will be dependant (or contingent) on the completion of another activity. This contingent relationship (logical dependancy) is represented in the model in Figure 3.12 as arrows: if B is contingent on A then an arrow drawn from A to B will represent this relationship

Figure 3.12 A contingent relationship; 'B' contingent on 'A' (adapted from Davies and Ledington 1991).

(Checkland 1979b, 1981a, 1989a; Open University 1984; Davies and Ledington 1991).

Consistent with systems concepts, the conceptual model comprises at minimum an operational subsystem and a control subsystem (Figure 3.13).
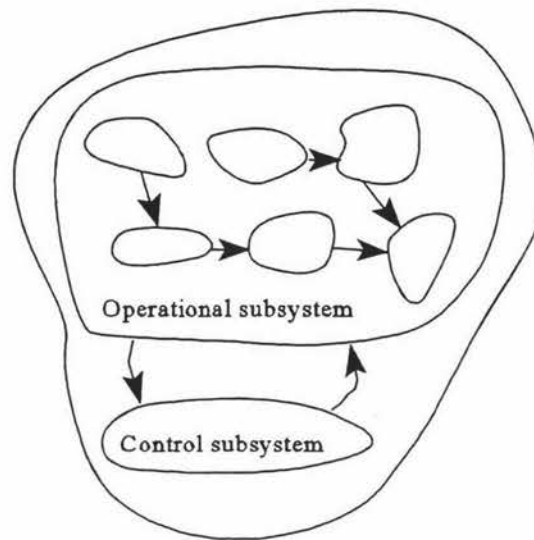
Figure 3.13   The necessary basic structure of a conceptual model of a purposeful system (adapted from Checkland, Forbes and Martin 1990: 40).

The control subsystem monitors and controls the operational subsystem's activities (Checkland *et al.* 1990). Within both these subsystems there may be further subsystems, and the system comprising the subsystems may itself be a subsystems of a wider system. The human brain is capable of coping with only a limited number of concepts at any one time (Miller 1968, cited Checkland and Scholes 1990). A guiding principle in the construction of these models is to limit the number of operational activities in any model to between 5 and 12 (Open University 1984; Checkland and Scholes 1990).

The recommended process for constructing the operational component of the systems model is as follows (Open University 1984; Checkland *et al.* 1990; Davies and Ledington 1991):

Step One: Highlight the verbs written as part of the root definition.

Step Two: Draw up a list of those verbs that refer to the main transformation activities of the root definition.

Step Three: Arrange the verbs in logical order with respect to their logical dependancy relationships.

Step Four: For each main activity (verb), consider the activities upon which it may be contingent, and construct in the model, using verbs, the logical structure of these contingent activities.

The control subsystem is contingent on the activities of the operational subsystem. Likewise, the operational activities are contingent on the monitoring and control activities of the control subsystem (Figure 3.14) (Checkland *et al.* 1990; Checkland and Scholes 1990).
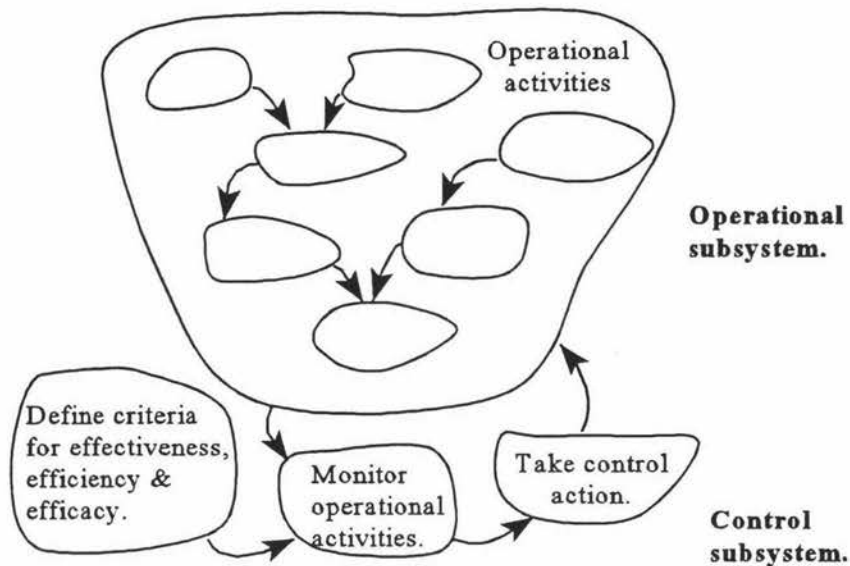
Figure 3.14   The necessary structure of an operational and control subsystem of a conceptual model (adapted from Checkland 1989a; Checkland *et al.* 1990).

The two verbs, monitor and control, describe the component activities of the control subsystem, and the relationship between these two activities is one in which the control function is logically dependant on the monitoring function (Checkland *et al.* 1990). The existence of a monitoring function also requires a number of criteria by which the performance of the operations being monitored can be assessed. Therefore, there is a logical dependancy between the activity of monitoring and the activity of defining relevant criteria by which the activities undertaken by the system can be monitored.

The core purpose of the system ('a system to do X, by means of Y, in order to achieve Z') is to perform a transformation (X), changing inputs to outputs, in a way (Y) that is meaningful to the world view and/or aims (Z) associated with the creation of the system. The 'success' or otherwise of the transformation is assessed in SSM through the definition of criteria that cover three aspects of a system's performance: (the 3 E's) efficacy, efficiency and effectiveness (Checkland *et al.* 1990). Efficacy criteria will assess whether the means (Y) actually works (does X) and produces the output desired. The question as to whether the transformation uses the minimal level of resources will be addressed by defining relevant criteria of efficiency. Criteria of effectiveness will address whether

the over riding aim of the system (Z) is actually being achieved by doing X by means of Y (Checkland *et al.* 1990). The link between the root definition and conceptual model for a hospital study is illustrated in Figure 3.15 and Figure 3.16.

Root Definition

A hospital-owned system which provides records for spending on drugs so that control action by administrators and doctors to meet defined budgets can be taken jointly.

      C: Administrators, doctors.

      A: Not stated.

      T: Need to know   ⟶   Need met by recording spending on   information. drugs

      W: Monitoring spending on drugs is possible and is adequate basis for joint control action.

      O: Hospital.

      E: Hospital mechanisms; roles of administrators and doctors; defined budgets.

Figure 3.15   Root definition paired with the conceptual model in Figure 3.16 (Checkland 1989a: 94).
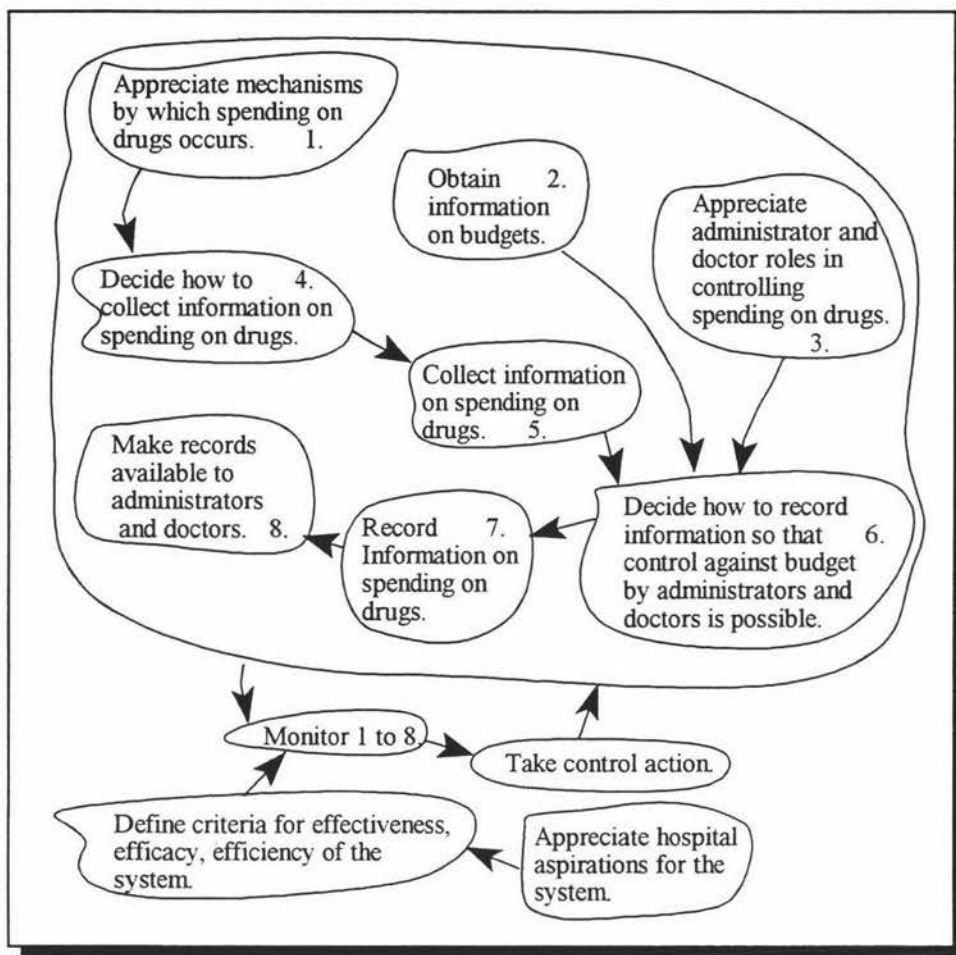
Figure 3.16   A conceptual model paired with the root definition in Figure 3.15 (Checkland 1989a: 94).

3.5.4   Testing a Conceptual Model of a System

The aim of the modelling phase of SSM is to generate root definitions and conceptual models that can be justified coherently in relation to the problem situation (Checkland 1989a; Checkland *et al.* 1990). The iterative process of matching the root definition and conceptual model is one means of testing these models. A second means is to match the components of the root definition and conceptual model against the components of the 'Formal Systems Model' (Checkland 1981a; Open University 1984; Wilson and Morren 1990; Davies and Ledington 1991). The Formal Systems Model is a checklist of generic attributes which, on the basis of the experience of SSM developers and users, are recognised as needing to be present "*if a set of activities is to comprise a system capable of purposeful activity*" (Checkland 1981a: 173).

[The Formal Systems Model] is really a practical safety net, designed to ensure that, as you engage the rarefied business of constructing a completely abstract Conceptual Model, you do not lose touch with the essential features of a purposeful human activity system (Open University 1984: 45).

The use of the Formal Systems Model is reviewed by Checkland and Scholes (1990), and is no longer considered to be a required part of the protocol for SSM. If all elements of CATWOE are included and explicit in the root definition and conceptual model, this is considered an adequate basis for testing the models (Checkland and Scholes 1990). However, as the Formal Systems Model continues to be advocated in a number of other SSM publications it is included in this thesis (Open University 1984; Wilson and Morren 1990; Davies and Ledington 1991). The model comprises ten attributes, the initial formulation contained only nine; the tenth was added by Davies and Ledington (1991). These ten attributes, illustrated in Figure 3.17, can be used to ascertain the completeness of the conceptual models.

The Formal Systems Model

A system (S) is a system if:

1. S has a mission, an objective, a definition of a desirable state, or an on-going purpose, or can have a purpose sensibly attributed to it, that reflects a transforming function of one set of things (or events) to another.

2. S has a measure of performance that reflects the extent to which the purpose of transformation is being achieved.

3. S has a mechanism of regulation (a process of decision making and resource allocation) that reflects the purpose, responds to information, and governs performance.

4. S has components that themselves exhibit all the properties of S and can thus be labelled subsystems.

5. S has components that interact and show degrees of connectivity that permit effects and actions to be transmitted and flow through the system.

6. S exists within wider (supra) systems and/or environments (E) with which it interacts. The use of Customers, Owner and Environment within CATWOE formalises this attribute for human activity systems.

7. S can be distinguished from the supra-system or environment (E) in which it exists by a boundary that represents the interface between an S and an E; and clearly distinguishes things that are under the S's control from things that are not controlled and to which the S must be adapted or accommodated.

8. S has both physical and (often) abstract resources at its disposal by virtue of its component parts, its internal environment (e) and inputs that it receives from its external environment (E) across the boundary.

9. S has some guarantee of continuity or stability, with the capability of returning to a stable state (or qualitatively acceptable changed state) when disturbed and/or resisting forces emanating both from within the system itself (e), and from its environment (E).

10. There is an observer who considers the system to be of interest. In SSM this is handled by the notion of Weltanschauung.

Figure 3.17   The Formal Systems Model (adapted from Wilson and Morren 1990: 190; Davies and Ledington 1991: 92-93).

The rigorous use of CATWOE as a protocol for the root definition or the Formal Systems Model as a checklist for the conceptual model are both steps that can ensure the conceptual model is complete in systems terms. However, the completeness and adequacy of a conceptual model will only become clear once the conceptual model has been compared with the real-world situation and the implications of the comparison debated by people involved in the situation (Open University 1984; Davies and Ledington 1991). The comparison process is part of the real-world activities of SSM and leads to action to improve the problem situation. This component of the SSM process is described in the following section.

3.6   Taking Action to Improve the Situation.

The aim of constructing the models of 'relevant human activity systems' is to provide a basis for structured and coherent debate that will lead to action that is acceptable and meaningful to the people involved in the situation. The comparison phase of the inquiry process is the stage at which people's real-world perspectives of reality are matched against perspectives constructed using systems thinking. The resulting debate and reappraisal of these perspectives generate further insight into, and learning about, the problem situation. Assumptions and Weltanschauungen that underpin perspectives are questioned as are the avenues for change that would constitute an improvement (Davies and Ledington 1991). The process may lead to a number of iterations of both the cultural and logic-based streams of analysis and may result in a new cycle of inquiry to address the questions of how best to implement change (Checkland 1981a; Checkland and Scholes 1990). Although iteration is an inherent part of the inquiry process, the end point of the process is not when a 'perfect' relevant model has been constructed. The process is a cycle, consequently there is never a clear end point (Checkland and Scholes 1990). A satisfactory outcome from the use of SSM is when action has been defined, which has been reached through full discussion and debate and, to which the people involved in the problem situation are committed (Checkland and Scholes 1990).
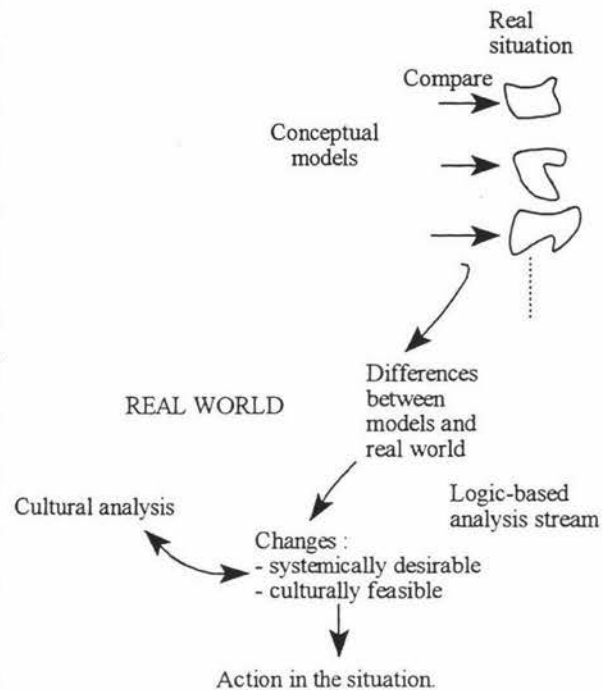
3.6.1   Comparison and Debate

B oth, structured and unstructured methods for comparing conceptual models with the problem situation are described in the literature. The unstructured method is informal-questioning (Checkland 1981a; Wilson 1984; Vietor and Cralle 1990) and is described in The Open University (1984: 45) publication in the following way:

> The least structured, most intuitive, way of doing it is to go away from the Problem Situation with the Conceptual Model and the Rich Picture, shut yourself up for a day and think about the implications of the 'CM' and the 'RP' together. Ask yourself questions like: how does the real world operate, and how does the model operate? Where are the two different, and why? And so on.

More structured methods by which the comparison process can be undertaken are:

- Formal questioning (Checkland 1981a, 1989a; Open University 1984; Wilson 1984; Checkland and Scholes 1990; Vietor and Cralle 1992):

    this is a more detailed analysis of the differences between a conceptual model and the problem situation than undertaken in the informal questioning technique. For each conceptual model, specific questions relating to each activity, and the relationships between activities are considered in relation to the real-world situation. The process is usually based around the filling in of a matrix.

- Scenario writing; based on 'operating' a model or historical reconstruction (Checkland 1981a, 1989a; Wilson 1984; Open University 1984; Checkland and Scholes 1990; Vietor and Cralle 1990):

    the conceptual model is operationalised, mentally or on paper, as a scenario of a real world activity and then compared with a case study of how it has been done in the past.

- Model overlaying (Checkland 1981a, 1989a; Open University 1984; Wilson 1984; Checkland and Scholes 1990; Davies and Ledington 1991):

    a model of part of the real world is constructed to represent as closely as possible the conceptual model. Overlaying models will highlight the differences in, and

similarities between, the two models. This is also useful for overlaying the activity boundaries of the model with that of the organisational and task related structures of an organisation and using this as the basis for thinking about current processes.

- Structured data collection and tabulation (Davies and Ledington 1991):
  this method is a combination of formal and informal questioning.

- Model to model (Davies and Ledington 1991):
  conceptual models that represent slightly different views of the situation are compared with each other and, if relevant, with representations of the actual operational task structures that exist in the problem situation.

- Attribute mapping (Davies and Ledington 1991):
  an attribute of management or organisational design, such as information system use, that is of particular interest to the analysts, is mapped onto the conceptual model. This may provide a guide as to potential changes and improvements in the attribute itself.

The method commonly used in the comparison phase of the SSM inquiry is that of formal-questioning (and structured-data-collection and tabulation) with scenario-writing being the next most commonly used method (Wilson 1984; Checkland and Scholes 1990). Overlaying-models is the most formally structured of the four methods outlined above. The use of this technique is limited to situations for which a real-world example of the modelled purposeful activity exists (Open University 1984; Checkland and Scholes 1990). The formal-questioning and structured-data-collection and tabulation methods are useful for guiding the comparison phase of any SSM system of inquiry and can be used in group discussions or in one-on-one interviews (Checkland 1981a; Checkland and Scholes 1990; Davies and Ledington 1991).

For any problem situation, a number of conceptual models will have been generated. The literature does not provide guidelines for choosing a comparison method. However, Davies and Ledington (1991) provide a framework for considering the type of comparison to use for different types of conceptual models (Figure 3.18). Conceptual models are classified as appropriate to one of three modes of comparison dependant on the confidence that is attributed to their relevance to the process of inquiry. The three modes of comparison are: exploratory, diagnostic and design.
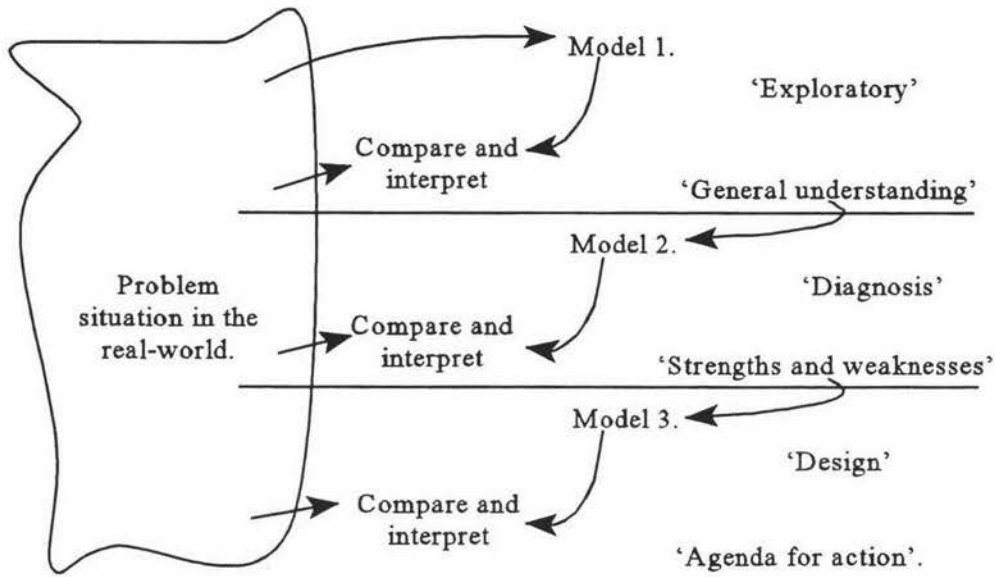
Figure 3.18 Exploratory, diagnostic and design mode of comparison (adapted from Davies and Ledington 1991: 111).

The exploratory mode is the most general form of the comparison process and is primarily aimed at assessing whether a conceptual model is relevant or not to subsequent debate. This mode of comparison is for conceptual models for which there is only a tentative match between the model and the perceived real-world situation. The 'exploratory mode' takes the form of four steps that are normally constructed as a matrix:

- all activities in the model are listed;
- the outputs (outcomes) from each activity are defined;
- the real-world situation is investigated and entities identified which match outputs of the model;
- 'how' the 'output' of the model is generated in the real-world is investigated. Firstly to establish if it exists, and then to compare the model 'how' with the real world 'how'.

Diagnosis is the mode of comparison suited to a conceptual model for which there is a high level of confidence in its relevance. A more detailed comparison of the conceptual model's component activities is made. The strengths and weaknesses in the problem area are identified relative to potential change. Davies and Ledington (1991: 118) suggest a number of questions that can form the basis of this mode of the comparison phase.

There are five questions:

- Who carries out the activity?
- What resources are utilised in carrying out the activity?
- How is the activity planned and controlled, and by whom?
- What information is received to help plan and operate the activity, and what information has to be produced for others?
- How does the activity gain its necessary inputs, and from where?
- How does the activity get its output to the recipients of the output?

For the part of the real-world situation that corresponds to the system model, assessment is made of both the performance of the current situation and the likely performance of the model. Efficiency, effectiveness and efficacy are the criteria by which performance is assessed and is also the basis for identifying the strengths and weaknesses of the current situation. Action to improve the situation is based on the outcomes of the assessment process (Davies and Ledington 1991).

A conceptual model, applicable to the design mode, may have undergone a number of changes as the result of the insights and questions generated in previous iterations and modes of comparison. The design phase is used to investigate the changes identified in the diagnostic mode in more detail. The aim of the design phase is to define a detailed agenda for action along with specific action plans (Davies and Ledington 1991).

3.6.2 Defining and Taking Action

The options for action that are worthy of further consideration are those that can be assessed as being systemically desirable and culturally feasible (Checkland 1981a, 1989a; Open University 1984). Systemically desirable changes are those that are consistent with the systems thinking that generated the conceptual models (Checkland 1981a, 1989a; Open University 1984). That is, the changes make sense and are 'desirable' given the knowledge that exists about the problem situation. SSM assumes that change will only be implemented if it is perceived as acceptable, by the people involved in the situation. Change that satisfies this criteria is culturally feasible, and its assessment is based on the findings from the cultural analysis stream of SSM (Checkland 1981a, 1989a; Open University 1984).

An aspect of defining and taking action in SSM that is not clear from the literature is the degree of, and stage at which, the participation of problem-owners, problem-solvers (decision-takers) and clients is sought. All the methods for comparison listed earlier can be used to structure debate between participants, if they are involved at that stage of the SSM process. One option is for a problem-solver to complete the comparison phase, and on the basis of their interpretation draw up an agenda for debate between other problem-solvers and problem-owners (Open University 1984). However, the examples provided by Checkland and Scholes (1990) indicate that there is no one right way to carry out this process:

> The models are used as a source of questions to ask of the real world; answering the questions initialises debate, which may be conducted in any way which seems appropriate to the particular situation. It may be carried out by a group of people gathered in one place at one time to have discussion, or carried out in one-to-one interviews or dialogues spread over a period of time. It is impossible to generalize. In the study related to decision support systems ... the debate took place at one meeting between Scholes and the initiator of the study; in the reorganization of the Shell Group's Manufacturing Function all 600 members of the Department as well as many managers from Shell Operating Companies, were given the opportunity to make their contribution to the debate over a period of months (Checkland and Scholes 1990: 43).

The nature and interconnectedness of the issues and the degree of variance between people's perceptions of the situation are likely to impact on the change that results from using SSM. Change will also be influenced by the level of support afforded SSM by decision-takers in the situation and the extent to which the decision-takers are comfortable with the outcomes of the study (Davies and Ledington 1991). This factor is highlighted by the outcomes of Davies' experiences in the British army (Davies and Ledington 1991). At the completion of her work, it became clear that the individual identified as decision-taker (someone able to invoke change) was dictated to by higher powers and was not in a position to act on the outcomes of the study.

A number of iterations of the full SSM cycle will usually be undertaken in a problem situation. The action that is defined from the comparison debate may lead to more 'finding-out' to provide new and more relevant human activity systems to be modelled, or it may lead to the naming of new relevant systems (Checkland 1989a).

The description of the general stages of SSM includes a number of protocols that have been developed to provide a guiding framework and to ensure a degree of rigour is maintained in the systems thinking phases of the process: these are CATWOE and the Formal Systems Model. As there is no template for 'how to use' SSM, the 'Constitutive Rules' (Naughton 1981; Checkland and Scholes 1990) were developed as a protocol for defining what constitutes an SSM process of inquiry.

3.7   Constitutive Rules for SSM

The idea of 'Constitutive Rules' for SSM was originally proposed and formulated by Naughton (1977). He recognised that to be able to teach SSM to students, there needed to be rules, which if adhered to, substantiated that SSM was the approach that had been applied (Naughton 1981; Open University 1984). The 'Constitutive Rules' for SSM (Figure 3.19) have been modified over the years as the experience in using SSM has grown. The rules continue to be used for the purpose Naughton (1977) first intended; however, they are also used as a framework to debate and reflect on the use of SSM to enable further development of the methodology (Checkland 1981a; Checkland and Scholes 1990; Davies and Ledington 1991).

> The purpose of doing this [formulating Constitutive Rules for SSM] is not that miscreants can be struck off some imaginary list of SSM users! It is to enable coherent critical debate about the experience of using SSM to take place (Checkland and Scholes 1990: 286).

Constitutive Rules of Soft Systems Methodology

1. SSM is a structured way of thinking which focuses on some real-world situation perceived as problematical. The aim is always to bring about what will be seen as improvements in the situation, and this is true whether or not the work done is part of the normal day-to-day managerial work or a special highlighted study.

2. SSM's structured thinking is based on systems ideas, and its whole process has yielded an explicit epistemology[7]. Any account of work which lays claim to being SSM-based *must be expressible in terms of that epistemology* whether or not SSM language was used as the work was done. In other words what ever gets done as part of the process of SSM inquiry must be able to be described using the terms and language defined by SSM's epistemology [Appendix IV summarises this epistemology].

3. The full claim "SSM was used" (implying some version of the approach as a whole) ought to refer only to instances in which the following guidelines were followed:
   - There is no automatic assumption that the real world is systemic. If part of the real world is taken to be a system to be engineered, then that is by conscious choice.
   - Careful distinction is made between un-reflecting involvement in the everyday world (the unfolding flux of events and ideas) and conscious systems thinking *about* the real world. The SSM user is always conscious of moving from one world to the other, and will do so many times in using the approach.
   - In the systems thinking phases, holons[8] are constructed. (These will usually take the form of purposeful 'human activity systems' which embody the four basic ideas: emergent properties, layered structure, processes of communication and control.)
   - The holons are used to inquire into, or interrogate the real-world in order to articulate a dialogue, discourse or debate aimed at defining changes deemed desirable and feasible.

4. Since SSM can be used in many different ways in different situations, and will in any case be interpreted somewhat differently by each user, any potential use of it ought to be characterised by conscious thought about how to adapt it to a particular situation.

5. As SSM is a methodology, every use of it will potentially yield methodological lessons in addition to those about the situation of concern. The methodological lessons may be about SSM's framework of ideas, or its processes, or the way it was used, or all of these. The potential lessons will always be there awaiting extraction by conscious reflection on the experience of use.

Figure 3.19   Constitutive Rules for SSM (source Checkland and Scholes 1990: 286-287).

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[7]Epistemology: theory of method or grounds of knowledge (Oxford Illustrated Dictionary 1964: 271); theory concerning the means by which we possess and express knowledge of the world (Checkland 1981a: 314).

[8]Holons: a term recommended by Checkland (1988a) to refer to the concept of an abstract system, to separate clearly the concept of a systems, in systems thinking, from that implied by the common everyday use of the term.

The Constitutive Rules for SSM are a good summary of the framework of ideas, the process of SSM and the way in which SSM is used. The rules provided the guidelines for the use of SSM in the research project reported in this thesis and the basis, in Chapter Six, for reflecting on the use of SSM in the on-farm labour situation in the New Zealand dairy industry.

3.8   Summary and Conclusions.

The fundamental ideas that underpin SSM include the concepts of Weltanschauung and human activity systems. Social reality is accepted as being the product of people's negotiated perceptions of reality and these perceptions can be modified through learning. SSM is a system of inquiry that involves a process of finding-out about a problem situation in order that components of the situation can be modelled as human activity systems. The systems that are modelled are relevant to the situation if they structure debate and learning that leads to action that improves the situation.

The research project described in this thesis uses SSM to inquire into the on-farm labour situation in the broad context of the New Zealand dairy industry. Based on the description of SSM in this chapter and a developing understanding of the problem situation, SSM was adapted for use in this research project. Chapter Four outlines the way in which SSM was adapted and used to investigate the on-farm labour situation in the New Zealand dairy industry.

CHAPTER FOUR

The Research Project and the Use of SSM in the On-farm Labour Situation

4.1 Introduction

The objectives for the research project presented in this thesis are twofold:

- to gain an understanding of the on-farm labour situation in the New Zealand dairy industry to help define action to improve the situation.
- to investigate the appropriateness of using a soft systems approach in a problem situation in the New Zealand dairy industry.

The two research objectives are interlinked. The understanding of the on-farm labour situation was gained by using SSM. The appropriateness of a soft systems approach was investigated through the use of SSM in the on-farm labour situation in the New Zealand dairy sector.

A model of a system of human activities was used as a framework for reflecting on and planning the research project (Checkland and Scholes 1990). As knowledge of SSM and the problem situation increased, the research project system model was modified and developed. In its final form, the research system model represents the activities that were undertaken to complete the research project. This final system model is used in this chapter to structure the description of the research project activities and the relationship between the activities. The application of SSM is represented as a subsystem model of the research project system.

4.2 The Research Project

An underlying assumption of the Farmer First Research (FFR) programme, of which this project is a part, is that the use of soft systems approaches in problem situations in the New Zealand dairy industry will lead to improvements in those situations (Reid 1996). This can be considered a component of W_3 Weltanschauung, the 'taken for granted assumptions' (Checkland and Davies 1986) about the 'social reality' in which the on-farm labour situation in the dairy industry

exists. W_2 are those real-world 'taken for granted assumptions' that make the root definitions and conceptual models meaningful to the on-farm labour problem situation. The root definitions and conceptual models are based on their specific Weltanschauung, W_1. Meaning is given to the research project system, represented below, by way of W_3. This Weltanschauung is articulated, in part, by Activity 1 (Figure 4.1) and Chapter one of this thesis. The transformation process of the research project system is to attain the research project objectives that were defined in Chapter One.

Figure 4.1   Conceptual model of a relevant human activity system to complete this research project.

The model of the research project system comprises 18 component activities. A description of the activities and the contingent relationship between them is outlined as a means of detailing the research process undertaken in this study.

Activity 1.

As outlined in Chapter One, this research project is a component of the FFR programme at Massey University. The overall aims of the FFR programme influenced the way in which this research project was undertaken. The FFR programme is funded in part by Livestock Improvement Corporation (LIC), of which Livestock Improvement Advisory is a component group. The long-standing relationship with LIC, and in particular Livestock Improvement Advisory, is important to the FFR programme and Massey University. Selection of the on-farm labour problem was undertaken in collaboration with Livestock Improvement Advisory. The findings gained from completing this research project will influence the direction of research undertaken in the broader FFR programme and, potentially, the actions of Livestock Improvement Advisory staff.

Activities 2, 3 and 4.

The on-farm labour situation was identified as a concern to people in the New Zealand dairy industry, including Livestock Improvement Advisory. The researcher, as part of the FFR group, had an established research interest in investigating the application of soft systems approaches to problems in the New Zealand dairy industry. These two factors were the basis for the formulation of the research objectives that have driven this research project.

Activities 5 to 12.

Chapter Two of this thesis outlines soft systems thinking, six soft systems approaches (activities 5 & 6), and the reasons for choosing SSM as the method most appropriate to solving the on-farm labour problem (activity 8). SSM was chosen (activity 8) based on an understanding of both soft systems thinking and the problem situation in which it was used (activities 6 & 7). An understanding of SSM was gained, in part, from reading the literature (activity 9). Chapter Three of this thesis represents an outcome of activity 9 and activity 10. As an appreciation of both SSM (activity 10) and the problem situation (activity 7) developed, the scope of the SSM inquiry was defined (activity 11). The application of SSM to the on-farm labour situation (activity 12) was dependant on an understanding of 'how to use SSM' (activity 10). This was gained, not only from reading and reflecting on the literature, but also from the use of the methodology. The way in which SSM was used was also influenced by the problem situation itself, and an understanding and appreciation of the problem situation developed out of using SSM in the situation (activities 7 and 12).

Activities 13 and 14.

In line with the second research project objective, a research journal was kept throughout the project (activity 13). Reflections and critical comments were recorded on SSM and its use in the on-farm labour situation. The journal provided a documented record of what was done, how it was done, the frustrations experienced, achievements made and knowledge gained about SSM and the problem situation. The journal entries and all the activities 1 through 12 enabled the activity of writing this thesis to be accomplished (activity 14). The act of writing the thesis also contributed to learning and appreciation of soft systems thinking, SSM and the problem situation.

Activities 15 to 18.

The criteria (activity 16) by which the project was monitored (activity 17) and controlled (activity 18) were based on the academic requirements demanded of research (activity 15). This knowledge was provided, in part, by supervisors of the project.

All the activities represented in the system model of the research project contributed to the attainment of the research objectives. However, a significant component of the project has been the use of SSM in the on-farm labour situation. The way in which SSM was used (activity 12) was dependant on the scope of the inquiry process (activity 11). Both, activities 11 and 12 were also dependant on the problem situation in which SSM was being used.

4.3   The Scope of the SSM Inquiry Process

Identifying the holders of the roles of client, problem-solver and problem-owner is a component of the analysis of the intervention, in the 'finding-out' phase of SSM. The client is the individual(s) who has some concern about the situation and made it possible for the SSM study to occur (Checkland and Scholes 1990). Livestock Improvement Advisory logically were given this role. It is the task of the problem-solver, the researcher in this project, to construct the rich description of the problem situation based on the perceptions of those people that fit the role of problem-owner. People included in the role of a problem-owner are those individuals or groups that have a stake in the problem situation, including the group holding the role of 'client'. Besides the NZDB, the 13 dairy companies, and the other groups and organisations associated with the industry, more than 14600 dairy farm businesses exist in the New Zealand dairy industry. No definitive statistics on the number of people employed, or employing staff, on New Zealand dairy farms could be found; however, it is likely that a significant proportion of dairy farm businesses employ staff. In a problem situation

involving such a large number of people, it is not practically possible to include the perspectives of all problem-owners in the development of the rich description of the situation. Within the time frame available for the research project a complete iteration of the SSM process of inquiry, although enabling an assessment of all SSM phases, would limit the number of problem-owner perspectives and the level of information able to be gained. As an appreciation of the complexity and extent of the problem situation emerged through the inquiry, the decision not to complete a fast full iteration of SSM was supported. The research objectives for the project would be satisfied through the development of a rich description of the situation and the construction of relevant human activity system models appropriate for debate to define action. Accordingly, the application of SSM to the on-farm labour situation was confined to an initial exploratory finding-out phase and construction of a rich description, and the development of a number of relevant human activity systems as root definitions and conceptual models. An important consideration for the researcher in developing a strategy to achieve the research objectives was that the ideas fundamental to SSM were not compromised. Consequently, a priority in the application of SSM was to gain as broad a range of problem-owner perspectives as possible in the finding-out phase. The scope of the use of SSM in this project is represented diagrammatically in Figure 4.2.
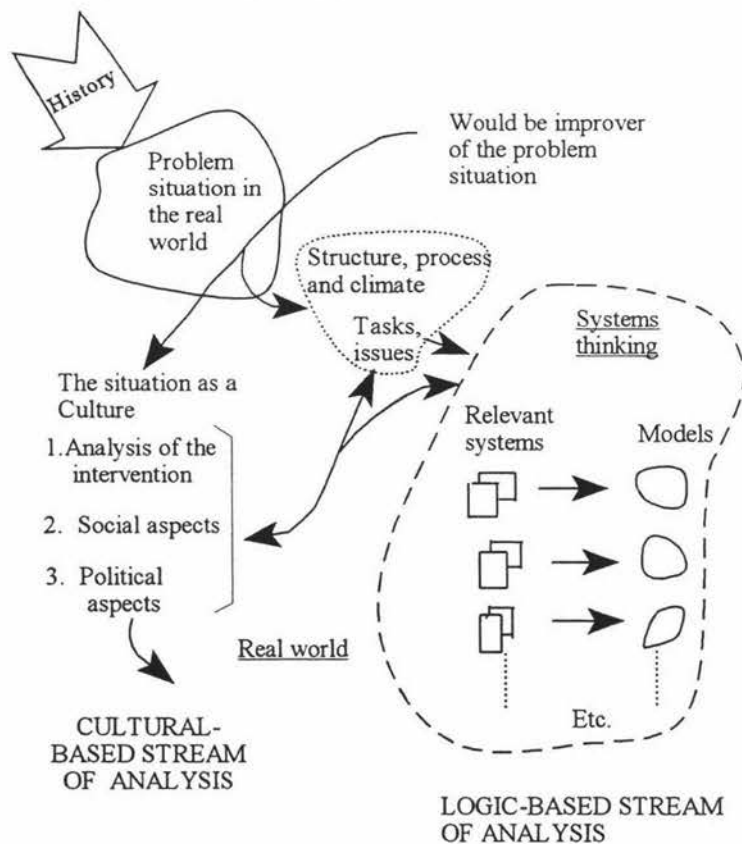
Figure 4.2   The scope of the SSM process undertaken in the on-farm labour situation (adapted from Checkland 1988b; Checkland and Scholes 1990).

The logic-based and cultural-based streams of inquiry are two interlinked streams of inquiry (Checkland and Scholes 1990). The logic-based stream of inquiry was completed up to the development of root definitions and conceptual models. An analysis of the intervention and an analysis of the social and political aspects of the situation (analysis 1, 2 & 3) was made. To define the selection criteria for relevant systems that were modelled, Livestock Improvement Advisory were allocated the role of primary decision-taker. Debate and comparison of the models with the problem situation will be undertaken with Livestock Improvement Advisory staff following the completion of this project.

SSM is a framework for action by which an understanding of a problem situation can be gained that will lead to debate, learning and the definition of action to improve the situation (Davies and Ledington 1991). The Constitutive Rules of SSM express the principles for action that are SSM. However, any one use of SSM will be specific to the problem situation in which it is used and to the user(s) of the methodology (Checkland and Scholes 1990). The specific use of SSM by this researcher in the on-farm labour situation, within the context of this research project and the broader FFR programme, is described in the next section.

4.4   The Application of SSM in the On-farm Labour Situation

A system model was constructed to represent the use of SSM in this project, and to show the relationship between the activities that were undertaken to complete this use of SSM. The expanded subsystem 'to use SSM in the on-farm labour situation' (activity 12, Figure 4.1) is represented in Figure 4.3. The model is the basis for the description of SSM that is outlined in the following sections of this chapter.
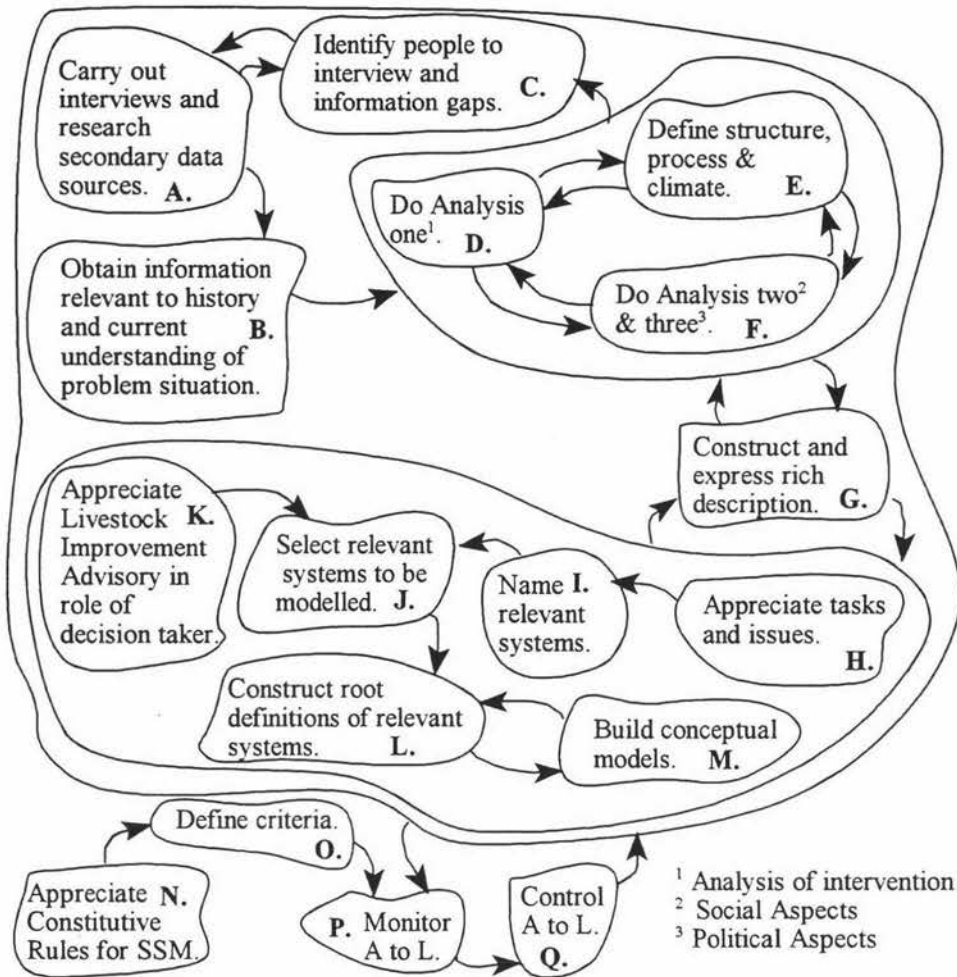
Figure 4.3   A systems model of a relevant human activity system to 'Use SSM in the on-farm labour situation'.

An exploratory 'finding-out' phase and a 'modelling' phase were the primary activities undertaken in the use of SSM in the on-farm labour situation. The activities within the finding-out phase are interconnected and iterative (activities A, B, C, D, E, F & G). The rich description of the problem situation was constructed and expressed (activity G) from the analysis of information obtained from a range of sources. These sources included individual and group interviews with problem-owners, and secondary data sources, such as reports, newspaper articles and research papers (activity A & B). The information obtained from these sources included the history and current perceptions of the situation. Information from interviews and secondary data was analysed in terms of the analysis of the intervention (activity D), and the analyses of the social and political aspects of the situation (activity F), and in terms of structure, process and climate (activity E). From interviews and secondary data (activity A), and from the analyses of the information obtained from these sources

(activities D, E & F) people to interview and aspects of the situation requiring further research were identified (activity C).

Identification of the tasks and issues (activity H), inherent in the rich description, led to the naming of systems relevant to the problem situation (activity I). The selection of relevant systems to be modelled (activity J) was based on a consideration of Livestock Improvement Advisory's allocated role as primary 'decision-taker' (activity K). The construction of the relevant systems as root definitions and conceptual models (activities L & M) was an iterative process. Naming, selecting and modelling a number of relevant human activity systems also provided insight into the problem situation, and led to modification of the rich description. The Constitutive Rules for SSM provided a constant reference point by which the process of using SSM was monitored and controlled (activities N, O, P, & Q).

Iteration between the activities occurred throughout the study and meant that at any point in time, a number of these activities were being undertaken. How SSM was used in this study is described in the next section in relation to the component activities of the 'System to use SSM'. They are outlined within the broad activity categories of 'finding-out' (Section 4.5) and 'modelling of human activity systems' (Section 4.6). Since the activities of monitoring and controlling the system were primarily subsumed within the broader 'project system', an expanded description of these activities is not included.

4.5   Finding-out

4.5.1   Analysis of the Intervention and Selection of Problem-owners Interviewed [Activities C & D]

L ivestock Improvement Advisory were allocated the role of client, and by definition also the role of problem-owner. The researcher assumed the role of problem-solver for the duration of the project described in this thesis. The identification of the holders of these roles is a component of the analysis of the intervention and was the starting point for the inquiry.

An initial appreciation of the problem situation and background to the on-farm labour situation was obtained from interviews with several senior Livestock Improvement Advisory staff. Due to the large number of problem-owners in the dairy industry and the time frame of the study, only a selection of

problem-owners were identified and interviewed. Livestock Improvement Advisory identified a number of initial problem-owners, and these individuals, along with problem-owners known to the researcher, were the starting point for interviews and secondary data research.

The initial people interviewed were identified as being knowledgeable in the problem situation and representative of different perspectives in the situation. Subsequent to the initial interviews, a snowball sample method (Neuman 1994) was used to identify additional problem-owners. Each person interviewed was asked to identify individuals in positions in the problem situation they felt could contribute a richer view of the situation, or a contrary view to their own. Problem-owners and potential decision-takers to the on-farm labour situation were identified from interviews, secondary data sources and from the analysis of the information obtained. Although the number of interviews undertaken were constrained by time, confidence that the rich description being developed incorporated a significant proportion of the important aspects of the situation was gained as the level of new information obtained from interviews and secondary data sources declined.

4.5.2   Obtaining Information from Secondary Data Sources
[Activities A, B & C]

Secondary data sources (Appendix V) provided information for the development of the rich description, in addition to that obtained from problem-owner interviews. A review of secondary data identified the paucity of definitive information available on the number and characteristics of people employing and employed on farms in the New Zealand dairy industry.

An historical perspective on the events and factors that have contributed to the current on-farm labour situation was obtained from the literature. Statistical data, recorded by the industry for over 40 years, provided an indication of the changes that have occurred in the dairy sector. A review of articles from dairy farmer conferences provided a commentary on the dairy sectors recurring labour concerns since the 1970s. Popular press, newspaper and magazine articles published in the last three years presented a range of industry perspectives on the on-farm labour situation. Information on the organisations, politics and the key 'movers and shakers' in the industry was also obtained from these sources. More detailed information on the structure and official tasks of organisations in the situation were obtained from a range of sources including: annual reports, corporate profiles of the organisation, popular press articles, commissioned reports assessing the activities of the organisation, newspaper advertisements for positions in the organisations and unpublished documentation such as memoranda's sourced from people affiliated with an organisation.

4.5.3   Obtaining Information from Interviews

[Activities A, B & C]

Twenty three formally initiated individual interviews and five group interviews were undertaken during the study. The positions in the industry represented by the people interviewed during the finding-out phase are outlined in Table 4.1. Several individuals represented multiple positions and roles within the industry.

Dairy Industry Positions and Affiliations of the People Interviewed
• Dairy farmer employers: including those employing and managing a team of single and married employees in a range of positions of experience and responsibility.
• Dairy farm employees from a range of employment situations and levels in the career and experience path.
• Livestock Improvement Advisory field staff and managers.
• Dairy Farm Agricultural consultants.
• Employment Services personnel, e.g. New Zealand employment services, Farmlink and Student Employment services.
• Farm supervisors to several large dairy farms, employing multiple employees.
• Two regional Ag ITO field officers.
• A chairman and several members of a number of Ag ITO regional committees.
• Ag ITO trainees
• Individual involved with the establishment of the New Zealand Qualifications Authority in relation to agricultural training and education.
• A teacher and coordinator of an agricultural course at a district High School.
• Elected Representatives of the New Zealand Large Herds Association.
• Massey University students undertaking undergraduate degrees in Applied Science and Diploma of Agriculture.
• Polytechnic Agricultural Course Tutor and Coordinator.
• Union Representative for the Central Amalgamated Workers Union.
• An elected member of a Dairy Company board of Directors.
• An elected member of a Dairy Company Milk Supply Committee.
• Ex-dairy farm employees.
• Individuals born on a dairy farm who had chosen not to go dairy farming.

Table 4.1   The positions and affiliations of people interviewed during the study.

Individuals were initially contacted by phone and the objectives of the research project were explained. When an individual had been recommended by someone else, the connection was described. In all cases, people contacted by the researcher willingly agreed to be interviewed. Eight interviews were conducted over the phone, when a personal interview was not possible due to time or distance constraints or when information sought from the individual was easily obtained through a phone call. The telephone interviews varied in length from around 10 minutes to 40 minutes. At the end of the interview, the researcher obtained permission to contact the respondent if further information was required. Most telephone interviews were taped and summary notes were compiled following the interview.

Face-to-face, informal semi-structured interviews (Foote-Whyte 1982; Rhoades 1982; Fontana and Frey 1994) were conducted in a range of situations, depending on what best suited the interviewee. The aims of the interview were to obtain an understanding of the individual's perceptions of the situation given their position and role in the industry, and to provide information that would inform the analyses that was to structure the rich description of the situation. This was achieved through questions guided by general discussion topics:

- individual's experience and level of involvement in the dairy industry;
- experience and current position of individual(s) in relation to on-farm labour;
- the degree to which the on-farm labour situation was considered problematic;
- factors perceived to have led to, and currently contributing to, the problem situation;
- the changes in the situation that would constitute an improvement; and
- whose responsibility it was to improve the situation.

Information obtained from the interviewee that did not match the researcher's understanding of the situation was discussed towards the end of the interview so as not to bias the person's responses to questions.

Most prearranged interviews were taped and transcribed. The need for note-taking was eliminated and, therefore, did not detract from the interview process. Transcripts of the interviews provided a full and accurate record of the interview contents, which could then be readily accessed during the construction of the rich description and the writing up of the research. In a number of cases, taping the interview appeared to affect the openness of the interviewee's responses to questions. In these instances, the tape recorder was turned off after 30 to 40 minutes and the apparently sensitive areas

were again discussed. Notes were made after all interviews to record impressions of the interview and the nonverbal and unrecorded components of the interview data.

An attempt was made to use the developing rich picture of the problem situation as a tool to stimulate discussion in three interviews. This practice was ceased as introducing the rich picture detracted from the exchange of information and ideas. To explain the rich picture took time and if the contents of the picture did not concur with the interviewee's view point, the interview became stilted.

A number of group interviews were undertaken with Massey University undergraduate agricultural students and Agricultural Industry Training Organisation (Ag ITO) trainees. Group meetings were undertaken during existing lecture slots. Due to the time constraint (30 to 40 minutes) and the number of people in the groups (4 to 12), the sessions took the form of a brainstorming exercise (Dick 1987). The group members were asked their opinion of various aspects of dairy farm employment and their perception of dairy farm work. Information on the background and dairying experience of group members was obtained and this was used to guide the discussion. The types of questions used to stimulate these discussions were: "What is a good/bad dairy farm employer?"; "What makes a good/bad dairy farm employee?"; "Why would you recommend someone to work on dairy farms as a career?". Comments from the group were recorded on a white board or flip chart and supplemented by notes made during the discussion or immediately afterwards. Although, taping the group interviews was found useful when five or fewer people made up the group, it was not successful in larger groups.

Opportunistic (haphazard) interviews (Neuman 1994) also provided information for the construction of the rich description. More than ten interviews took place in several different settings and generally developed out of casual conversation. Some interviewees represented a problem-owner role in the situation, others were involved in, or associated with, the dairy farming sector. Where possible, the information obtained from these interviews was recorded in note form after the encounter.

Livestock Improvement Advisory Workshop

In the early stages of the formulation of the rich description, a workshop was held with a group of Livestock Improvement Advisory staff. At the time of the workshop, this group had been allocated the role of 'client' (initiating the study), 'problem-owner' and potential decision-taker.

The workshop satisfied a number of objectives. Personal contact was made with all members of the group and the fundamental ideas underpinning soft systems approaches were introduced to the group.

Also, the SSM process of inquiry was briefly outlined. In the role of problem-owner, the group members' perspectives of the problem situation were obtained. A 'Pin Board' technique (Carman and Keith 1994) was used to canvass the views of the group members and to cluster these views into a number of common areas.

Drawing from the rich description of the problem situation as it then existed, the issues identified by the group were expanded and sometimes challenged by the researcher. The main issues raised by the group in the ensuing debate were recorded on flip charts. The perspectives voiced at this workshop, and those obtained from individual group members in discussions following the workshop, contributed to the rich description. When Livestock Improvement Advisory was later defined as primary decision-taker for the modelling phase of the inquiry process, information gained from the workshop assisted in the selection of relevant systems that were modelled.

4.5.4   Analysis of the Situation's Structure, Process and Climate
[Activity E]

Information obtained from interviews and secondary data sources were analysed to identify the structure, process and climate in the situation (Open University 1984; Checkland 1989a; Davies and Ledington 1991). A list of these elements of structure, process and climate was developed. While not evident in the literature, the practice of listing these elements was found useful for recording and sorting the ideas and perceptions that were relevant to the situation.

Five interview transcripts were initially analysed to assist the researcher distill out an understanding of the elements and to establish a protocol for the analysis. Direct reference to, or about, entities and ideas that correlated with the SSM definitions for structure, process or climate were recorded in a list specific to each transcript. Common aspects coinciding with one or other of the elements were generated from within and across interview transcripts and from the pool of secondary data that was accumulated. The link between structure and process that related to a particular climate did not necessarily arise together in any one section of text or interview. Rather, the identification of one element, say climate, led to reflection as to related elements of structure and process relevant to the situation. Likewise, if an element of structure and a related process had been identified, the relationship between the two (climate) was reflected upon given the researcher's understanding of the issues that existed in the problem situation. An illustration of the task of identifying these elements from an interview transcript is provided in Figure 4.4.

This is an extract from an interview with a farm owner. At the current stage in their farming career it was anticipated that the farming partnership could employ a sharemilker and thus reduce the need for the input of personal and family labour into the farm. Due to changing circumstances this is now not possible. They have employed young workers who have stayed with them in their home. However, at the time of the interview they have been unsuccessful in filling this position and the female partner was reluctantly helping with the farm work.

> *we thought we would have the numbers for a sharemilker..we won't..15 years ago we bought our first farm..and 7 years ago we looked at selling up and moving further out as land prices here... are high..but the next door farm came up and we decided to go for it..in 1989..when we bought we thought it would be big enough to put a sharemilker on..but the reality is that it won't be or the sharemilker that we get..won't be the type of farm that will attract a high performing sharemilker.....we tried to streamline our management and we hope that in time we will be able to employ a manager and have work to suit that level of labour.*

Structures:
[Physical, biological & social patterns, & organisations that are durable and slow to change]
- Farm ownership and expansion.
- Farming career pathway.
- Sharemilker employment.
- Farming career goals and expectations.
- Income generation from production of milk....etc.

Processes:
[Activities & task undertaken within the structure & who undertakes them.]
- Farm is managed and operated efficiently by farm owners.
- Cows are currently milked by family labour, somewhat reluctantly.
- Sharemilker employment undertaken by farm owners with larger herds and farms.....etc.

Climate:
[Relationship between structure & process. Match and/or mismatch].
- Mismatch between the farm career expectations and the farm owners ability to attain a large enough farm or herd of cows to support a sharemilker (or a good sharemilker).
- Farm owners inability to expand the size of farm and herd is affecting the employment of sharemilkers......etc.

Figure 4.4   A section of interview transcript and a sample of the structures, process and climate elements identified in the transcript.

A single amalgamated list of the elements of structure, process and climate identified from the initial five interview transcripts, was developed. This central list was then used as a working database to which new elements from the situation were added when identified in subsequent analysis of interview transcripts and secondary data.

The amount of data generated from the analysis was problematic. It was found helpful to sort the list into categories that were relevant to a national/industry, regional/community and individual farm business level. These groupings reflected not only the organisational and decision making structures within the dairy industry, but also the emerging structure of the problem situation of the on-farm labour situation. The final form of the list that was developed is included in Appendix VI. Grouping and sorting the lists helped the management of the information and the identification of elements for inclusion into rich pictures.

4.5.5   Analyses of the Social and Political Aspects of the Problem Situation [Activity F]

Social aspects of the problem situation are the unspoken, less obvious elements that define roles, norms and values important to the situation from the perspective of the problem-owners (Checkland and Scholes 1990). The political aspects are the relationships of power made evident through the authority and respect afforded people as part of the unspoken culture of the situation (Davies and Ledington 1991).

An appreciation of the problem situation as a social system and a political system developed as the process of inquiry progressed. Initially, a working familiarity with the elements of roles, norms and values, and those relevant to the political system was gained from a formal analysis of three transcripts. Sections of text that indicated or were considered to represent one or a combination of the elements were highlighted and noted in the margin next to the text. This proved useful in sensitising the researcher to these aspects of the situation when reading subsequent transcripts and secondary data. Although many social and political aspects were identified from direct analysis of transcripts and secondary data, the majority were generated from conscious reflection on, and during the construction of the rich description of the problem situation.

Many ideas relevant to describing the social and political aspects of the situation were identified from a consideration of the formal structures, roles and processes that existed in the situation. For

example, the roles, norms and values, and authority associated with a particular job or position in an organisational structure within the industry, such as the farmer representatives on a dairy company's board of directors were noted. Other less explicit elements of the social and political systems in the situation emerged as the researcher's understanding of the situation developed.

The exact pieces of information and ideas that contributed to any one of the many social or political aspects identified as important to understanding the situation, cannot with certainty be tracked. However, some of the things that were consciously noted during the analyses were, the fact that some organisations and individuals were, or were not, mentioned in relation to the situation by problem-owners. Also significant, were the organisations and individuals who were criticised by problem-owners for not acting in a manner that was considered appropriate to their position in the situation. Likewise, people and groups who problem-owners made reference to in relation to the situation were noted, as was the terminology by which the people were referred and the reason they were identified. Stories, and experiences recounted by problem-owners to illustrate aspects of the problem situation also provided indications of norms and values as well as the attributes and resources that afforded people respect and power, from the perspective of the problem-owner.

In the early stages of the inquiry ideas identified as important to the social and political elements of the situation were noted in the research journal. As the inquiry progressed and the number of ideas increased, two tables of information were developed into which the social and political aspects were recorded (Appendix VII & VIII). Modifications and additions to the tables occurred throughout the inquiry process as new ideas emerged directly from interviews and secondary data and from the analysis of this information. The task of updating and changing the tables was assisted by setting the tables up as separate computer files that could then easily be modified. Reflection on the components of the tables also lead to the identification of aspects that were then also included.

Overlap between the social and political analysis and the structure, process and climate analysis exist. This is due, in part, to the adoption of a definition for structure, process and climate that was articulated in the literature before the analyses of social and political aspects had been separately developed. Therefore, elements of the social and political aspects of the situation appear in the list of structure, process and climate, and visa versa.

The appreciation of the social and political aspects of the situation were drawn on by the researcher during the construction of the rich pictures and in formulating and naming relevant human activity systems.

4.5.6   Construction of the Rich Description
[Activity G]

Construction of the rich description of the problem situation is based on the findings from analyses one, two and three and analysis of the situation in terms of structure, process and climate. The four analyses were carried out concurrently and iteratively.

Rich pictures (Open University 1984; Wilson and Morren 1990; Daellenbach 1994) were used to summarise the outcomes of the analysis of information. Elements of structure, process and climate provided an initial framework for the rich pictures. Initially, rich pictures were developed to summarise the first five interviews, these were then amalgamated into one rich picture. New data was added progressively to this larger rich picture and as understanding of the situation developed it was modified and progressively expanded. Figure 4.5 is a section of a combined rich picture.

Eventually new rich pictures were developed as the amount of data became too great for one picture. Three larger rich pictures and a number of smaller ones were finally developed, in addition to those used to summarise initial interviews (Appendix IX). The rich pictures were used to reflect on the understanding of the situation and to highlight areas requiring more analysis or information. The rich picture of the problem situation developed for inclusion in this thesis (Chapter Five) is a summary of the main aspects of the situation identified from all components of the rich description.
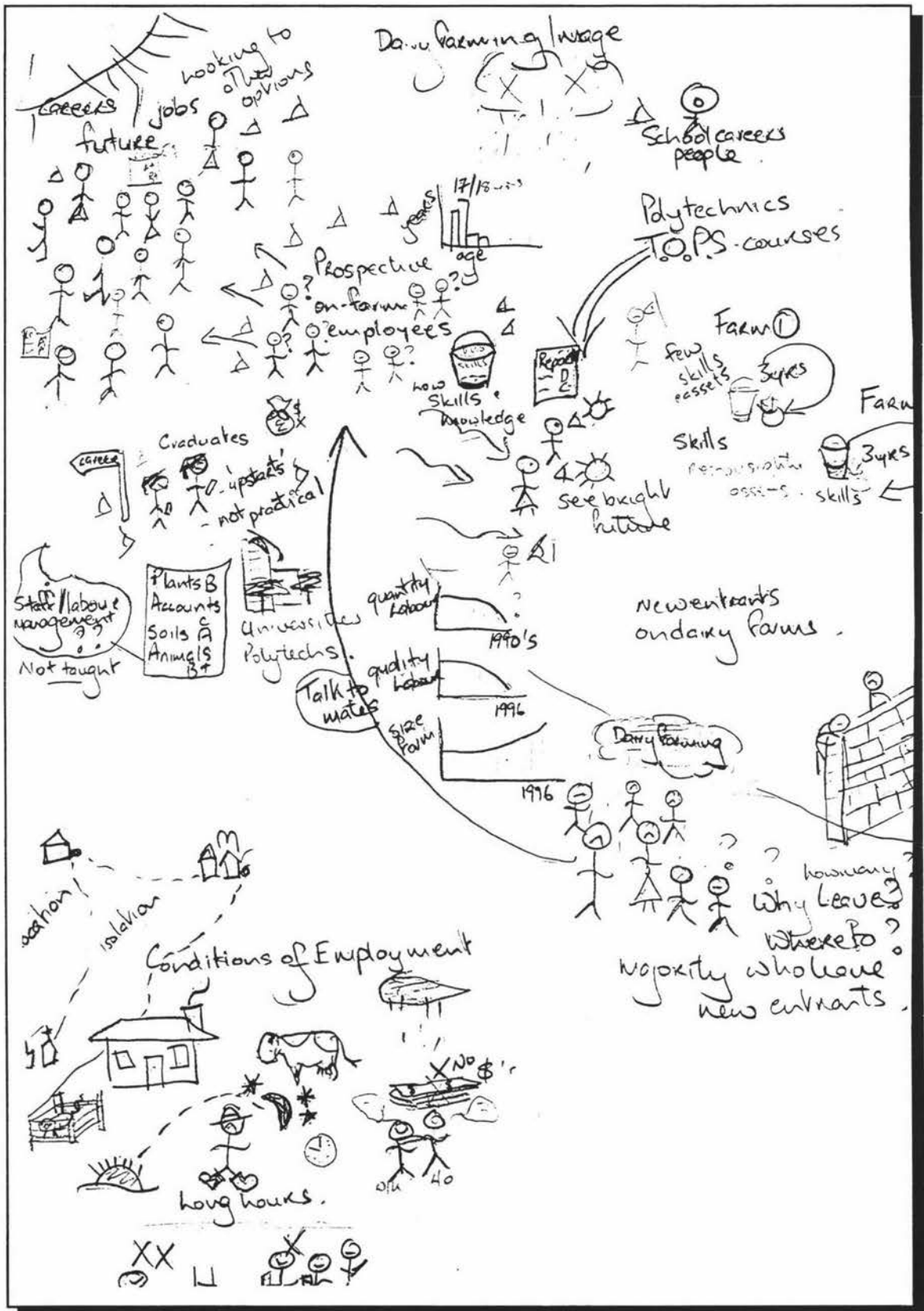
Figure 4.5   Portion of rich picture constructed from analysis of interviews and secondary data sources.

4.5.7   Naming Relevant Human Activity Systems
[Activities H & I]

P rimary task and issue-based human activity systems (Checkland and Wilson 1980; Open University 1984) were named from conscious reflection of the rich description. Outcomes of the analysis of the intervention, and the analyses of social and political aspects of the situation, in addition to the elements of structure, process and climate and the rich pictures were all components of the rich description. Tasks and issues inherent in the rich description were identified. From reflection on these tasks and issues, in relation to the understanding of the situation represented in the rich description, a list of potentially relevant primary task and issue based systems was developed.

The list of potentially relevant systems was further analysed and sorted into lists of primary-task and issue-based systems within general problem areas relevant to the situation. As over 100 potentially relevant systems were initially named, logical groupings for the systems, into problem areas, were sought as a means of rationalising the list. The nominal problem areas chosen were those that had been identified in common by problem-owners, they were: a shortage of farm labour, a shortage of good quality farm labour, the poor image of dairy farm work, and on-farm training of staff. Several more problem areas considered relevant to the situation by the researcher were also included, for example, farmer representation in decision making in the industry and problem solving mechanisms in the industry. An example of a list of primary task and issues based systems named and grouped under the general problem area of 'Dairy Farming's Poor Image' is given in Figure 4.6. The full list of relevant systems is included in Appendix X.

Poor Image of Dairy Farming as a Short and Long Term Career	
Primary Task Relevant Systems: • Dairy Industry promotion and media communication system. • Media and Public communication system. • Community word-of-mouth communication system. • Employer ability recognising and communicating system.	Issue Based Relevant Systems: • Dairy sector image enhancing system. • Traditional dairy farmer employer myth dispelling system. • System to publicise cases of good treatment of farm employers. • System to recognise and appreciate career satisfaction in dairy sector positions not involving or leading to herd or farm ownership. • Staff management qualification acquiring system. • Corporate/large business employment condition myth dispelling system. • A system to identify and filter out the poor employers from the employment market place. • A system to canvass school leaver perceptions of dairy farm careers and jobs. • Regional provision of social and community facilities to accommodate and facilitate the social and recreational needs of farm employees.

Figure 4.6   A component of the list of relevant systems grouped under the general problem area 'Poor Image for Dairy Farming'.

Relevant systems named were not sorted into service and non-service categories (Davies and Ledington 1991). The distinction was not found to be helpful in sorting or selecting relevant systems for modelling. This was attributed to the exploratory nature of this first iteration of SSM. A number of subsystems were developed to service the higher level systems ultimately selected and modelled. There, it is expected that this categorisation will be more meaningful in later iterations of SSM as more comprehensive information on the situation is obtained and a better understanding of the situation is developed.

4.5.8   Selection of Relevant Systems
[Activity J & K]

More than 100 relevant human activity systems were generated. The size of the list was problematic as it was impossible to develop models for all of the relevant systems within the scope of this project. To constrain the number of relevant systems that were modelled, the decision was made to allocate the role of decision-taker to one group within the problem situation. This would define the focus of the models to those that were considered relevant to the debate,

learning by the specific group, and the potential action they would be able to take. No one decision-taker was identified that had the resources or power to address all the issues that comprised the on-farm labour situation. However, many potential decision-takers were identified as having the resources and the power to improve components of the larger problem situation. For example, farmer employers and employees, NZDB, dairy companies and Livestock Improvement Advisory. To help define the scope of the relevant human activity systems to model, Livestock Improvement Advisory were allocated the role of primary decision-taker for the remaining phases of the single iteration of the SSM inquiry initiated in this research study. This decision was based on a number of considerations relating to the broader context in which this project is being undertaken. Maintaining and strengthening the long term research relationship with Livestock Improvement Advisory is an aim of the FFR programme. In their role as client, Livestock Improvement Advisory identified the on-farm labour situation as one of concern to them and one they wished to contribute to improving. The findings from this research project will be taken back to Livestock Improvement Advisory and they will define what action will result from this research project.

Five relevant systems were ultimately selected and modelled. The aim in selecting the models was to provide a basis for debate and learning that would lead to Livestock Improvement Advisory gaining a better understanding of the problem situation so that they could then define action to improve the situation. The current role and position of Livestock Improvement Advisory was a further factor in the choice of relevant systems. As a decision-taker it was considered critical that Livestock Improvement Advisory define the level of involvement and the type of action they were prepared and/or able to take to improve the problem situation. One model was constructed to specifically debate and explore the options Livestock Improvement Advisory have to take action in the dairy sector and broader dairy industry. Two other models were developed that related directly to their current role as extension agents and consultants with dairy farmers at the on-farm level. The models represented human activity systems, one, that Livestock Improvement Advisory staff could undertake and the other a system of activities they could use with their dairy farmer clients to assist farmers to improve the on-farm labour situation at the farm level.

Livestock Improvement Advisory staff's perceptions of the problem situation and component issues had been gained from the group workshop and interviews with individual staff members. In particular, two issues were highlighted by the staff as important to the problem situation; the poor image of dairy farming as a career and on-farm training of trainee employees in the dairy sector. Two relevant systems were chosen and modelled that related directly to these issues. This was considered

likely to stimulate debate and to enable the researcher to inform the debate from the broader rich description that had been constructed.

4.5.9 Root Definition and Conceptual Model Construction [Activity L & M]

Construction of root definitions and conceptual models was an iterative process. The first step was to develop a statement of the relevant system as an activity system; that is a system **X** to do **Y** in order to achieve **Z** (Checkland and Scholes 1990; Davies and Ledington 1991). This structure required that the Transformation and Weltanschauung relating to the relevant system were developed first. Once these had been compiled, the remaining elements of the CATWOE mnemonic were developed. CATWOE was then used as the basis for writing the root definition. The final structure of the root definition incorporated all the components of the CATWOE and took the form of:

> An '**Owner**' owned and '**Actor**' operated system to do the '**Transformation**' by various logically dependant and related human activities in order to match the world view stated in the '**Weltanschauung**' to benefit or impact on the '**Customers**'. The system will operate within the '**Environment**'.

An example of a root definition for a human activity system considered relevant to the on-farm labour situation is provided in Figure 4.7. It is a root definition of a 'lifestyle and income-option-choosing system'.

> A prospective dairy farm employee [**Actor, Owner**] owned and operated system to choose an option for obtaining income [**Transformation**]. This will be achieved by comparing and matching employment and lifestyle expectations with income providing options, including unemployment [**Logically dependent activities**]. Employment positions offered by dairy farmer employers [**Customer**] will be chosen by prospective employees [**Customer**] when the job competes with other lifestyle and income providing options [**Weltanschauung**]. The system will operate provided a range of income generating options is available to employees [**Environment**].

Figure 4.7   An example of the CATWOE structural components of a root definition.

A conceptual model was constructed from each root definition. The primary activities in the system were identified by highlighting the verbs in the root definition. In the example in Figure 4.7, the verbs were 'compare', 'match' and 'choose'. The logical dependancy between primary activities were then established. The activity 'choose' is dependant on first, assessing the acceptability or otherwise of the options. Thus, 'choose' is logically dependant on the activities of 'compare' and 'match'. The secondary activities on which the primary activities were logically dependant were then formulated and ordered logically in relation to the primary activity that was contingent on them. This was generally achieved by answering the question 'how' of the primary activity 'what'. For example, the answer to the question: how can you 'compare', is, by establishing some basis for comparison. The answer to the question: how can you establish a basis for comparison, is, by 'appreciating lifestyle and employment expectation options'. In practice, this process was undertaken using a white board, which enabled the arrangement and definitions of activities to be easily changed. Construction of the conceptual model then led to modifications to the root definition, so that both, conceptual model and root definition were logically paired. In some cases, the construction of the conceptual model highlighted a lack of clear definition of the CATWOE components in the root definition. Modification of the CATWOE then led to further iterations of the process.

In the relevant system models that were developed, environmental factors were described and represented as lying outside of the system. W_1, the Weltanschauung was implied by the activities within the model and the transformation was expressed by the component activities, as is the case in Figure 4.8. The Actor and Customer (the prospective employee and dairy farmer employer) were implied within the activities. The Owner of the system (the employee) defined the criteria for monitoring and control of the systems activities. The conceptual model constructed from the root definition in Figure 4.7 is represented in Figure 4.8.
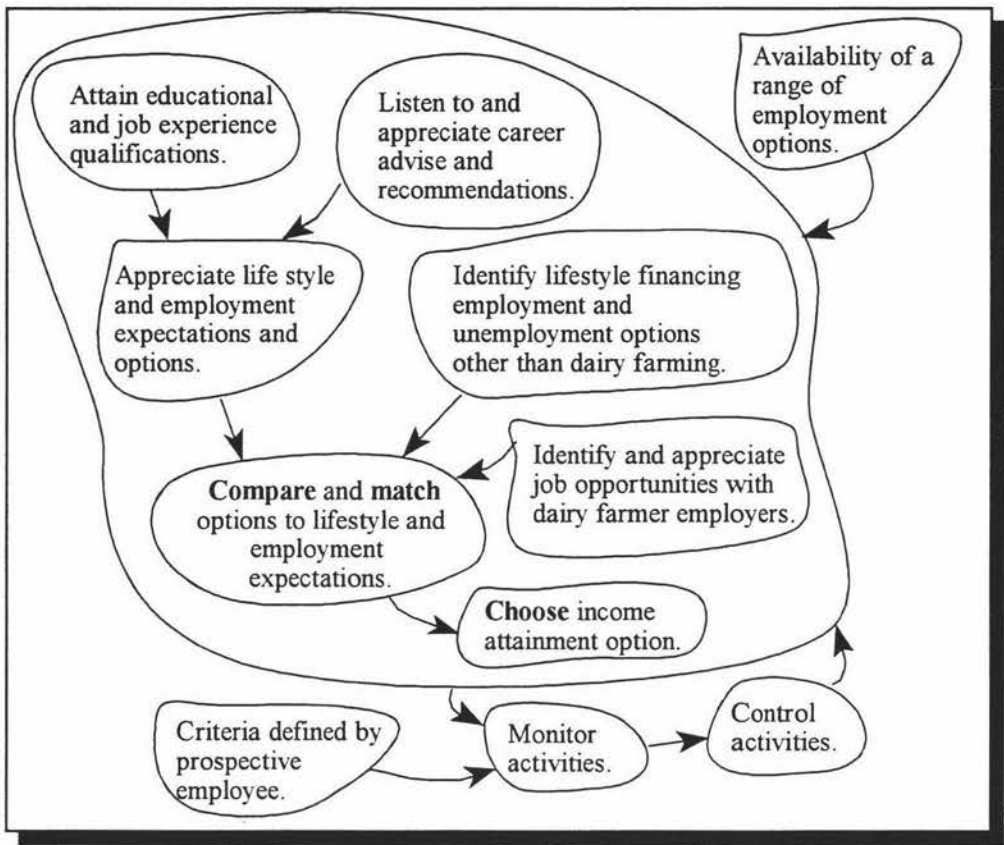
Figure 4.8   The conceptual model constructed from the root definition (Figure 4.7) of the relevant system to 'choose an income-providing option'.

Completion of a root definition and conceptual model pair, generally involved three or more iterations. The number of iterations depended on the complexity of the relevant system and the clarity of the relationships between the activities comprising the system. The guidelines provided in the literature as to the number of component activities to have in any one system were followed (Miller 1968, cited in Checkland 1981a; Open University 1984). In relevant systems with more than 12 to 15 component activities, lower level conceptual models of the relevant system's subsystems were constructed. The logic-based process of analysis demanded, in some cases, the sourcing of additional information to clarify the relationship between component activities. This was gained either from interview transcripts and notes or from secondary data sources.

The Formal Systems Model (Checkland 1981a; Davies and Ledington 1991) was used as a guide for checking the completeness of the conceptual models. However, the usefulness of this task became increasingly redundant. Adequate rigour was attained by including all components of the CATWOE

in the root definition and the conceptual model. This was supported by the findings of Checkland and Scholes (1990).

The control subsystems for the conceptual models were always included as part of the model. The criteria of efficiency, effectiveness and efficacy, which are used to monitor the performance of the systems, were not defined due to the exploratory nature of the SSM process of inquiry. It was assessed that until the conceptual models of the relevant systems could be confirmed through debate as relevant to the problem situation, there was little point in completing these criteria.

4.6   Summary

This chapter has described how SSM, within this research project, was used to gain an understanding of the on-farm labour situation and to investigate the appropriateness of soft systems approaches in the New Zealand dairy industry. A partial iteration of SSM was the basis for an exploratory investigation of the problem situation. Information obtained from interviews with problem-owners and secondary data sources were analysed in terms of structure, process and climate and analyses one, two and three of the cultural stream of analysis. A rich description was constructed on the basis of the analyses and comprised specific lists and tables from the analyses and rich pictures. Relevant systems were named from the tasks and issues inherent in the rich description. Livestock Improvement Advisory staff were allocated the role of primary decision-taker and five relevant systems were selected and modelled in relation to Livestock Improvement Advisory's role in the dairy industry. The rich description and the modelled relevant systems represent the understanding of the on-farm labour situation that was obtained through the use of SSM and are presented in Chapter Five.

CHAPTER FIVE

The On-Farm Labour Situation Expressed and Structured for Debate

5.1   Introduction

The on-farm labour situation is ill-defined and comprises a number of interrelated issues. The partial use of SSM as described in Chapter Four provided a framework for structuring the situation for debate that will lead to action to improve the situation. A rich description of the problem situation is presented in this chapter as the broad rich context from which the five conceptual models were developed for Livestock Improvement Advisory to debate. The rich description comprises the outcomes of the analysis of the intervention and the analyses of the social and political aspects of the situation. The structure, process and climate components are represented along with aspects of the other analyses in a rich picture of the situation. The main aspects of the situation represented in the rich picture are described in more detail in the text.

Five models human activity systems considered relevant to the debate of, and insight into, the problem situation by Livestock Improvement Advisory are presented. The relevance for these system models is justified with reference to the role of Livestock Improvement Advisory in the New Zealand dairy industry. A root definition and conceptual model for each relevant system is presented and described.

5.2   Analysis of The Intervention

Identification of the holders of the role of client, problem-owner, problem-solver and decision-taker are the main component of the analysis of the intervention (Checkland and Scholes 1990; Davies and Ledington 1991). A client is by definition also a problem-owner (Checkland 1989a). The problem-solver adopts the use of SSM as a means of defining improvement in the situation and has the task of identifying problem-owners and seeking their perspectives of the problem situation (Checkland and Scholes 1990). Decision-taker is a real world role that is allocated to individuals or groups that have the power and resources to improve the situation (Davies and Ledington 1991).

5.2.1   Client, Problem-solver and Decision-takers

The SSM client for this inquiry was Livestock Improvement Advisory as they identified the on-farm labour situation as a matter of concern, and made it possible for the inquiry to take place. The researcher and author of this thesis assumed the role of problem-solver, and, in accordance with this role, obtained the perspectives of a cross section of problem-owners.

As the understanding of the problem situation developed, a large number of potential decision-takers were identified. However, no one group or individual had the power or resources to bring about improvement that would address all the areas of concern identified in the situation. Dairy farmer employers and dairy farm employees could assume the role of decision-taker in relation to labour issues that occur at the farm level. Individuals and groups whose primary task is to service the management and operational needs of the dairy farming sector also have the ability to influence change and improve the on-farm labour issues at an on-farm level. Agricultural consultants and employment services are examples of these types of decision-takers.

At a regional level, individuals in positions of influence in organisations that operate regionally, such as dairy company directors, AgITO committee members and Federated Farmers elected representatives could potentially assume the role of decision-taker. At an industry level, the NZDB are in a position to improve the situation. For example, in addition to their influence over their subsidiaries, such as the LIC and Livestock Improvement Advisory, the NZDB have influence in the AgITO through the NZDB representative on the AgITO board and they have the resources to fund initiatives to promote the dairy sector as an employment option.

Livestock Improvement Advisory were allocated the role of primary decision-taker for the modelling phase of the SSM inquiry in the research project. Consequently, Livestock Improvement Advisory will also be allocated the role of primary decision-taker when the relevant human activity system models developed in this research are taken back to them to be debated. However, all decision-takers, problem-owners and problem-solvers associated with intervention in the problem situation will be a component of the rich description that will inform Livestock Improvement Advisory debate of the relevant system models. Consistent with SSM, Livestock Improvement Advisory, in using the outcomes of the SSM inquiry to inform and structure debate to improve the on-farm labour situation, will also assume the role of problem-solver.

5.2.2   Problem-owners

Individuals, groups and organisations that are affected by, or have an affect on, the problem situation fit the role of problem owner. A large number of problem-owners were identified in the on-farm labour situation and these groups and individuals are outlined in Table 5.1.

Problem Owners to the On-farm Labour Situation
• Dairy farm employers; including those employing and managing a team of single and married employees in a range of positions of experience and responsibility. • Dairy farm employees from a range of employment situations and levels in the career and experience pathway. • Agricultural consultants, involved in assisting clients meet and manage employment needs. • Employment placement services: e.g. New Zealand Employment services, Farmlink, student employment service. • Farm supervisors for a number of large dairy farms employing multiple employees. • AgITO field officers. • Members of AgITO regional committee. • AgITO Executive and Board of Directors. • AgITO trainees. • Livestock Improvement Advisory field staff and managers. • New Zealand Dairy Board. • High School teachers and coordinators of Agricultural courses in High Schools. • Careers advisors in High Schools. • Individual involved in the establishment of NZQA with respect to agricultural training and qualifications. • Absentee dairy farm owners. • New Zealand Large Herds Association executive and members. • Dairy Company executive and elected farmer representative Board members. • Non employer dairy farmers. • Polytechnic Agricultural Course Tutor. • Federated Farmers members and elected representatives. • Employees who have left the industry out of dissatisfaction and/or to follow an alternative career path. • Prospective employees to the industry; including school leavers and people from other sectors of the employment market.

Table 5.1   Problem-owners in the on-farm labour situation in the New Zealand dairy industry.

The New Zealand dairy board is primarily concerned with marketing and selling milk-based products internationally to maximise the sustainable income of New Zealand dairy farmers (NZDB 1991;

Boston Consulting Group 1993). Thirteen cooperatively owned dairy companies are involved primarily with the collection, processing and sale of quality milk-based products to the NZDB (NZDB 1996a). They aim to do this in a way that maximises the returns to supplier shareholders (Bay Milk Products (N.Z.) 1996; N.Z. Dairy Group of Companies 1996; Tui Milk Products 1996). Although the NZDB and dairy companies may be aware of the labour issue in the dairy farming sector, they do not apparently consider it their problem. The on-farm labour situation has not impacted on the primary function or purpose of these structures in the New Zealand dairy industry. However, given their role and influence in the dairy industry, they were identified by people in the dairy sector as problem-owners.

A perception held by people in the dairy industry is that a situation that affects many dairy farmers is a problem that should be a concern to the industry as a whole. The on-farm labour situation is an industry problem as the shortage of labour will potentially affect the quality and supply of milk from dairy farms to dairy companies. Consequently, the payout the companies can pay farmers for their milk would be affected. Therefore, the industry is a problem-owner, and by implication so too are the entities that comprise the dairy industry, from dairy farmers through to the NZDB.

The on-farm labour situation is problematic for dairy farmer employers who have difficulties recruiting and retaining staff of the calibre and level of experience they require for their farming operations. Management of staff and employer/employee relations are an ongoing area of concern for many dairy farmer employers. Some employers are unable to provide a level of income and conditions of employment that will attract and retain staff who have the attributes and experience they seek. Absentee dairy farm owners and supervisors of properties owned by absentee owners also are problem-owners. The effective employment and management of staff that will undertake the operations necessary to attain the business objectives of these farm businesses impact on these farming operations as they do on owner-operator farm businesses. Factors external to the farm business are also identified as contributing to the situation. These factors include the dairy company's payment for milk, the image of dairy farming as a career and the changing expectations of young people.

Dairy farm employees who are dissatisfied with their employment situation perceive the on-farm labour situation as problematic. If their initial expectations on choosing dairy farm work as a career are not being met, the situation is also perceived to be problematic. Likewise, the declining opportunities for people to climb the dairy farm career-path is a concern to employees. Although many employees are in very good positions of employment in the dairy sector and are confident that

their expectations will be met by the dairy sector, they also are problem-owners as they are a part of the industry.

Prospective employees to the dairy sector do not perceive themselves as problem-owners in the on-farm labour situation. This group of problem-owners wish to obtain a source of income that will support their lifestyle expectations. Dairy farming may or may not compete with other employment (and unemployment) options for achieving these expectations. This sector of the employment pool is a problem-owner as their employment choices are affecting the ability of dairy farmers to secure staff. Furthermore, individuals that have left dairy farm employment to seek employment opportunities elsewhere are identified as problem-owners as the experiences of these people, good or bad, will influence the image dairy farm work has as an employment option.

The on-farm labour situation is seen as problematic to individuals and organisations whose primary task is servicing the needs of a sector of the dairy farming community. These problem-owners include agricultural consultants and Livestock Improvement Advisory staff. The labour situation directly affects members of the dairy farm sector with whom this servicing group work, and influences the type of service they provide.

The on-farm training of staff, and the lack of formal acknowledgement of skills and qualifications of dairy farming, is also considered a component of the on-farm labour situation. It followed therefore that, AgITO, Polytechnics, Universities and other providers of training and qualifications to dairy farmers are also problem-owners. This includes High School teachers and coordinators of High School agricultural courses, and the careers advisors in these schools who advise students in their career choices.

5.3   Social and Political Aspects of the Problem Situation

Analyses of the social and political aspects of the situation contributed directly to the development of the rich description. The outcomes of both analyses are not complete (Appendix VII & VIII). The findings presented in this thesis were developed from an initial iteration of the finding-out phase of SSM in the broad on-farm labour situation. The social and political analyses will be elaborated and refined after the relevant systems models, which have been constructed, are debated by Livestock Improvement Advisory and action to improve the situation has been defined. The level and type of intervention that Livestock Improvement Advisory decide to

undertake will define the areas within the broad problem situation that will be the focus for further SSM inquiry. A more comprehensive analysis of the social and political aspects relevant to the problem area in which action is going to be taken will then be undertaken. The findings from the analysis of the intervention and the analysis of the social and political aspects of the situation, will inform debate of the relevant systems that have been modelled. These finding will also provide the basis for defining action to improve the situation that is culturally feasible.

The on-farm labour situation is a problem situation that comprises many interrelated issues that are perceived differently by people in the situation. Likewise, the roles, norms and values that contribute to the understanding of the problem situation as a social system are also perceived differently by people. Likewise, the political aspects of the situation through which power and authority are obtained or allocated to individuals and groups are seen differently by people. As the social and political aspects of the situation are interlinked, they are considered together in relation to the industry, regions and communities, and individual farm businesses.

5.3.1 Social and Political Aspects at an Industry and Regional Level

The on-farm labour situation is primarily a concern of the dairy farming sector. It is at this level that the direct impact of the labour situation is being felt. The New Zealand dairy industry is commonly described by people in the industry as a dairy farmer cooperative. Many people in the dairy sector consider that because the industry is a cooperative, the NZDB and dairy companies have a responsibility to address problems considered to be industry problems, such as the on-farm labour situation. The responsibility expected to be taken on by the NZDB and dairy companies reflects the leadership role attributed to these entities by farmers and other organisations and groups within the industry. However, the primary objectives of the NZDB and the dairy companies are to optimise the performance of these entities, in order to maximise the financial efficiency and returns they are able to pay to their shareholders. The role that people in the industry expect the NZDB and dairy companies to adopt in relation to industry issues is at odds with the primary objectives that drive these entities. The standards by which the performance of the NZDB and dairy companies are judged by sectors of the dairy farming community and other organisations in the industry differ, in part, to the performance standards defined by the business and financial performance objectives of these entities.

Dairy companies vary in the role they adopt in the dairy farming community and the industry. For example, Kiwi Dairies is recognised to be a 'lean mean' company that is totally committed to

optimising the financial performance of the company to maximise returns to its dairy farmer suppliers. The company will not support or sponsor activities that do not directly contribute to or fall within the clear business mandate of the company. Other dairy companies accept a greater role within the broader farming community and will sponsor and support initiatives that are considered to contribute to the broader dairy farming community and industry. Therefore, the expected and actual role of dairy companies in the on-farm labour situation differs between the supply regions associated with the companies and individuals within those supply regions.

At an industry and regional level, power is allocated to individuals and groups in accordance with the positions they hold in the NZDB, dairy companies and organisations that have a national and regional responsibilities. Consequently, those people elected by the farming community to sit on boards of directors of the dairy companies, NZDB, Federated Farmers, and LIC are allocated certain authority within the industry. However, it is significant that only dairy farmers who own land have voting rights in the dairy industry. Therefore, employees and employers who do not have a stake in dairy farm land can only bring influence through informal channels and through membership of lobby groups such as Federated Farmers. Power is also attained by those people who are employed in positions of authority in the NZDB and Dairy Companies, positions such as the Chief Executive Officer. Within training organisations such as the AgITO and Polytechnics, positions of authority correspond to positions of employment in the organisations.

Agricultural consultants who were employed by dairy farmers to assist them manage their employment situation, were identified as having an important role at the on-farm level. However in general, Livestock Improvement Advisory were not identified as having a major role in improving the on-farm labour situation at an industry and regional level. Livestock Improvement Advisory has a service role in the dairy industry. It is not a political organisation and although the organisation is a link between the farming sector and LIC and NZDB, the influence of Livestock Improvement Advisory staff on decision making in these entities is unclear. Livestock Improvement Advisory has very limited representation in the AgITO and no official involvement with groups, such as Federated Farmers.

Federated Farmers were not identified as having a major role in the on-farm labour situation. Individuals holding national positions in Federated Farmers have taken an active part in publicising through the media a range of perspectives on the labour situation. This role has also been adopted by Polytechnic tutors, individual farmers, organisations and reporters for the farming press who all hold views and concerns about the on-farm labour situation.

5.3.2   Social and Political Aspects at a Dairy Farming Community Level

At a community level within the dairy farm sector, the roles and reputation afforded members of the farming community by other farmers and community members define the social and political aspects relevant to the problem situation. Good and bad employers and employees are in the main defined by the degree to which their behaviour conforms to the norms expected of these people in the community. Community level roles in the dairy sector also reflect general trends evident in society as a whole. This is seen in the farming community in the changing role of women in the dairy sector and the changing expectations of young people to work, leisure and social life. At a community level, the degree to which people's behaviour conforms to the dominant views and attitudes within the community define the roles and behaviour acceptable within those social systems.

Behaviour and attitudes that are acceptable vary with the parochialism of the community. In areas of New Zealand that have been settled and farmed by generations of the same families, and where there is little movement of people in and out of the area, there are strongly held traditions and beliefs as to socially acceptable behaviour. Reputation and authority in these communities are interlinked with family and individual history in addition to size of herd, land holding and level of involvement in the community. Dairy farming areas that more recently have been settled by dairy farmers new to the area are less bound by strong social standards and norms. Family name and history holds less social importance in the newer established regions than factors such as size of herd, and farm, number of staff employed, production and performance of the farm business. Although many of these factors are also important in the more established areas, it is considered that there is generally less conservatism and a greater willingness to accept employees irrespective of their ethnic or religious backgrounds or their current marital or relationship status.

People in farming communities are judged by the community according to certain standards that are defined implicitly by the community. Individuals who are respected and given status as a result of their behaviour and involvement in the community are the people elected to positions in the community, such as members of the local school board or council. People who are valued by their community are also the people who are commonly elected to represent the farming sector in industry decision making, at a dairy company and NZDB level. The standards by which people are valued at a community level may not reflect the attributes and skills required and valued at the board table of the increasingly large dairy companies and the NZDB. Dairy farmer representation in industry decision making is an inherent part of the accepted culture of the cooperative industry.

Livestock Improvement Advisory's role in farming sector is an historical role that initially provided herd improvement advice to farmers. The profile and standing of this organisation at an on-farm and community level reflects this historical role and the reputation of individual Consulting Officers or FarmWise consultants working in the farming community. Livestock Improvement Advisory were not identified as having a strong role in the on-farm labour situation at a farming community level.

5.3.3   Social and Political Aspects at a Farm Business Level

On individual farms the acceptance of certain behaviour and the expectation and allocation of roles and norms will vary, in part, in accordance with the wider community to which the farm employers are a part. However, the predominant determinant of the social and political aspects relevant to the on-farm labour situation will be the employers. The employee enters an existing social system and the degree to which the behaviour of the employee matches those expected by the employer will determine the success or otherwise of the relationship. The standards that define a good or bad employee and employer will be defined relative to the individuals involved. Likewise, the different roles adopted by the male and female farmer employers in the relationship with the employee, will depend on the social and political aspects of different farm businesses and the level of involvement of the female partner in the farm business.

At times in the dairy industry when there has been a shortage of available positions on-farms, balance of power on dairy farms was largely held by the employer. However, with the current shortage of employees and the abundance of employment options open to employees, within and outside the dairy industry, employees now hold a greater degree of power in the employment situation. Employers, who may have attracted staff when less jobs were available, are increasingly having to provide conditions of employment that compete with other employment options. Employees do not have to accept positions as the 'dogs body' on farms in order to secure employment. In line with this, employers who are able to provide conditions of employment that match the expectation of the people they are employing are at an advantage over other employers in the employment market. This advantage is afforded by a range of factors relating to employees expectations including factors such as: size of farm, number of cows, willingness of farmer to train and support the employee, type of accommodation, reputation of employer and number of other employees on the farm.

Further elaboration of these social and political aspects will be undertaken once action to improve the situation has been defined by Livestock Improvement Advisory. The findings outlined in the

previous sections contributed to the rich description of the situation. The rich description is expressed in more detail in the following sections.

5.4   The Rich Description Expressed

The rich description of the problem situation includes the outcomes of analyses one, two and three and the elements of structure, process and climate identified in the situation. A rich picture representing the main aspects important to understanding the current situation is presented and the main aspects described.

5.4.1   Rich picture of the On-farm Labour Situation

Rich pictures were used throughout the process of SSM inquiry into the on-farm labour situation. Figure 5.1 is a rich picture representing important aspects of the situation that can be summarised as:

1. On-farm labour is a recurring problem situation in the New Zealand dairy industry.

2. Historical changes in the dairy industry have contributed to the current situation at an industry, regional and on-farm level.

3. Farmers with transitional size herds (180 to 240 cows) and farmers with larger (more than 240 cows) herds face distinct employment related issues.

4. The traditional incentive of herd and farm ownership is increasingly more difficult to attain.

5. Farming communities traditionally support and train employees in the dairy sector. The farming community has an important role in the on-farm labour situation.

6. The changing role of women on dairy farms and the changing expectations of young people to employment are aspects important to the current situation.

7. The image of the dairy sector and employment in the dairy sector is associated with a number of other problem areas in the situation, including the conditions of employment on farm and the reputation of dairy farmers as employers.

8. Formal training of employees on farms is provided by a number of organisations including the AgITO. Concerns exist as to the effectiveness of their role in training and their link with the farming community.
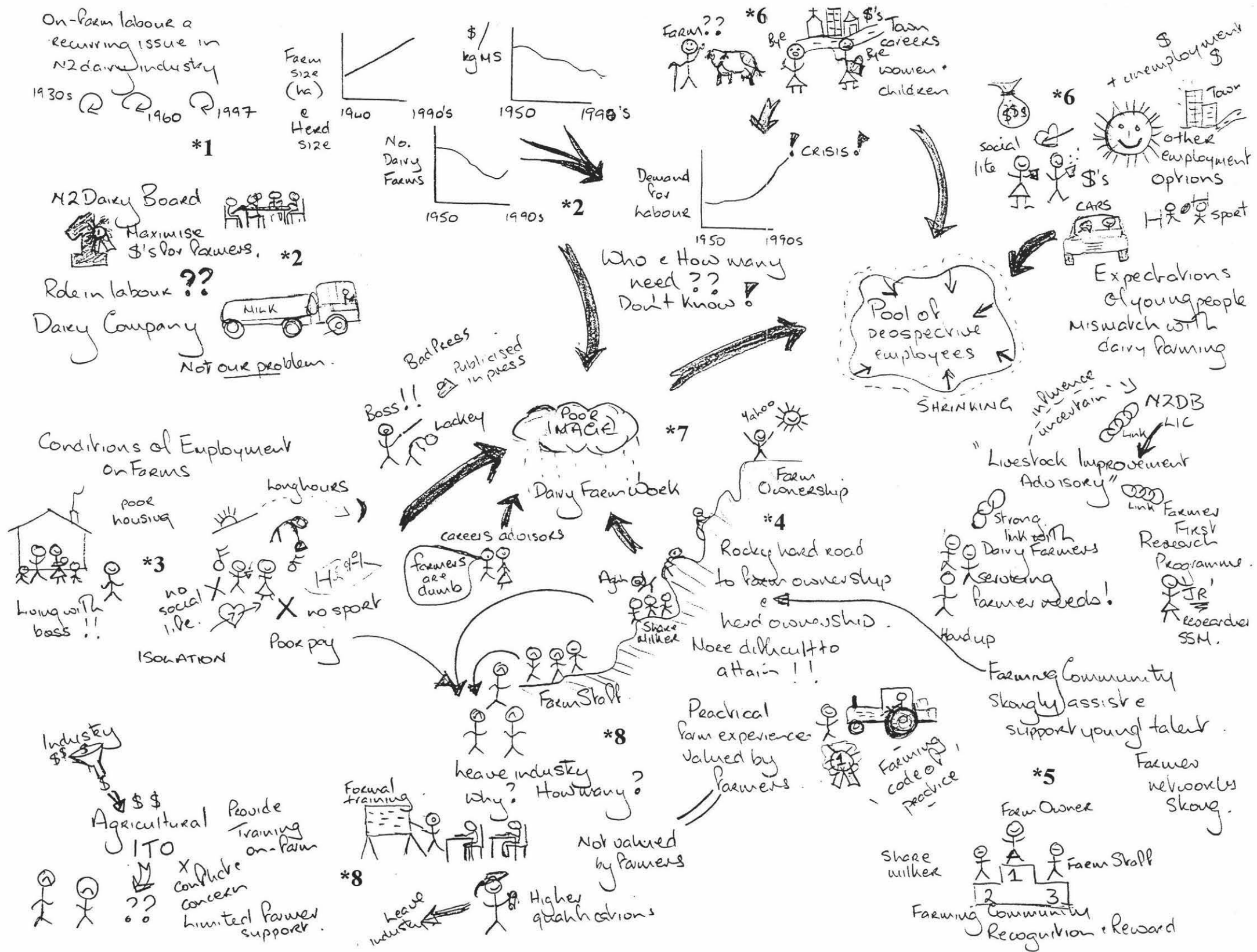
Figure 5.1   A rich picture summary of the on-farm labour situation in the New Zealand dairy industry.

5.4.2   The On-farm Labour Situation: A Recurring Concern

Many of the factors contributing to the on-farm labour problem situation are due to recent changes in society, the dairy industry and the employment market as a whole. However, concerns with the availability and the quality of people seeking employment on dairy farms has been a part of dairy farming in New Zealand for over fifty years. In the 1930s, concerns were expressed by dairy farmers with larger farms looking to employ labour. The extract below outlines many of the issues contributing to the situation then, including those from a quotation taken from a Labour Review article written in 1933:

> Except in the case of sharemilkers, married men are rarely found employed on dairy-farms, probably because suitable accommodation is not available and partly because there are comparatively few who regard such positions as a satisfactory permanent situation. Most farm labourers regard the position as a temporary expedient to gain funds or experience before taking up farming on their own account or because no better job offers at the moment.
>
> Satisfactory hired labour is difficult to obtain owing to the competition of town jobs, which offer higher wages and more congenial conditions of employment. The youth of twenty who requires more wages is discharged and another youth takes his place. With the advent of machinery, a greater mechanical aptitude is required than in the past, but the type of skill which needs the slow accumulation of experience is less necessary. Maturity and responsibility are less important. Consequently, in dairying at least, the farmer tends to satisfy, or at least to put up with, youthful employees. To them, farming is a blind-alley occupation, and they must go elsewhere when they desire adult wages. When they are seasonally unemployed, they drift to the cities, and, if placed, remain there (Belshaw 1933, cited in Hamilton 1944).
>
> Labour difficulties have been a major factor in the demand for family-sized farm units and in the development of grassland farming as opposed to cropping (Hamilton 1944: 106).

In the same publication, an extract highlights the other side of the story, the perspective that acknowledges that not all dairy farmers are 'good' employers:

In dairying as in other jobs, there have been good and indifferent employers.
There have been those who have been considerate of labour, and there have
been others equally inconsiderate where accommodation has been poor and the
worker has been expected to join with enthusiasm in ensuring the solvency of
his employer's business by long hours of work, low wages, and poor working
conditions. The attraction of urban positions will not diminish, and dairying
must do more than prate about the freedom of country life and the low cost of
living or merely rail against the shallowness of the towns attractions if it wishes
to retain the best of its youth on the land (Hamilton 1944: 112).

Although these extracts are taken from a 1944 publication, they still reflect the sentiments and
perceptions voiced by problem-owners in the on-farm labour situation in 1997. The ongoing concern
with these issues is also evident in the recurring theme of labour management in the papers presented
at dairy farmers' conferences in New Zealand, local farming magazines and the press (Appendix V).
The New Zealand dairy industry has not established the means to monitor or predict the changing
dynamics of the on-farm labour situation, nor has it developed a process to address the issue at an
industry level. Although there have been major advances in farming practices during the last 50 - 60
years, it seems that little improvement has been made in the general labour/personnel management
skills of dairy farmers.

The apparent lack of progress towards resolving the employment situation in the dairy sector is, in
part, due to the dairy industry structure. The New Zealand dairy industry comprises many farm
businesses, dairy companies, the NZDB and those groups and organisations that service the industry.
In a decision making or organisational sense, the industry is not a single entity that can take
ownership over problems that impact on the industry. It is an informal group of entities that are
bound together by a common interest in the production, processing and sale of milk-based products.
The on-farm labour situation is identified as an industry problem, but no one clear group or
organisation has the power or the formal responsibility within the industry to take action to address
the situation.

Although many of the concerns expressed in the extracts included in this section are as relevant in
1997 as in 1944, the industry context in which the issues exist has changed dramatically. Little
information is available on the dairy industry prior to the 1950s. However, existing figures show that
the industry has undergone some major structural changes. The background to the current industry
context is outlined in the next section.

5.4.3   Industry, Regional and On-farm Factors

The New Zealand dairy industry is based on the production of milk from more than 14600 seasonal supply dairy farms. The milk produced is almost exclusively supplied to, and processed by, dairy companies that are cooperatively owned by dairy farmers. The industry is a vertically integrated structure from the farm through to the New Zealand Dairy Board (ACIL 1992). The NZDB was established in 1961 under Government legislation as the industry's statutory single desk seller responsible for the export of all New Zealand milk based products:

> The board determines the mix of products and markets which it believes will maximise returns to producers and the industry. There is a complex set of arrangements for then determining which cooperatives [dairy companies] produce what products. These arrangements include incentives for cooperatives to minimise costs and hence maximise milk payments to farmers. Commercial activity and performance throughout the industry is very much influenced by the decisions of the Board and the large cooperatives (ACIL 1992: 97).

The New Zealand dairy industry has changed significantly over the last 40 to 50 years (Warr 1988; Nightingale 1992). Included in this change has been the development and improvement of dairy farming practices and production levels. Technological innovations, such as mechanised milking machines and dairy shed design, have dramatically improved working conditions and reduced labour requirements (Hamilton 1944; Warr 1988). Technological advances have also contributed to improving the quality and performance of the New Zealand dairy herd and production per cow and per unit area of land farmed (Nightingale 1992; Livestock Improvement 1996a). Little data was available on changes in labour use efficiency on dairy farms. However, an indication of the improvement in efficiency can be gained from the change in the number of cows considered able to be managed by one labour unit. In 1935, a single labour unit was associated with between 20 and 30 cows (Hamilton 1944). One labour unit, in 1997, now manages more than 150 cows (NZDB 1996b). Concurrent with the increases in efficiency and production, the real value of payout farmers receive for the milk they supply to a dairy company has declined since the 1950s. Figure 5.2 illustrates the trend in the inflation adjusted payout to New Zealand dairy farmers since the 1950/51 season. The nominal value of payout per kg milk solids is also shown.
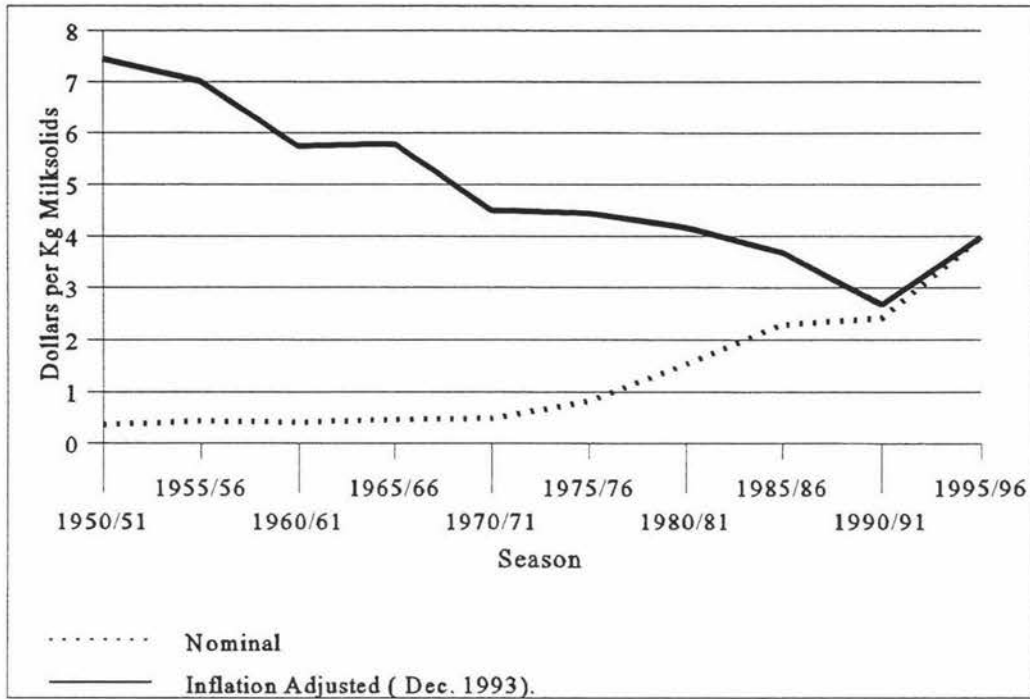
Figure 5.2   Trend in milksolids payout to dairy farmers since 1950/51 (Livestock Improvement
             1996a: 37).

New Zealand seasonal supply dairy farmers receive payment for the milk they supply to their dairy
company based on the milksolids component of the milk. Payout to farmers is expressed as dollars
per kilogram of milk solids (kg MS). The average dairy company payout to dairy farmers in 1995/96
was $3.99 per kg MS and in 1950/51 the relative inflation adjusted payout was $7.46 per kg MS
(Livestock Improvement 1996a). Until the end of the 1970s, the real value of the milk payout
declined relatively consistently. Since 1980, it has fluctuated with a low of $2.67[9] in 1990/91 and
a high of $4.59[9] per kg milk solids in 1981/82 season. Although the graph shows that payout has
increased between 1990/91 and 1995/96, in fact, it has fluctuated. In the five years from 1991/92
to 1995/96, the payout to farmers was worth, respectively: $3.66, $3.95, $3.54, $3.47 and $3.99 per
kg MS.

The general decline in payout over the last forty years has been accompanied by an increasing trend
in the average size of dairy farms (Figure 5.3). The average herd size, and production per hectare and
per cow has also increased (Livestock Improvement 1996a). In the 1974/75 season, 18540 herds with
an average size of 112 cows were milked on New Zealand farms. In 1992/93, the number of herds
had declined to 14458, but average herd size had increased to 180 cows (Livestock Improvement

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[9]   Relative to the inflation adjusted value in 1995/96.

1995a, 1996a). This trend has continued with the average size of herds in 1995/96 recorded at 199 cows. For the period that these data have been recorded by LIC, the effective farm size has also continued to increase. The average effective area of dairy farms in 1980/81 was 63 hectares; in 1995/96 it had risen to 82 hectares (Figure 5.3). Recently, the trend to fewer farms has been reversed. In 1992/93, the number of herds in New Zealand was 14458 and in 1995/96 it had increased to 14736, primarily due to the conversion of non-dairy farms to dairying (Livestock Improvement 1996a).
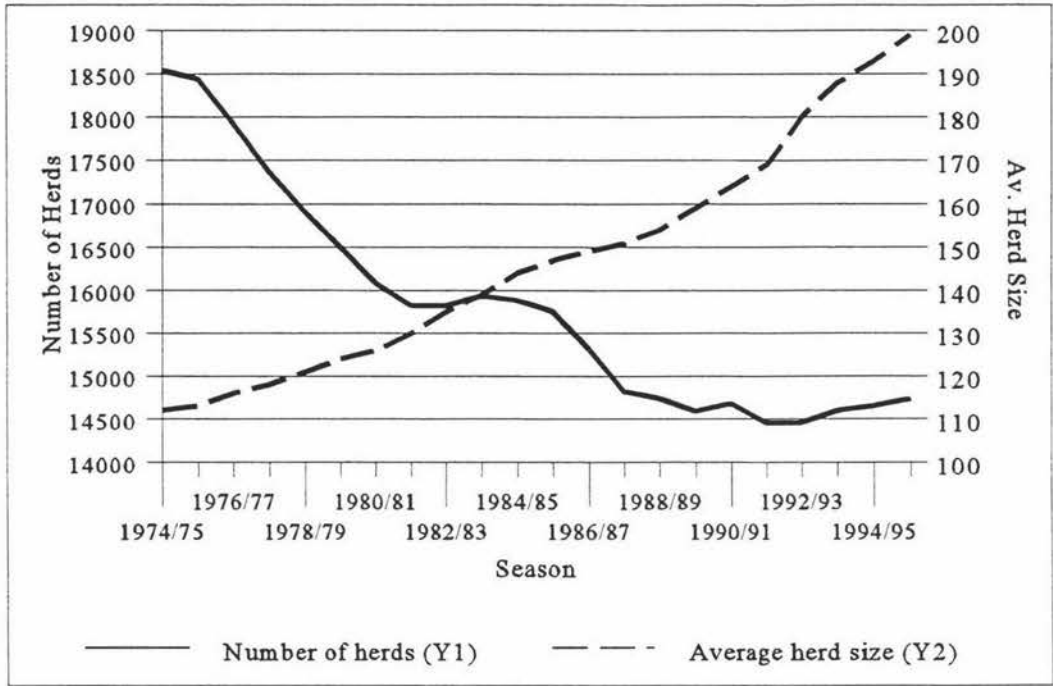
Figure 5.3   Trend in the number of herds and herd size since 1974/75 (adapted from Livestock Improvement 1996a: 6).

As a percentage of the total number of herds, the number of larger herds in the dairy industry has increased. Data on herds with more than 300 cows show the extent of this change. In 1970/71, fewer than 1% (90 herds) of seasonal supply dairy herds in New Zealand had 300 or more cows (NZDB 1984). By 1990/91, this had increased to 6.5% (955 herds) and by 1995/96, they accounted for 14% of all herds (2100 herds) (Livestock Improvement 1996a). Of the 2100 herds in 1995/96, 382 herds (2.5%) had more than 500 cows (Livestock Improvement 1996a).

The dairy industry, through LIC, records and analyses a range of statistics including information on herd improvement, farm production and farm ownership structures. However, the industry records only limited information related to on-farm employment in the dairy sector. Consequently, the

characteristics of this aspect of the dairy sector description can only be estimated from such factors as the trend in herd size and number of herds. At an industry level, in the last four to five years, both herd size and number of herds in New Zealand have increased. Consistent with this increase, it is assumed that there has also been an increase in the demand for labour on farms.

The above data show several factors that have contributed to shaping the New Zealand dairy industry and the on-farm labour situation at an industry level. However, the data do not reflect the variation between dairying areas and dairy farming communities. Factors contributing to, and characteristics of, the on-farm labour situation differ between regions. The regional statistics that make up the national figures provide an indication of these differences. Payout to farmers varies depending on the dairy company to which they supply milk (New Zealand Dairy Exporter 1995a). Between farms, herd size, farm size, production level per hectare and price of land, all vary across regions and districts (NZDB 1996b). An example of the variation in farm and herd size is illustrated in Table 5.2.

Farming Region	Total Herds	Average Herd Size	Av. Effective Hectares
Northland	1555	168	91
Central Auckland	888	164	76
South Auckland	5054	197	71
Bay of Plenty	861	207	80
Central Plateau	494	265	110
Western Uplands	57	185	93
East Coast	17	176	66
Hawke's Bay	46	251	125
Taranaki	2545	168	71
Wellington	692	219	90
Wairarapa	667	192	81
North Island	12876	190	78
Nelson/Marlborough	332	204	82
West Coast	357	183	110
North Canterbury	375	314	119
South Canterbury	104	348	125
Otago	263	299	115
Southland	429	294	124
South Island	1860	264	112
New Zealand	14736	199	82

Table 5.2   1995/96 Herd and farm size analysis by region (Livestock Improvement 1996a: 12).

Table 5.2 outlines the total number of herds and the average herd and farm size across the dairying regions of New Zealand. For example, in the 1995/96 season, the expanding South Canterbury dairy farming region comprised 104 herds of on average 348 cows, with an average farm size of 125 effective hectares (Livestock Improvement 1996a). In contrast, Taranaki, one of the longest established dairy farming regions in New Zealand, had 2545 herds of on average 168 cows and 71 effective hectares (Livestock Improvement 1996a).

The factors that define the on-farm labour situation at the farm business level vary between farm businesses. Some of the factors that define the labour situation on a farm are: farm size, number of cows, level of debt, availability and quality of accommodation, number of employees, family labour input, and farm ownership structure.

> *I have couples that milk 330 cows...generally assume most owners over 40 with more than 200 cows would be employing staff...I would think that would be the general case...*[Dairy farm consultant].

> *I've got 140 cow units out there with labour on them..but then I have got 230 cow units out there without any labour on them...and sharemilkers tend to do it with less labour...I have a couple milking...420 cows to milk with 2 full timers....*[Dairy farm consultant].

Given that the requirements for labour on farms are in part related to the size of herd, the characteristics of the on-farm labour situation differ between farm businesses and between regions. Evidence in support of this is highlighted by the identification, by problem-owners, of specific types of farms businesses facing particular employment related problems. Dairy farms with larger herds and multiple staff face ongoing problems with the recruitment and management of employees and the relationship between employer and employee. However, there are a number of advantages associated with larger farms. More options for managing the employees' demands for time off and accommodation are possible when more than one staff member is employed. Employers of multiple staff are usually more able to provide separate staff quarters and the social needs of staff are better met when there are a number of employees on the farm

Another group of farmers that were specifically identified in relation to the current on-farm labour situation were those with farms in, what was defined as, a 'transitional stage'. Taranaki, Bay of Plenty, Waikato and Northland were regions identified as having a high proportion of farm businesses in this category. These farm businesses have dairy herds of between 180 and 240 cows. It was considered that, herds of this size demand a higher level of labour input than can be provided by a single full time operator. However, income generated from a farm business of this size limits

the level and type of labour input that can be employed. A farmer on a 180 to 240 cow farm is faced with three options, to employ either a part time labour unit, a full time inexperienced labour unit or to use family labour. The farm owners' age and stage in the farming cycle also influences the situation. Many farmers in this position are looking towards retirement and may have had limited experience in employing staff. As a result, they are often reluctant employers and are likely to have to provide accommodation for a staff member in the family home. A consequence of this situation is that increasing pressure is placed on family labour, and in particular the female partner, to help on the farm. In addition, if the staff member is required to live with the farmers family, this places additional pressure on the family unit as well as on the employee to fit in with the whole family.

> *50% of our clients would be owner operators..they can't afford to employ staff..they are not high enough up the scale..so they are doing it with an unwilling partner whom is generally the wife..who is committed to milking, child rearing and making sure..that when she leaves the shed at 6 pm and he hoses down the yard, she manages to have a 7 course meal cooked by the time he arrives..*[Dairy farm consultant].

One farm owner whose situation corresponded to the so-called 'transitional stage', had employed a youth to assist on the farm. At the time of the interview, the farmer had been unable to replace the last employee and the female partner had unwillingly taken on a greater role in the dairy farm operation. In answer to a question as to whether it was an option to pull back cow numbers and thereby reduce the need for labour, the female partner in the farm business replied:

> *...no..because that still ties me up..I've been 15 years on the farm..and if I am going to change direction in my career, now is the time to do it..so I don't want to spend the next 20 years putting cups on cows..and if we chop cow numbers..we couldn't afford to employ and I would be milking full time..and that's not my future..I'm very fond of this industry..I married into it..and I think its wonderful and I enjoy..but I know these issues are there ..but I don't know what I'm likely to do..but if I'm to stay in the industry..it won't be putting cups on cows...*

This response is also indicative of social and political changes that have taken place in the dairy industry and New Zealand society. Changes that have impacted on-farms have also had an affect on the ability of people to attain herd ownership and farm ownership. It is now more difficult for people to buy their own farm and as a result, the attractiveness of working in the dairy sector has diminished.

5.4.4 The Traditional Incentive of Dairy Farm Ownership

The incentive that traditionally attracted people to dairy farming was the expectation that farm ownership was a realisable goal. In the past, a realistic career path for a motivated person in the dairy sector would have looked something like that represented in Figure 5.4. Having attained a job in the dairy sector after leaving school, experience and assets were accumulated through a progression of positions on different dairy farms. Herd ownership and a sharemilking position were the next step. By moving to new sharemilking positions with larger herds, adequate assets were obtained to purchase a dairy farm. Having attained farm ownership, the motivation was then to expand the size of the farming operation to a stage at which a sharemilker could be employed. This would then release the owner from the day-to-day responsibility of managing the farm and milking the cows, while retaining the asset of the land in family ownership. Ultimately, retirement from the farm would coincide with the passing on of the farm to a family member.

Figure 5.4   The idealised pathway for a dairy farm career.

Considerable hardship and sacrifice were borne by farm employees and their families to progress up the career pathway. However, given the rewards that could be attained, it was considered worthwhile. Status and esteem were bestowed by the farming community on individuals who, through sacrifice and against the odds, attained these goals. People who attain these goals in this way were, and continue to be, part of the traditional heroes/heroines and role models in the dairy sector. To attain farm ownership against the odds remains a motivation of people working in the dairy sector and the basis for earning the respect of other people in the industry.

> *I know people.. who have developed a farm..160 ha's grass..330 cows all without labour..unbelievable..focus of these people that go into the industry..10 years they did it.. these people put on labour this year..I admire their approach the family..pitched in as kids..the eldest is only 14..* [Individual in a service role to the dairy farm sector].

Attaining the goal of herd and farm ownership, although still possible, is acknowledged to be increasingly difficult. As these types of opportunities decline, the willingness of employees to accept long work hours and often poor living conditions is declining also. Employees, prospective and current in the industry, are re-evaluating their employment options.

> *..he was doing really well and we had really high hopes for him in the dairying industry..he was happy in his job..he said he loved it..but his reason for going was that he couldn't see a future...the chance for him to own his own farm was too far in the future ..he didn't feel he would have a chance to develop a social life at all..and that's where the dairying industry has got to change..and we couldn't guarantee that for him..* [Dairy farm employer].

Counter to this is the growing acceptance that the dairy sector can offer good career opportunities and rewards that do not involve herd or farm ownership. With the move towards larger properties, opportunities for professional herd and farm managers in the industry have increased. This view is supported by individuals and groups in, and associated with, the dairy industry: Jim Keir, a long time educator in the dairy industry, and Kerry Ryan, a consultant in the agricultural sector, provide an illustration of this perspective:

> Farm ownership as a goal is a commendable objective, but it is becoming much more difficult. The dedicated few will get there. But in the meantime I recommend to current students that they take a career of dairy farm management, looking for salaries of $50,000 plus, with incentives as in private enterprise (Keir cited in New Zealand Dairy Exporter 1996a: 55).

A new step for sharemilkers - as shareholders in joint ventures in cows and land with city investors in herds around 800 cows - is emerging as an alternative to outright farm ownership as the ultimate in dairying career (Ryan cited in New Zealand Dairy Exporter 1996b: 37).

5.4.5   Cultural Frameworks of Dairy Farming

The progression of people in their careers in the dairy sector has traditionally depended on the support and assistance given to them by the dairy farming community of which they are a part. This is illustrated by the structures and processes inherent in the farming community that help and enable the employment and the career progression of individuals to take place.

Farmer networks and word-of-mouth are the main avenues through which employment relationships are established in the farming community. Many employment positions are never publically advertised. The reputation of employees and employers is common knowledge within farming communities. However, the strong community and rural culture that are characteristic of many farming regions in New Zealand can also act as a barrier to the entry of new people from outside the community. Outsiders find it often difficult to gain access to farmer networks and to understand accepted codes of practice.

The characteristics and culture of the farming community vary between regions and communities. A more established farming region is considered to have a better developed network and more strongly established protocols and norms by which people are afforded status or disrespect. In a dairy farming district that has recently been settled by dairy farmers, the infrastructure, farmer networks and hierarchies will not be well established. Therefore, it may be more difficult to assess the reputation and standing an individual employer or employee has in the community. Alternatively, fitting into these communities may also be easier for people from a non-farming background.

The parochial views and beliefs that define acceptable and unacceptable behaviour in some dairy farming communities in New Zealand is illustrated by the following section of transcript. The interviewee is referring to a past event when a larger dairy company took over the dairy company in which most of the community were shareholders. Before the takeover took place, a united front of resistance was presented to the larger company by the majority of shareholders. However, a small number of farmers chose to shift their loyalty and supply milk to the larger new company. This weakened the ability of the remaining shareholders to resist the takeover. The community's treatment

of the people who did not remain loyal to the smaller company continues to be evident years after the incident:

> ..we've seen a lot of people leave the area who were the ones that went away and left the company..the run away ones who left us all in the lurch..and we had to pay to get in and they got in without paying..and there is a lot of animosity, even some of those people they won't elect them on to school committees. ..if anyone is doing a stock transaction they will be very careful with them, they won't deal with them, only if they have to...country people are like that..and it will take years..[Dairy farmer].

The values and beliefs of communities and individual employers is also an important factor in determining the type of employee that is considered acceptable. Marital status, ethnic origin, religious affiliations, family name and standing in the community were all factors identified as important for some people in the selection of staff.

> It is unbelievable to me that non-married couples have been fired because they are not married. Farmers cannot sit in moral judgement of their staff in 1996. When you get a couple that work well hang on to them (Keir, cited in New Zealand Dairy Exporter 1996b: 55).

The cultural characteristics of the dairy farming sector and the dairy industry may appear to have remained unchanged over the years. However, this is not the case. The role of women in dairy farming, the industry and the wider community is one of several aspect of the dairy industry culture that has changed.

5.4.6 Changes in the Role of Women and the Employment Expectations of Young People

Women's role on dairy farms and the changing expectations of women in society were highlighted as factors that has contributed to the increase in the demand for paid labour on some dairy farms. Women's input into dairy farming has traditionally been significant. In comparison to other agricultural sectors, women have traditionally taken an active role in the management and operation of dairy farm businesses. The willingness of women to marry and forgo their careers to help their male spouse on the farm is perceived to be changing.

> woman have changed..I think there are more women working off the farm and a lot of women get married a lot later than ..I was 23 when got married and that was old in those days..most married at 19/20..now I think women who come into the industry are getting married a lot older and they have already set up their own career paths, and they don't want to give it up..so the men have had to rely on their staff a lot more..[Dairy farmer].

Women go into a marriage a lot more organised now a days, they don't put up with a lot of things that we put up with..but I think at least we did it because we were striving towards a common goal..and it was what we wanted..but now days women will go in and they will say I won't have men [employees] in the house ..I know 2 women who are sharemilking ... who have helped in the partnership and the women has been quite clear from the outset that they wouldn't have a man in the house..I thought to myself, I never really had that choice..I never really thought about it..25 yrs ago I just got stuck in and did it..my choice was do you want to be in the shed full time with little children or will you put up with a man in the house..I knew which choice I would take..I was quite happy in that situation.. [Dairy farmer and employer].

The greater number of women choosing to work off farm and also choosing not to house staff in their homes has placed greater pressure on some farms to employ labour and to provide separate accommodation for staff.

A further aspect of society that has contributed to the current on-farm labour situation is the changing expectations of young people to work and employment. No definitive information on the age and skill level of people entering on-farm employment is available. However, most people that are employed on-farm seem to be younger unskilled school leavers or individuals who may have completed a Polytechnic course or University Diploma. The aspirations of school leavers in general were identified by many people as an issue. This sector of the employment pool is apparently unwilling to accept work on a dairy farm. This unwillingness relates, in part, to the prevailing poor image of dairy farm work, but also to young people's expectations for wages and conditions of employment, including time off for social and sporting endeavours. Dairy farm work is perceived to entail the sacrifice of many of the activities young people want to pursue.

..I speak to a lot of young people friends of my 17 year old..and the thing they will not contemplate is dairy farming as a career..there is a big social element to it..their mates work 5 days a week..these guys are normally living from home so they don't see the impact of rent etc., but the main thing I believe is that whatever they do, they have enough money to buy a shiny car and hoon in the weekends with enough time to do it..there is a real social difference to that and someone committing themselves to a standard Fed farmers contract of a weekend off a month....or something terrible..that's the bottom line option. Social change..speaking to one of [17 year old son's] *mates last night who has been out of work for 6 weeks or so now..he'll do anything, even hay making in the summer, but he will not milk cows..he's been there and done that and he will never do it again ..the dole would be a much preferable option to him.*

The size of the pool of prospective employees for dairy farm work has also diminished due to the availability of unemployment benefits and the acceptance of this source of income as a legitimate alternative to working. New Zealand's low level of unemployment in recent years has also meant less potential employees for dairy farmer employers.

The traditional expectation that the sons and daughters of dairy farmers will come home to milk cows and eventually take over management of the farm is also considered to be changing. The greater emphasis on the attainment of higher qualifications and training outside of farming is contributing to the decreasing pool of potential employees for dairy farms. The traditional career path that led to farm ownership is no longer considered a realistic possibility by many people. This is also considered to be a factor in the failure of the dairy sector to recruit and retain people in the industry.

5.4.7   The Image of Dairy Farming

Dairy farming's image is perceived to be a factor contributing to the reluctance of people to work on dairy farms. The image of dairy farmers in the early days of the agricultural industry in New Zealand was that of the poor cousin to the larger more prosperous sheep and beef farmers. The term 'cow cockie' was coined by large run holders coming to New Zealand from Australia. It was a derogatory term referring to the small 'cockie' size of the farms on which dairy farming families were eking out a living.

> There has always been something demeaning about the term as the upper classes in the early years intended. Dairy farmers, however, having little concern for airs and graces and titles, might not be much put out by being referred to as 'cow cockies' (Yerex 1989:12).

How much the traditional image of dairy farming still influences the perception of dairy farming as a career is unclear. However, the generally accepted view is that school career advisors discourage students from considering a job or a career in dairy farming. Dairy farm work is perceived as an option for those students less suited to school and academic study. Linked with this, is the perception that the skills required to be a dairy farmer can be learnt solely through on-farm experience.

> *educationalists believe farmers are dumb and professionals believe they are thick..there is no formal training..or formal recognition of their training* [Parent and dairy farm consultant].

Conditions of employment traditionally associated with dairy farming are also considered to influence the willingness of people to work in the sector. Long hours of work, poor accommodation, the tie of milking cows twice a day every day, the requirement to work in all weather conditions combined with poor wages have contributed to this image. A prevalent perception is that dairy farmers are generally 'indifferent' employers of staff. This is, in part, reinforced by the idea that qualifications are not

prerequisites for a dairy farmer. The professional standards of practice layed down in many other professions and trades are not present in the dairy industry, nor is there any formal apprenticeship scheme in place.

The poor image of the dairy sector employment situation is considered exacerbated by the disproportionate amount of media coverage given to the less than positive aspects of the sector and poor dairy farmer employers. The lack of promotion of the opportunities offered by employment in the dairy sector is identified as an issue.

5.4.8   Qualifications, Recognition and On-farm Training

A lack of skilled and motivated employees was identified as an issue in the on-farm labour situation. The apparent demand for better quality staff in the dairy sector was contradicted, in part, by the view of some employers. A sector of dairy farm employers seek to employ young unskilled school leavers. The level of wages they can, or are willing, to pay dictates the experience and age of the employee taken on.

A reluctance to employ people with higher qualifications is also evident. The perception of some employers and employees was that people with tertiary qualifications thought they knew it all, were difficult to work with and adopted a superior attitude to other staff and the employer. There is also an apparent unwillingness to reward, in income, staff with higher qualifications. From the employees point of view, the attainment of a qualification off-farm requires forfeiting income, practical farming experience and the opportunities and contacts that may have developed had they remained employed.

A further concern voiced by several current employees on dairy farms was the apparent lack of recognition for skills gained in dairy farm employment by other employers outside the industry. Several employees stated that they wish they had attained a 'trade' qualification, such as a builder or motor mechanic, prior to taking up employment in the dairy sector.

Many dairy farmer employers accept that in employing a person, one also takes on the responsibility to train and support that individual's career advancement in the industry. However, this is not a consistent norm throughout the dairy farming community as some employers state that they want an employee simply to: "*put cups on cows, do as they are told and not make too many cock ups*". This employment attitude is felt to be contributing to the poor reputation of dairy farmers as employers.

A general trend for employees starting in dairy farming is to remain on one property for only two to three seasons. After that time, it is accepted that experience and career opportunities will be enhanced by moving onto a new employment situation. This is recognised by many employers who actively encourage employees to find new positions. A sense of satisfaction and pride in the achievements of past employees was expressed by employers.

> [how long would you like your staff to stay with you?]..*we like 3 to 5 years...by then you are thinking that they should go and gain experience on another farm..move onto lower order sharemilking .. you can't hold people back and we really love it when we hear that men who have worked for us have got a 50/50 job..or a lower order* [sharemilking position], *that's great...can't keep them back forever..*[Dairy farm employer].

The Industry Training Act 1992 enables industries to establish Industry Training Organisations (ITO's) (Smelt 1995). The Agricultural Industry Training Organisation (AgITO) is one of a number of ITO's set up and partially funded by government and industry to:

- set national skill standards to be registered on the New Zealand Qualification Authority's (NZQA's) framework;
- develop arrangements for delivery of training (both on and off-job); and
- develop arrangements for monitoring training and assessing trainees (Smelt 1995).

The scheme was established under Government policy to encourage industry-based funding of training on the job (Smelt 1995). The AgITO is 80% funded by Government and 20% by the agricultural industry. Of the 20% provided by industry, 80% is funded by the New Zealand dairy industry through payments made by dairy companies. The payment made by dairy companies is voluntary and is based on a set amount per 'trainee' signed up with the AgITO in the region. The New Zealand dairy industry is represented on the board of directors of the national AgITO body by a member of the NZDB. Regional AgITO field officers are appointed to undertake the tasks of signing up trainees and supporting and managing the training of these people on-farms. Field officers are supported by a local AgITO committee. The committee is made up of volunteers and has no power or resources.

In a report undertaken for the Education Forum, Dr. Simon Smelt, an Economic and Government Consultant, painted an uncomplimentary picture of the operations and effectiveness of ITO's overall. His report was directed at all ITO's and not the AgITO specifically; however, his comments support the concerns being stated by people involved in the dairy industry.

> Whilst broad brush goals are easy to state, the specific problems to which ITOs are the solution are unclear, as is the nature of the actual changes that the government is seeking to effect. There are unresolved tensions, e.g. between 'top-down' and 'bottom-up' approaches to the formation of ITOs and between employer and trainee interests. The public system under which ITOs operate is messy and their role unclear (Smelt 1995: iii).

This report was written in 1995. Indications are that a number of changes have been made within AgITO at a National Executive level since that time. The perspective of the CEO of the AgITO and other people associated with the AgITO at a national level is a component of this rich description that is missing.

AgITO's role in the training of young people employed on dairy farms was identified as a concern by several problem-owners. The low profile and the lack of reference by employers and employees to this service supported these concerns. The number of employees signed up as AgITO trainees and attending AgITO courses was estimated to be only a small percentage of the individuals employed in the dairy sector. AgITO's profile varied between regions and was influenced by the dairy sectors perception of the ability of the regional AgITO field officer. Some field officers were well respected and supported by the community, but others were not. Despite this, recognition of the need for an industry-based organisation that managed and monitored the on-farm training of employees was consistently acknowledged by problem-owners.

Concerns were expressed as to the effectiveness of the AgITO at a regional and industry level given the amount of funding it receives from the dairy industry. A range of problem-owners considered that the perceived poor performance of the AgITO had contributed to the decline in people seeking employment in the dairy sector and the loss of people from the sector. The level of recognition given to people with formal qualifications by the dairy sector and the willingness of the sector to employ unskilled people is considered to have influenced the poor image dairy farm work has in the wider community.

The rich description of the on-farm labour situation has been outlined in terms of the outcomes of the analysis of the intervention and the preliminary outcomes of the analyses of the situation as a social and political system. A rich picture provided a representation of the main aspects important to the rich description. These aspects have been described in more detail to give an understanding of the problem situation as a whole. This rich description is the rich context from which relevant systems were named and selected. The relevant systems that were selected have been modelled and are presented in the final section of this chapter.

5.5   The Problem Situation Structured for Comparison and Debate

Relevant systems were named from conscious reflection of the tasks and issues inherent in the rich description of the problem situation, which has been outlined in this chapter. To provide a focus for the selection of relevant human activity systems from the large number that were named, Livestock Improvement Advisory was allocated the role of primary decision-taker. Five relevant human activity systems were selected for Livestock Improvement Advisory to debate, learn about and define action to improve the on-farm labour situation. The relevant systems were named as root definitions and constructed as conceptual models. The 'relevance' of the systems selected and modelled was based on a consideration of the current and potential role of Livestock Improvement Advisory in the New Zealand dairy industry. The five relevant system models are presented and described within the context of the broad rich description of the problem situation and the role of Livestock Improvement Advisory as primary decision-taker.

5.5.1   The Decision-taker: The Role Of Livestock Improvement Advisory in the Problem Situation

Livestock Improvement Advisory are a group that are in a position to influence decision making and information transfer in the New Zealand dairy industry, at an industry, organisational and farm level (Harvey 1994). Field staff of Livestock Improvement Advisory have a strong working relationship with the dairy farming sector. Consulting officers (CO's) and FarmWise consultants are involved with extension and consultancy activities with individuals and groups of dairy farm employers and employees in the dairy farm sector (Livestock Improvement 1996b). The activities of CO's and FarmWise consultants are mainly directed at helping farmers attain their farm business and production goals. On the basis of their involvement with farmers, Livestock Improvement Advisory as an organisation are a link between dairy farmers, Livestock Improvement Corporation, NZDB and other industry related organisations in which they have representation (Harvey 1994). The field staff of Livestock Improvement Advisory live in or near the dairy farming communities that they service. The reputations and involvement of individual CO's and FarmWise consultants at a regional and community level is also an important determinant of the influence the organisation has in the dairy sector and the industry. The rich description of the on-farm labour situation identified component issues within the situation that impact at an industry, regional and on-farm level. In the context of the on-farm labour situation, potential intervention by Livestock Improvement Advisory could occur at all three of these levels. Direct intervention in the problem situation could occur through the

extension and consultancy activities of field staff. Given their position in the dairy industry Livestock Improvement Advisory could also intervene by influencing other decision-takers in the industry. For example, the AgITO at a regional and industry level, dairy companies and the NZDB.

Relevant systems were selected that were considered likely to provide the basis for Livestock Improvement Advisory to debate and learn about the problem situation from the perspective of a cross section of problem-owners, so that they could then define action to improve the situation. The level and the type of intervention Livestock Improvement Advisory were prepared and able to undertake was likely to impact on the action that would be defined from the debate of human activity systems relevant to the problem situation. For this reason, a relevant system was developed to structure debate to clarify and define Livestock Improvement Advisory's involvement in improving the problem situation (Model 1).

A significant aspect of concern in the problem situation was the on-going management of the employment relationship between employer and employee. Given this and Livestock Improvement Advisory's role with dairy farmers, two relevant systems were selected and modelled to focus debate on the management of the employment relationship (Model 2 and Model 3). Livestock Improvement Advisory staff had identified two areas that they considered were important in the problem situation: the poor image of dairy farm work, and the role of the AgITO in the on-farm training of employees. A relevant system model was developed to focus learning and debate in relation to both these aspects of the situation (Model 4 and Model 5).

The five relevant human activity systems that were selected and developed are:

[1]   A Livestock Improvement Advisory intervention defining system.

[2]   An employment relationship establishment and management system.

[3]   A system to service the employment needs of dairy farmers.

[4]   A dairy farm employment promotion system.

[5]   A system to develop and implement a collaborative on-farm training strategy.

The five relevant systems have been developed for Livestock Improvement Advisory to compare with their perception of the problem situation, informed by the rich description. The comparison and debate will take place subsequent to the completion of this research project. However, as this is the reason the system models were developed, the type of comparison process that will be used for each

model has been considered. Conceptual models of relevant systems can be sorted into one of three modes of comparison on the basis of the models relevance to debate and action (Davies and Ledington 1991). The three modes are exploratory, diagnosis and design. None of the five models of relevant systems are considered likely to be at a stage of development appropriate to the design mode of comparison. Debate of the five models of relevant systems is unlikely to result in a detailed agenda for action being formulated by Livestock Improvement Advisory. All the models of relevant systems will require a number of further iterations before confidence in their match with the real-world leads to the design of action represented in the model. Models 4 and 5 are models of relevant systems that will be appropriate to an exploratory mode of comparison and debate. These are the models of relevant systems for which least confidence is held in their relevance to debate by Livestock Improvement Advisory, and for which there is only a tentative match between the system model and the perceived real-world situation. A greater level of confidence is held in the likely relevance to debate of Models 1, 2 and 3 by Livestock Improvement Advisory. There is a match between these system models, particularly Models 2 and 3, and the perceived real-world activities. Therefore, Models 1, 2 and 3 will be appropriate to a diagnostic mode of comparison.

The basis for the selection of each relevant system is outlined in relation to Livestock Improvement Advisory's role as primary decision-taker and the activities in the relevant system models are described. Each relevant system is described as a root definition, with an explicitly stated Weltanschauung (W_1) and transformation, and represented as a conceptual model of the root definition.

5.5.2 Intervention by Livestock Improvement Advisory to Improve the On-farm Labour Situation [Model 1]

Action to improve the on-farm labour situation will be defined through debate. A critical factor in defining action is the level of involvement and the nature of the intervention Livestock Improvement Advisory are willing and able to take. Accordingly, a relevant system was selected to structure debate that will require Livestock Improvement Advisory to consider and define their current and future role in the problem situation. Livestock Improvement Advisory will also be required to clarify the level of commitment they can make to action to improve the situation. A root definition (Figure 5.5) and conceptual model (Figure 5.6) were developed as the basis for debating this issue with Livestock Improvement Advisory. The activities in this relevant system have a reasonable match with the real-world problem situation and research context. However, it is likely further research and additional iterations of the relevant system will be required before a clear

detailed agenda for action is formulated by Livestock Improvement Advisory. Therefore, this system model is likely to be appropriate to a diagnostic mode of comparison and debate.

RELEVANT SYSTEM 1: **Livestock Improvement Advisory intervention defining system.**

ROOT DEFINITION 1:

W_1 Livestock Improvement Advisory are in a position and want to improve the on-farm labour problem situation in the New Zealand dairy industry. SSM is accepted as an approach that will help them define action to improve the situation.

T Situation of concern to Livestock Improvement Advisory, structured and expressed by SSM inquiry process **TO** action by which Livestock Improvement Advisory can improve the situation of concern is defined.

R.D. 1 A Livestock Improvement Advisory and Researcher owned and operated system to define and implement action to improve a situation of concern to the dairy industry. The outcomes of an SSM process of inquiry will provide the basis for debate and the development of a negotiated perspective of the problem situation. Understanding of the problem situation will be matched with the resources and role of Livestock Improvement Advisory as the basis for defining action. Knowledge of SSM will contribute to, and be enhanced by, the system. A strategy for action will be developed and implemented. The system will operate with continued funding and support from the industry and Livestock Improvement Advisory management.

Figure 5.5 Root definition for the relevant system to define Livestock Improvement Advisory's intervention to improve the problem situation.

CONCEPTUAL MODEL 1:
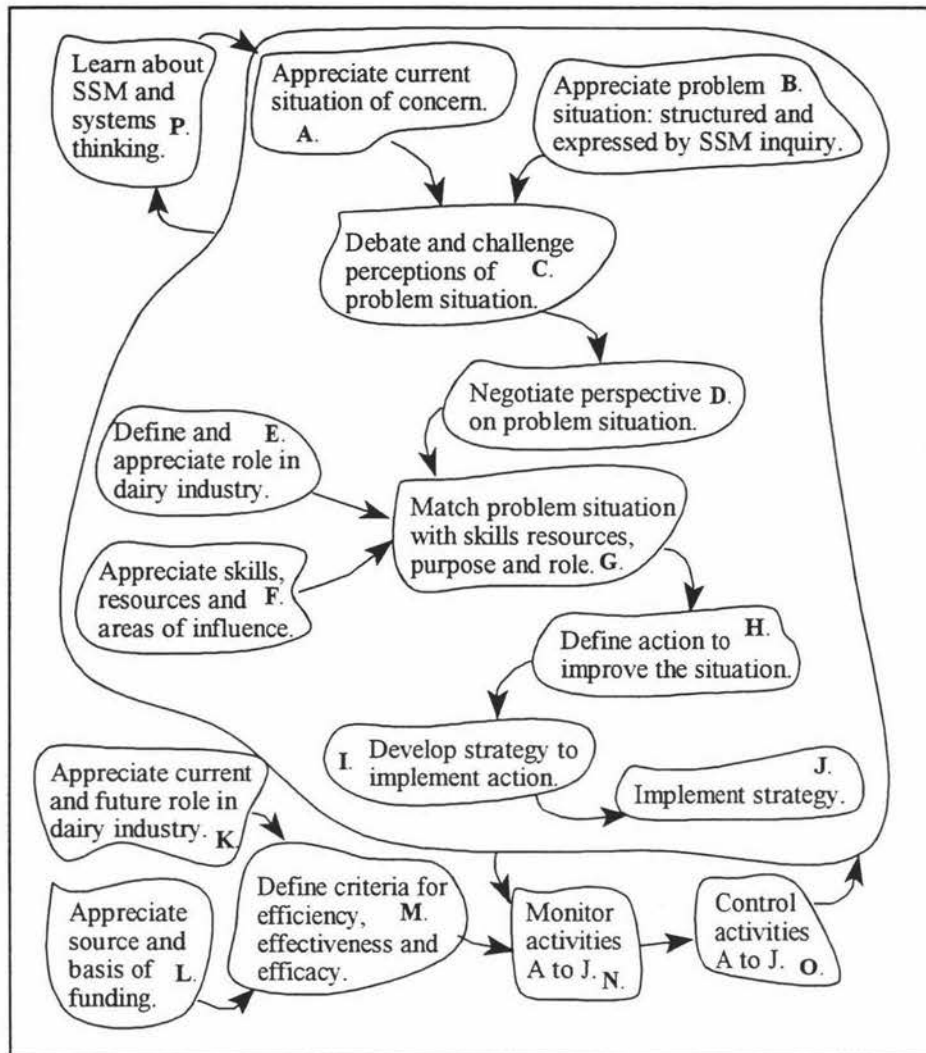
Figure 5.6.   Conceptual model of relevant system to define and implement action to improve the on-farm labour situation.

Livestock Improvement Advisory staff's current perception of the on-farm labour situation will be challenged and modified through debate structured by the relevant systems modelled from the rich description of the situation (activities A, B & C). A common view of the problem situation will be negotiated once the range of perspectives of the situation have been expressed and debated (activity C & D). Matching the negotiated view of the problem situation with an understanding of the current role, resources and potential influence of Livestock Improvement Advisory (activities G, E & F) will enable Livestock Improvement Advisory and the researcher to define the type of intervention they are able to take to improve the situation (activity H). A strategy for action can then be formulated and implemented (activities I & J).

A knowledge of SSM will be gained through the completion of the activities A to J and this knowledge will inform the activities in the system (activity P). The performance of the system will be required to operate within the efficiency, effectiveness and efficacy criteria defined by the current and future role of Livestock Improvement Advisory in the dairy industry and the continued funding of the activities of Livestock Improvement Advisory (activities K, L & M). The systems performance will be monitored and controlled on the basis of these criteria (activities N & O).

5.5.3   Management of the Employment Relationship [Models 2 and 3]

An important aspect of the on-farm labour situation is the relationship between the employer and the employee. Livestock Improvement Advisory's role in the dairy industry is focussed primarily on servicing and supporting farmers to attain their farm production and business goals (Livestock Improvement 1996b). Given Livestock Improvement Advisory's service role, it was considered important to develop relevant systems that were concerned with aspects of the relationship between employer and employee and the establishment and management of this relationship. Two relevant systems were constructed, an 'employment relationship establishment and management system (Model 2) (Figure 5.7, 5.8 & 5.9) and a 'system to service the employment needs of dairy farmers' (Model 3) (Figure 5.10 & 5.11). Both Model 2 and 3 were developed from an understanding of real-world processes. Therefore, there is a strong match between the models and the perceived problem situation. It is expected both these models will be relevant to debate and appropriate to a diagnosis mode of comparison.

Model 2: An employment relationship establishment and management system.

This relevant system model was constructed from interviews with farm employees, agricultural consultants and experienced employers. The model of a relevant system is not the model of a real-world process. It is an 'ideal' systems model of a process identified as important for the successful establishment and management of an effective relationship between a dairy farm employer and employee.

Given Livestock Improvement Advisory's service and extension role with dairy farmers, there is the opportunity for them to work to assist farmers to develop improved employment processes. Livestock Improvement Advisory field staff have some knowledge of what is required to successfully recruit and manage an employment relationship on a dairy farm. The relevant system model 2 was developed to provide the basis for Livestock Improvement Advisory to compare and debate their real-world

knowledge of 'good' and 'bad' employment practice. This will provide the opportunity for Livestock Improvement Advisory staff to share their experiences and knowledge and learn more about the on-farm management of employment relationships. Consistent with the use of the relevant system model with Livestock Improvement Advisory, they too could use a system model, similar to model 2, as the basis for debate and learning with their farmer clients. Figure 5.7 describes the root definition of the relevant system model and Figure 5.8 represents the root definition as a conceptual model.

RELEVANT SYSTEM 2:
An Employment relationship establishment and management system.

ROOT DEFINITION 2:

W_1 The successful establishment and ongoing management of an employment relationship is dependant on the relationship meeting the changing needs and expectations of both the employer and the employee.

T   Employer and employee employment needs defined   **TO**   employer and employee employment needs met.

R.D 2: An employer, employee owned and operated system to establish and manage the employment relationship, by matching the needs and expectations of both parties in the relationship and establishing and maintaining the relationship. The successful establishment and maintenance of an employment relationship is dependant on the relationship meeting the changing needs and expectation of both the employer and the employee. The operation of the system is dependant on the availability of staff and the ability of the employer to provide the necessary resources to employ a staff member.

Figure 5.7   The root definition for an employment relationship establishment and management system.

CONCEPTUAL MODEL **2**:
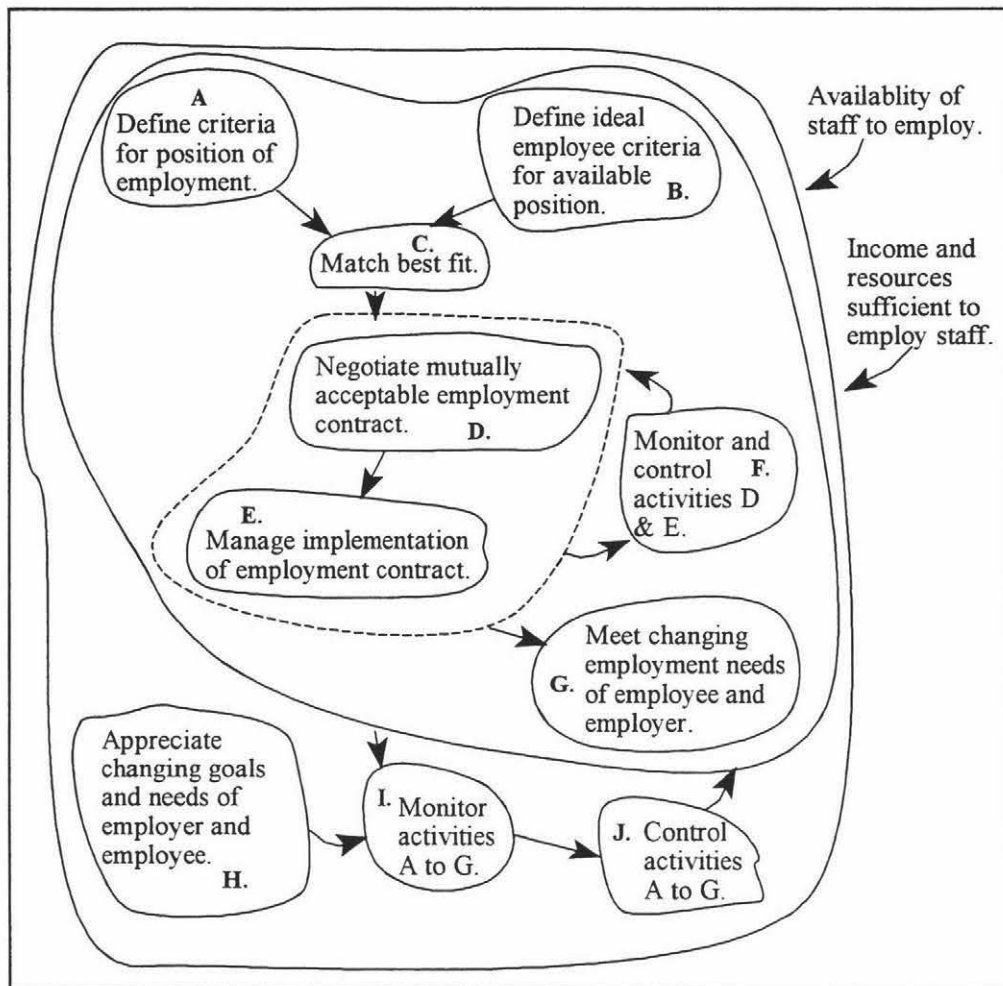
Figure 5.8   Conceptual model of an employment relationship establishment and management system.

Establishment of an employment relationship is dependant on matching the needs and expectations of both the employer and employee (activities A, B & C). Activities to define the criteria on which the needs and goals of employer and employee are matched (Activities A & B), have been expanded into two subsystems (Figure 5.9).

Figure 5.9   Conceptual model of subsystems A and B of conceptual model 2.

An employer will base the choice of employee on an appreciation of the personal and business goals that define the operation of the farm business and the employment needs related with these goals (activities B1, B2 & B4). The attributes of an employee sought by an employer will be also influenced by the accommod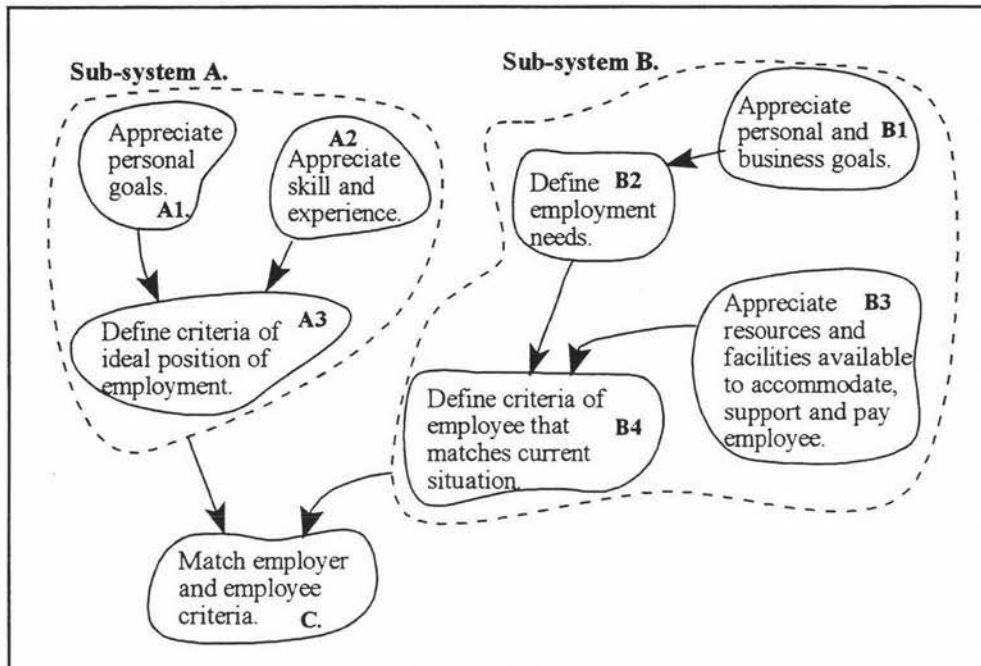ation and conditions of employment, including wages that the employer is able to offer (activity B3 & B4). The attributes of the farm employment situation sought by the employee will be dependant on the level of experience in dairy farming, the position of the employee on the farm career path and the individual's goals (activities A1, A2 & A3). Matching the employer's and employee's employment criteria will be the basis for deciding if an employment relationship will be established (activity C).

The employment relationship will be based on some form of contract. This may be very informal and limited to a hand shake based on the assumed common understanding of the expectations of both parties. Alternatively, it may be a very formal process bound by a legal document (activity D). However the relationship is set up, there is an on-going requirement from both parties to manage the relationship (activity E). Meeting the changing needs of both parties in the relationship (activity G) is dependant on monitoring and controlling the relationship and continually renegotiating the employment contract (activities D, E & F).

An example of the process that is represented by the monitoring and control subsystem, to manage the employment relationship (activity F), is the process described by an employer problem-owner. The monitoring process has been developed over time by a husband and wife employer team:

> *there are really only 2 or 3 things that go wrong with men..firstly, if their car doesn't go..the car is of major importance to a young person..and then if they have money problems and that's usually tied up with their car..the cars broken down and then its girl friends, relationship problems..and that problem is very difficult to fix..and I think people are getting far better at working through their relationship problems than they did......so now we understand that if a boy is upset, things are going wrong and you will find they will make silly mistakes ..they will leave a gate open or they'll get bike punctures a lot or they'll let a cow go through the yard that they were meant to collect...just silly things ..and it will happen in a run..and then you learn to get the young person quietly on their own...and that's my job..[husbands name] will come home and tell me that so and so has done this and done that..and I'll say all the positive things..umm you have to look at ..are you normally happy with him..is he normally a good staff person .. and if he is..I'll make certain I am hovering around somewhere where I will catch him and then just have a quiet word..with him and I know its one of those 3 things that will be bothering him.*

The employment process system indicated by activities A to G is dependant on the appreciation of the changing needs and goals of both the employer and employee (Activities H, I and J). The system as a whole is contingent on the availability of resources to employ staff and the availability of staff to employ. When the goals and needs of both parties no longer match, it may be time to establish a new employment relationship. The matching of goals, needs and attributes of employer and employee will then be renegotiated.

Model 3: A system to service the employment needs of dairy farmers.

Similar to Model 2, this relevant system model is based on a real-world process that a number of agricultural consultants have developed over time in response to the needs of their farmer clients. It is an 'ideal' model of a process by which an agricultural consultant could service the ongoing employment needs of a group of dairy farmer employer and employee clients. The process involves the maintenance of a 'stable' of employees, at various stages of career development and experience, from which the changing employment needs of farmer employer clients can be met. The term 'stable' is the phrase used by a problem-owner consultant to refer to the pool of employees maintained informally as the source of staff for their farmer clients.

This relevant system was selected to again direct debate among Livestock Improvement Advisory to the issue of managing the on-farm employment needs of dairy farmer employers and employees. The relevant system represents a process that Livestock Improvement Advisory's FarmWise consultants may currently (or potentially could) undertake as part of their work with fee paying farmer clients. As with relevant system model 2, this system model can be compared by Livestock Improvement Advisory staff with their knowledge of similar real-world processes. It will be the basis for the sharing of experiences and ideas among the staff and if staff are not involved with this type of activity, their potential involvement at this level in the problem situation can also be debated and defined.

The root definition (Figure 5.10) and conceptual model (Figure 5.11) were constructed to represent the human activities associated with a relevant system that maintains and manages an employment 'stable' in order to meet the ongoing employment needs of both employer and employee farmer clients.

RELEVANT SYSTEMS 3: A system to service the employment needs of farmer clients.

ROOT DEFINITION 3:

W_1 An important component of dairy farmer employers' farm management is the meeting and management of their employment needs. This is a component of the service farmers are prepared to pay their Agricultural consultants to provide.

T Dairy farm clients with employment needs TO Employment needs of dairy farm clients met and managed.

R.D 3: An agricultural consultant owned and operated system to maintain and manage the employment needs of dairy farmer clients. This is achieved by establishing and maintaining a stable of employees, and the establishment and ongoing management of employment relationships that meet the employment needs of farmer clients. The system is operated to provide an important component of the service needs of dairy farm employers whom are willing to employ an agricultural consultant to assist manage their employment needs. The system will be able to operate if adequate people are willing to work in the dairy sector and if farmers continue to be able to employ a dairy farm consultant.

Figure 5.10 Root definition for a relevant system to service the employment needs of dairy farmers.

CONCEPTUAL MODEL 3:
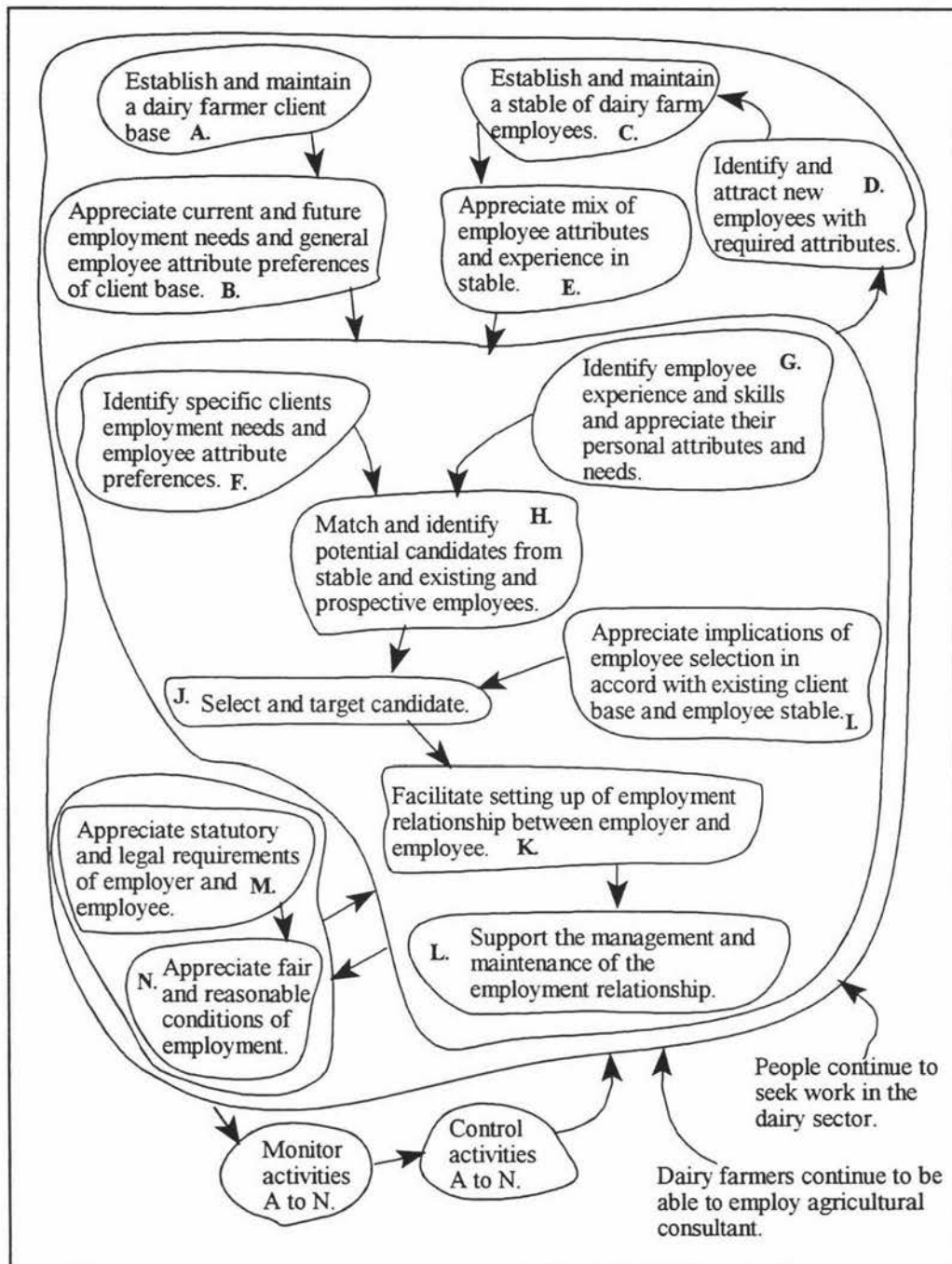
Figure 5.11 Conceptual model of a system to service the employment needs of dairy farmers.

Figure 5.11 is the conceptual model that is paired with root definition in Figure 5.10. Agricultural consultants generally establish and service a core group of long term clients, who are dairy farm employers. Over time the consultant will develop an understanding of the client's personal preferences, goals and needs in relation to employees and employment (activity A & B). In order that

the employment needs of clients can be met, a 'stable' of employees is established (activity C). Through involvement with employees on clients' farms, an understanding of the employees attributes and experience is gained (activity E). Activity D was included in the model in recognition that the maintenance of a stable of employees also requires the continual recruitment of prospective employees. The attributes of the staff that are recruited will be defined by the existing and future needs of the client group and the expected turnover of employees from the stable.

The selection of an employee, to meet the specific requirements of a client (activity J), is dependant on matching the specific needs of the client to a number of potential employee candidates from the stable (activities F, G & H). Given a suitable candidate is likely to be employed on another client's property, the final selection of the candidate (activity J) is dependant on a consideration of the implications of moving the employee from his/her current employment position (activity I).

Once the selection of an employee is made, the establishment of the employment relationship between employer and employee is facilitated (activity K) and the management and maintenance of the relationship supported over time (activity L). The relevant system requires knowledge of the statutory and legal obligations of on-farm employment and an understanding of fair and reasonable conditions of employment that will attract and retain employees in the stable (activities M & N). The system as a whole is contingent on the availability of staff and the continued ability of farmers to employ the agricultural consultant.

5.5.4 The Promotion and Improvement of the Dairy Sector Employment Image [Model 4]

L ivestock Improvement Advisory identified the current poor image of the dairy farm sector, as a place to work, as a major factor contributing to the on-farm labour situation. The apparently poor reputation of dairy farmer employers and the conditions of employment provided on dairy farms was considered to be a factor contributing to the inability of the sector to compete with other employment options for staff. Other factors that contributed to this were the publicised difficulties of attaining herd and farm ownership and the perception perpetuated by careers advisors in schools that dairy farming is for the less academically able. The NZDB was identified, by Livestock Improvement Advisory, as a decision-taker that has the potential resources to promote and improve the image of the dairy sector. Livestock Improvement Advisory are a group within LIC, a subsidiary of the NZDB. The degree to which the NZDB will perceive this as their role is unclear, as is the influence Livestock Improvement Advisory can bring on the activities of the NZDB. Both

these aspects of the situation are considered worthy of debate. Therefore, it was assessed as relevant to construct a human activity system that would focus debate within Livestock Improvement Advisory on the factors that may contribute to an image, the activities that promoting and improving the image would entail and who would fund a promotional campaign.

The image of dairy farming in the rich description is associated with a number of different but interrelated factors. They include, the declining opportunities for herd and farm ownership, the conditions of employment dairy farmers are able to provide given their current circumstances, and the training and support given to the farming sector in relation to employment issues. It follows therefore, that debate of Model 3 will also provide a basis for the identification and debate of these other factors that are considered to relate to the current image of dairy farming.

The industry has limited information on the extent of the current labour shortage. Likewise, the skills and attributes of employees and the number of employees sought by the dairy sector is also not known with any certainty at a regional or national level. In order to take action to promote the industry, a clear appreciation of what the dairy sector has to offer and an understanding of the audience to whom the promotion is directed, is required. It is anticipated that Model 4 will assist Livestock Improvement Advisory to explore the problem situation from their perspective but also to define the type of action that can be realistically undertaken within the situation. However, as there is a relatively weak match between this relevant system and the problem situation as it is perceived it is expected that, although useful for learning, it will not immediately lead to an action plan. This model of a relevant system will be appropriate to an exploratory mode of comparison. The relevant system is represented as a root definition in Figure 5.12 and as a conceptual model in Figure 5.13.

RELEVANT SYSTEM **4: A Dairy Farm Employment Promotion System**.

ROOT DEFINITION **4**:

W_1 If prospective employees were aware of the opportunities available in the dairy sector, the poor image of dairy farming would be improved and dairy farm employers would be able to attract and retain the number and type of employees they seek.

T Excellent and competitive employment opportunities available in the dairy sector
   TO   employment opportunities in the dairy sector promoted.

R.D. 4: A dairy industry owned and operated system to promote dairy farm sector employment opportunities. This will be achieved by identifying the target group of employees sought by the dairy sector and designing and implementing a strategy to promote the opportunities for employment to an audience that includes the target employees and the people who influence their employment choices. The system will be used in order to increase the pool of prospective employees available for employers in the dairy farming sector. The system will operate contingent on funding being available.

Figure 5.12   Root definition for the relevant system to promote dairy farm employment.

CONCEPTUAL MODEL 4:
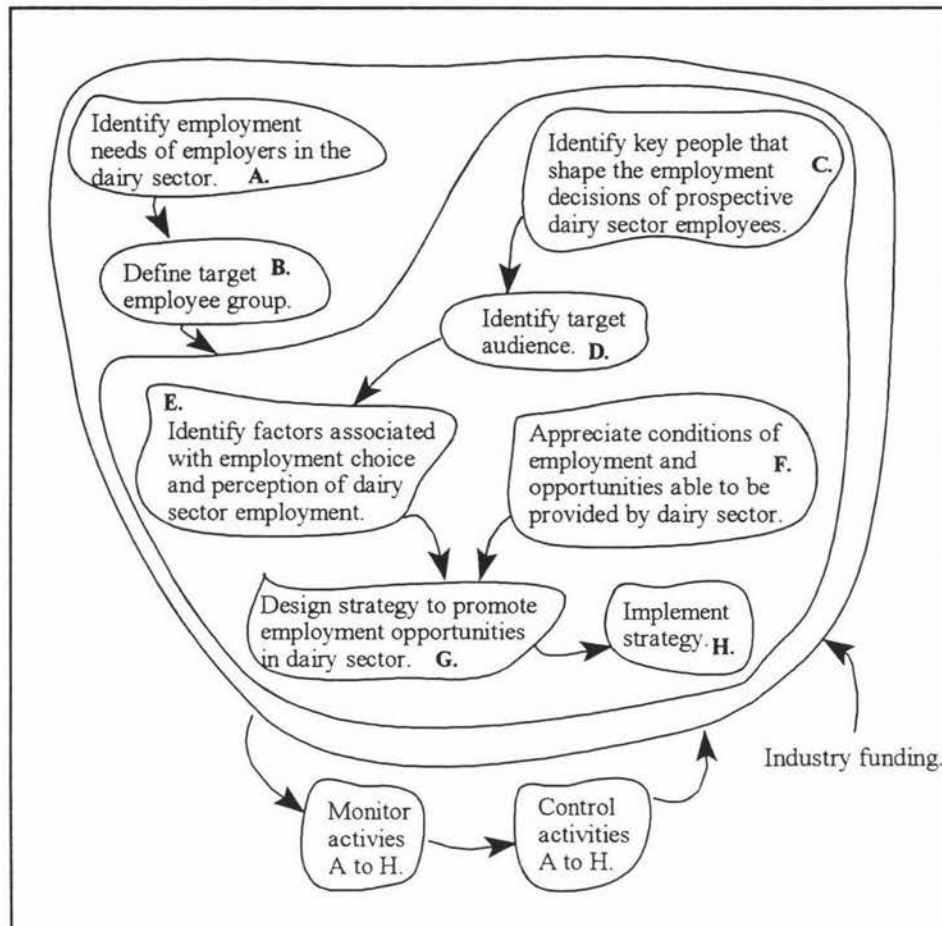
Figure 5.13 A conceptual model of the system to promote employment in the dairy sector.

A relevant system to promote and improve the image of the dairy sector requires an understanding of the employment needs of employers in the dairy farm sector (activities A & B). Once this is known, the target audience to whom the promotion of the dairy sector can be directed will be able to be identified (activity D) along with the individuals who influence the career and employment decisions of those individuals in the target group (activity C). In order to design a promotional strategy, an understanding of the factors that influence the employment decisions of the target group of employees will need to be ascertained (activities E & G). Likewise, a promotional strategy will also need to reflect the opportunities and conditions of employment that are able to be offered by dairy sector employers (activity F & G). Design and implementation of the strategy to promote and improve the image of employment in the dairy sector (activities A to H) will be contingent on organisations within the industry agreeing to fund such a system.

5.5.5 On-farm Training [Model 5]

On-farm training of employees was identified by a range of problem-owners, including Livestock Improvement Advisory staff, as an important component of the on-farm labour situation. The quality of on-farm training and, in particular, the role and place of the AgITO were questioned. A number of Livestock Improvement Advisory staff also acknowledged that they were unclear of the official reason for the establishment of the AgITO and the basis for its continued funding by the dairy industry. Currently the link between Livestock Improvement Advisory staff and the AgITO at a national and a regional level, is informal and not strong. However, as the issue of on-farm training had been identified by Livestock Improvement Advisory it was considered relevant to consider what role Livestock Improvement Advisory could have in improving the current effectiveness of on-farm training and the AgITO.

A further reason this relevant system was developed was that there were clear overlaps between the current activities of Livestock Improvement Advisory staff in the dairy sector and the role AgITO was established to provide. A major component of the work of Livestock Improvement Advisory Consulting Officers is the facilitation of farmer discussion groups. The groups are a forum through which farmers exchange ideas, gain new information, and learn through active discussion and interaction. A number of initiatives for training farm employees have been developed by Livestock Improvement Advisory staff. Short course workshops and training sessions have been undertaken as well as the active encouragement of both farm employers and employees to attend discussion group meetings.

A weakness identified in the current activities of the AgITO was the poor links the organisation had with the dairy sector and the training processes that exist within this sector. The training of dairy farm employees is being undertaken on many dairy farms in the dairy sector without the support or involvement of the AgITO. It is accepted by many dairy farmer employers that employment of people in the industry also involves training those individuals in dairy herd and farm management. Several problem-owners argued that the reason AgITO is not well supported by the dairy farm sector is because the sector is effectively supporting and training employees, and the AgITO has little to contribute to improve the existing informal programmes. A relevant human activity system that integrates the existing informal training programmes used by farmers with the activities of the AgITO and other on-farm training providers, was considered worthy of debate by Livestock Improvement Advisory staff. Further, a relevant system that required clarification of the reason for the establishment of the AgITO and its current funding, was seen also to be an advantage.

Of the five relevant systems that were selected and modelled, this is the system that is considered, with least confidence, to be relevant to defining action to improve the on-farm labour situation. However, given the concerns expressed by Livestock Improvement Advisory in relation to the AgITO and on-farm training, if debate of this relevant system clarifies the importance of this issue with respect to the on-farm labour situation, its inclusion will have been of relevance. For these reasons the model of this relevant system will be appropriate to an exploratory mode of comparison.

The relevant system selected is for a system that develops and implements a strategy by which the AgITO and other training providers collaborate with the dairy farming community to improve the overall training of employees on dairy farms. The relevant system is represented as a root definition (Figure 5.15) and as a conceptual model (Figure 5.16).

RELEVANT SYSTEM 5: **A system to develop and implement a collaborative on-farm training strategy.**

ROOT DEFINITION 5:

W_1 The dairy farm sector has an effective informally structured process by which farm employees are trained and supported. Collaboration by the AgITO, other on-farm training providers and the dairy farming community would enhance the on-farm training of dairy farm employees.

T Need recognised for a closer collaborative partnership between on-farm training providers, including the AgITO, and the informal dairy farmer based training programmes **TO** strategy designed and implemented to develop such a relationship.

R.D. 5: An AgITO and dairy industry owned; AgITO, and the dairy farming sector operated system to build a collaborative partnership between the dairy farming sector, the AgITO and other on-farm training providers. This will be achieved by developing and implementing a strategy that appreciates the informal farmer based training programmes and other on-farm training programmes available; and identifies the needs and opportunities to enhance these existing processes by appreciating the purpose and resources of the AgITO at a national and regional level. The system will improve existing training of people in the dairy farming sector. The system will operate within the resource limitations of the AgITO, and the continued support of the dairy industry for AgITO.

Figure 5.14 Root definition for a system to develop and implement a collaborative dairy sector training strategy.

CONCEPTUAL MODEL 5:
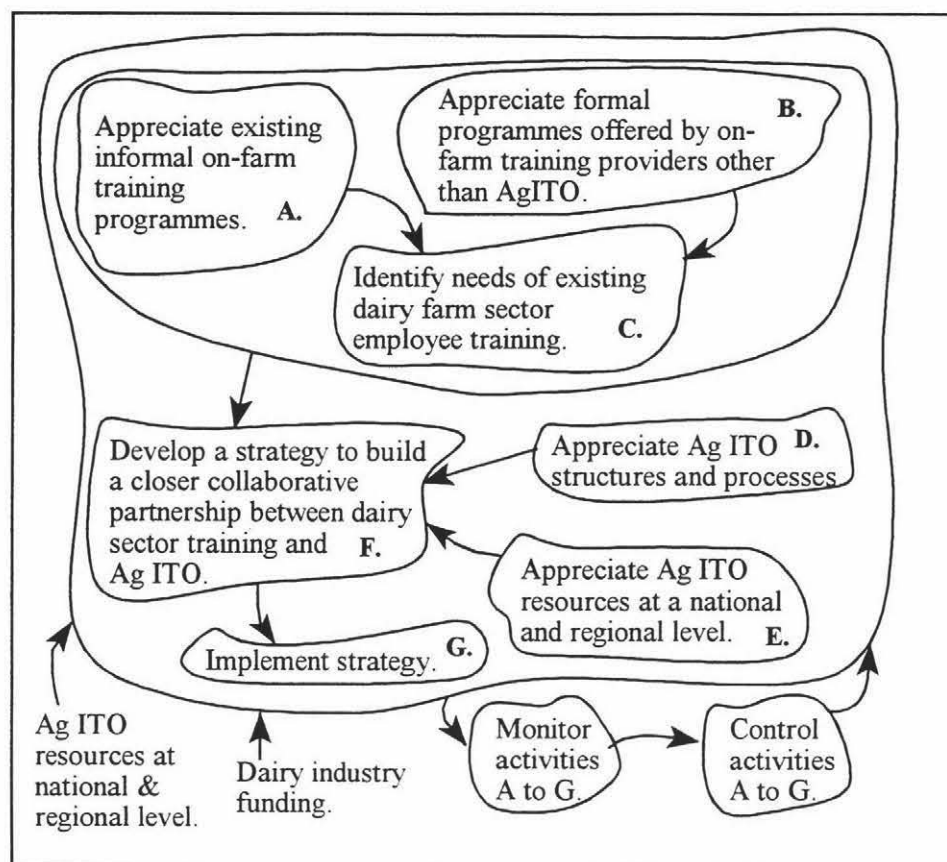
Figure 5.15   Conceptual model of a relevant system to develop and implement a collaborative on-
farm training strategy.

Strong and well established informal training and support programmes exist in dairy farming communities for dairy farm employees. An understanding of these programmes (activity A) will enable the needs of these programmes to be identified (activity C). Other avenues for obtaining practical training, such as Polytechnics, exist in regions for employees. An understanding of the training opportunities offered by these organisations will enable the identification of the possible role AgITO could have to support and enhance these existing initiatives (activities B & C).

The relevant system requires an understanding of the purpose for which the AgITO was established and the current funding arrangements for the organisation (activity D & E). The development of a strategy to combine the role and resources of the AgITO with those that already exist (activity F) will enable a strategy to be implemented (activity G).

5.6   Summary and Conclusion

Chapter Five presented the findings from the finding-out and the modelling phase of the SSM inquiry that was undertaken. The rich description, developed as part of the finding-out phase, was presented. This included the outcomes of the analysis of the intervention and the analysis of the social and political aspects of the situation in addition to a rich picture of the problem-situation. The main problem areas represented in the rich picture were described.

Five relevant human activity systems were selected and developed from the rich description and as part of the modelling phase were constructed as root definitions and conceptual models. The five modelled relevant systems are presented and reasons for their selection given. The activities that make up the relevant systems are described.

Although beyond the scope of this project, the next phase of inquiry will be to present the five modelled relevant systems to Livestock Improvement Advisory for comparison and debate. The debate will be informed by the rich description constructed from the perspectives of a cross section of problem-owners. The definition of action to improve the situation, by Livestock Improvement Advisory, will be informed by the outcomes of the analysis of the situation as a culture. That is, the outcomes of the analysis of the intervention, and the analyses of the social and political aspects of the situation. These outcomes will provide the basis for defining action to improve the situation that is culturally feasible. The outcomes of the logic-based stream of inquiry, the relevant systems models, will provide the basis for defining action that is systemically desirable.

An understanding of the on-farm labour situation has been obtained through the use of SSM. The understanding is structured and expressed in a way that will be the basis for debate by Livestock Improvement Advisory to define action to improve the situation. The conclusions and reflections on the use of SSM as it has been adapted to this research project and the problem situation are outlined in Chapter Six. The implications of the findings from this study, in terms of the future use of SSM and other soft systems approaches in the New Zealand dairy industry context is also evaluated in Chapter Six.

CHAPTER SIX

Conclusion and Reflections

6.1   Introduction

An understanding of the on-farm labour situation in the New Zealand dairy industry was obtained by using a soft systems approach, SSM, in the problem situation. In this chapter the research is summarised and the conclusions drawn from the research are outlined and discussed. The research method and the use of SSM in this project are evaluated and the appropriateness of soft systems approaches for problem situation in the New Zealand dairy industry is discussed. Recommendations for future research that were identified from this study are outlined.

6.2   Research Summary and Conclusions

This research project was guided by two interlinked objectives:

- To gain an understanding of the on-farm labour situation in the New Zealand dairy industry to help [*Livestock Improvement Advisory*] define action to improve the situation.

- To investigate the appropriateness of using a soft systems approach in a problem situation in the New Zealand dairy industry.

The on-farm labour situation is a situation of current concern to a large number of people in the New Zealand dairy industry. The situation comprises multiple issues that are interrelated within and between the problem situation at an industry, regional, community and individual farm business level. People in the situation view the situation differently and consequently also define the nature of improvement to the situation differently. The on-farm labour situation is a complex problem situation that in unlikely to ever be resolved. However, by obtaining a better understanding of the problem situation people in the situation can be assisted to define improvement in the situation.

Although the structure of the dairy industry has changed dramatically over the last sixty years, the on-farm labour situation has been a recurring problem throughout the history of the industry. Despite this, the dairy industry as a whole has not yet developed the mechanisms or procedures to predict, monitor or manage the on-farm labour situation.

The employment needs of dairy farm sector employers are not being met. Conditions of employment on farms and the current opportunities for people who enter the industry are failing to compete with alternative employment options for prospective employees. A number of industry related and social changes have contributed to the current labour situation in the dairy industry. A decline in the real value of the payment farmers receive for milk is linked to an increase in the average size of dairy herds. The number of dairy farms has increased in recent years as the financial returns from dairying have exceeded those from other land uses. Both these factors have contributed to an increase in the demand for labour on dairy farms. Greater pressure has also been placed on the demand for labour as a result of the decline in the level of farm work undertaken by farming women and farmers' children. A decline in the number of people available and willing to work on dairy farms has been influenced by the poor image dairy farm work has relative to other employment options and the declining opportunity for attaining herd and farm ownership. Also adding to the labour problem, the changing expectations of young people to employment has reduced the number of people prepared to work on dairy farms.

Although the on-farm labour situation is problematic to the industry, the magnitude and specific nature of the labour shortage in the dairy sector at a regional and industry level is unknown. Information that would enable this to be ascertained is not collected by the dairy industry and is not available from other sources. The problem situation is further complicated because there is no one decision-taker that can take action to address the situation. The dairy industry is not a single organisation, but a collection of a large number of separate entities. Because of this, and the multiple interrelated issues component in the problem situation, no one organization, group or individual in the dairy industry have the resources or the ability to address the problem situation as a whole. However, many different decision-takers do have the resources, ability or power to intervene in the situation to improve it at an on-farm, regional, community and/or industry level. Livestock Improvement Advisory, within their current role and with their current resources, can potentially take action to improve the situation at an on-farm, regional and industry level.

From the understanding of the problem situation gained from the use of SSM, five conceptual models of relevant systems were developed to structure debate and learning, and assist Livestock

Improvement Advisory define action to improve the situation. If Livestock Improvement Advisory are to improve the situation, they need first to define the level and type of intervention they can and wish to take. For this reason, Model 1, a relevant system for Livestock Improvement Advisory to define intervention in the situation, was developed. Livestock Improvement Advisory's primary activities are directed at servicing the needs of dairy farmers. Given the on-farm focus of their activities, two relevant systems were developed for Livestock Improvement Advisory to compare with, and debate, their understanding of real-world processes for the establishment and management of on-farm employment. The relevant systems developed are: 'a system to establish and manage the employment relationship between an employer and employee' (Model 2) and 'a system to service the employment needs of dairy farmers' (Model 3). Both models of relevant systems are also potentially models of 'ideal' processes that could be used to design future action to improve the on-farm labour situation at an on-farm level. Model 2 is a process based on human activities that a farmer employer and employee could undertake. However, given Livestock Improvement Advisory's role with dairy farmers, it is a model that they could use as the basis for debate with their farmer clients to question and improve the processes the farmers' currently use to establish and manage their employment relationships. Model 3 is a model of a relevant system that could be used by Livestock Improvement Advisory as the basis for improving current, or developing new, processes to service the employment needs of a group of farmer clients and, thereby, improve the on-farm labour situation.

Both, the image of dairy farming and on-farm training of employees were a concern expressed by Livestock Improvement Advisory, in relation to the on-farm labour situation. To improve the image of dairy farm work, the employment needs of the dairy sector and the opportunities that exist for employees need to be more clearly understood. Activities to gain this understanding were included in a model of a relevant system developed for Livestock Improvement Advisory to explore the options and implications associated with implementing a promotional strategy for dairy farm employment. A fifth relevant system was modelled to focus debate and learning by Livestock Improvement Advisory on the training of employees on farms and the role of the AgITO in this training. The last two models of relevant systems were developed primarily for Livestock Improvement Advisory to debate and learn more about these aspects of the situation. Debate of these models may not necessarily lead to direct action by Livestock Improvement Advisory to improve the situation, but a better understanding of these aspects of the situation will assist Livestock Improvement Advisory define the type and nature of intervention they will take.

The relevance of these five human activity systems to debate of and action in the problem situation, will be tested when the models are debated by Livestock Improvement Advisory. The comparison and

debate phases of this application of SSM will be undertaken subsequent to the completion of the phases of the inquiry reported in this thesis.

The first objective of this research project has been achieved. The use of a soft systems approach, SSM, has resulted in an understanding of the on-farm labour situation being obtained and structured to an extent that will assist Livestock Improvement Advisory to define action to improve the situation. The understanding that has been gained is structured in the form of a rich description that includes the elements of structure, process and climate in the situation, the social and political aspects and the identification of problem-owners and potential decision-takers. The understanding of the problem situation has been further structured as models of five relevant human activity systems that will be used to structure debate by Livestock Improvement Advisory to define improvement to the on-farm labour situation.

The appropriateness of soft systems approaches to a problem situation in the New Zealand dairy industry was investigated through the use of SSM in the on-farm labour situation. The conclusions relating to the attainment of research objective two are addressed in Section 6.5 of this chapter.

6.3   Evaluation of and Reflections on SSM

The Constitutive Rules for SSM (Checkland and Scholes 1990) were in part developed to enable *"coherent critical debate about the experience of using SSM"* (Checkland and Scholes 1990: 286). Rules 1 to 4 question the legitimacy of the claim that SSM has been used in a project. Rule 5 demands the evaluation and reflection on the specific use of SSM in the problem situation and a consideration of the methodological lessons learnt from this use of SSM.

Constitutive Rules 1 and 2 are:

1.   SSM is a structured way of thinking which focuses on some real-world situation perceived as problematical. The aim is always to bring about what will be seen as improvements in the situation.

2.   SSM's structured thinking is based on systems ideas, and its whole process has yielded an explicit epistemology. Any account of work which lays claim to being SSM-based *must be expressible in terms of that epistemology* (Appendix IV summarises this epistemology).

SSM was applied to the on-farm labour situation perceived to be problematic. Action to improve the situation was not attained within the context of this project. However, this use of SSM is the initial

phase of a broader research programme that aims to define and carry out action to improve the on-farm labour situation. The documentation of this application of SSM has used the language specific to the SSM epistemology.

Rule 3 of the Constitutive Rules:

3. The full claim "SSM was used" (implying some version of the approach as a whole) ought to refer only to instances in which the following guidelines were followed:
    - There is no automatic assumption that the real world is systemic. If part of the real world is taken to be a system to be engineered, then that is by conscious choice.
    - Careful distinction is made between un-reflecting involvement in the everyday world and conscious systems thinking *about* the real world. The SSM user is always conscious of moving from one world to the other, and will do so many times in using the approach.
    - In the systems thinking phases, holons are constructed. (These will usually take the form of purposeful 'human activity systems' which embody the four basic ideas: emergent properties, layered structure, processes of communication and control.)
    - The holons are used to inquire into, or interrogate the real-world in order to articulate a dialogue, discourse or debate aimed at defining changes deemed desirable and feasible.

A partial use of SSM was undertaken. However, a claim can be made that the partial use was SSM as defined by Constitutive Rule 3. Relevant systems models were used to present a number of perspectives relevant to the situation. During the process of inquiry, a clear distinction was made between the construction of the rich description, from interviews and secondary data sources, and the use of systems thinking to make sense of that information. A conscious attempt was made to separate the systems thinking from the real world analysis and depiction of the problem situation.

Five relevant human activity systems were constructed as root definitions and conceptual models. The models of relevant systems were constructed in line with protocols for systems modelling defined in the literature and the models incorporated the ideas of emergence and layered structures. This is evident in the inclusion of the elements of CATWOE in the models of relevant systems and the construction of systems and subsystems. Processes of communication between, and control of, the activities in the relevant systems were included and represented in the models of relevant systems that were selected.

The relevant systems that were modelled were the basis for reflection on, and modification and expansion of the rich description. The researcher used the models to challenge her understanding of the rich description and to generate further inquiry into the situation. Use of the models of relevant systems for comparison with the real world and debate to define action will take place following the completion of this project.

Rule 4 of the Constitutive Rules:

> Since SSM can be used in many different ways in different situations, and will in any case be
> interpreted somewhat differently by each user, any potential use of it ought to be characterised
> by conscious thought about how to adapt it to a particular situation.

The use of SSM has been adapted in accordance with the research project's parameters, the problem

situation and the scope and context of the dairy industry. The project model (Figure 4. 1) and the

model of the system to use SSM (Figure 4.3) are expressions of this adaptation of SSM.

Based on the degree to which the application of SSM applied in the on-farm labour situation concurs

with the Constitutive Rules 1 to 4, it can be concluded that SSM has been applied in this research

project. In accordance with Constitutive Rule 5, the methodological lessons gained from this use of

SSM are outlined in the next section.

6.4   Evaluation of the Research Method and Methodological Lessons from the Use of SSM

The next sections of this chapter will evaluate the specific methods used in this project and address the methodological lessons gained from the use of SSM in the on-farm labour situation. This is a requirement of all applications of SSM and is defined in the last Constitutive Rule number 5.

Rule 5 of the Constitutive Rules:

> As SSM is a methodology, every use of it will potentially yield methodological lessons
> in addition to those about the situation of concern. The methodological lessons may
> be about SSM's framework of ideas, or its processes, or the way it was used, or all of
> these. The potential lessons will always be there awaiting extraction by conscious
> reflection on the experience of use.

6.4.1   Selection of Soft Systems Methodology

SSM was selected for use in this project from a preliminary investigation of six soft systems approaches. The selection was based on a consideration of the objectives of the research project, the initial appreciation of the problem situation and the decision to use a systemic-pluralist approach. SSM provided the means by which an understanding has been gained of both, the complex interrelated components and, the different views people have of the problem situation. These

outcomes support both the decision to use a systemic/pluralist approach and SSM in the on-farm labour situation.

The decision to use SSM was also based on the assessment that the skills and resources available to the research project were appropriate to the requirements for applying SSM, including the methods used in the approach. A single researcher, using SSM for the first time, effectively applied a partial iteration of the methodology to the on-farm labour situation. This was achieved within the resources available for the project, and through the use of the researcher's existing skills and those she developed during the inquiry process. The literature contends that components of SSM can easily be used by inexperienced people (Eden 1990). This claim is not supported in terms of applying the version of SSM used in this research project. SSM is a methodology that requires adaptations in order to suit the problem context in which it is being applied. A practical knowledge of SSM is a required on which to base this adaptation.

Compared to the other systemic-pluralist soft systems approach considered, the relatively large amount of literature describing the process and use of SSM was a factor in the selection of SSM. Although SSM is well documented by a number of authors, the descriptions of the methodology proved to be problematic. Articulations of the process of SSM were inconsistent, contradictory and in parts poorly described. This reflects SSM's status as a methodology and not a method, and the relatively recent development of the components of the cultural stream of analysis in the version of SSM used.

6.4.2   The Scoping of the Application of SSM in the On-farm Labour Situation

A rich description of the problem situation and five models of relevant human activity systems were developed within the scope of the application of SSM in the on-farm labour situation. The scope of SSM and the way that SSM was applied was influenced in this project by the complexity and extent of the problem situation and the research project objectives. As a consequence, emphasis in this thesis has been on describing the methods used and the justification for the selection of relevant human activity systems that have been modelled. This level of description of these early phases of the SSM process is not normally found in published accounts of the application of SSM in real-world problem situations.

The on-farm labour situation is characterised by a very large number of problem-owners and potential decision-takers (would-be-problem solvers). In this type of problem situation, the inclusion

of all problem-owner' perspectives in the rich description is practically impossible, as is the active inclusion of all decision-takers in debate to define action to improve the situation. As a limited number of people are to be involved in defining action to improve the situation, bias in the development of the rich description was minimised by ensuring a broad cross section of problem-owners were interviewed. From the more than 100 relevant systems identified from the rich description, five relevant systems were selected and developed for debate by one decision-taker, Livestock Improvement Advisory. The selection of only five relevant systems for one decision-taker was justified as the broad rich description will inform the debate and influence the definition of culturally feasible action by Livestock Improvement Advisory.

Had a complete iteration of SSM been undertaken in the time available the models of relevant systems could have been validated and a fuller appreciation of SSM as a soft systems approach would have been possible. The number of problem-owner' perspectives obtained through interviews and the amount of secondary data researched would have been less. Consequently, the outcomes of debate and the definition of action would more likely be biased to the perspective of Livestock Improvement Advisory staff.

Livestock Improvement Advisory were allocated the role of client for the SSM inquiry. Had they also been allocated the role of primary decision-taker from the start of the inquiry, less time would have been spent interviewing Livestock Improvement Advisory staff. The focus in the development of the rich description would have been on the inclusion of people's perspectives other than those of the group who were to debate and define action for the models of relevant systems developed. Further, the involvement of Livestock Improvement Advisory in debate of models of relevant systems would have occurred earlier, in particular, to define their likely intervention in the situation.

With more time to complete this research project, an assessment of the relevance of the five models of relevant systems to debate and improvement in the situation would have been completed. As there is uncertainty as to the type and level of intervention Livestock Improvement Advisory can and wish to undertake in the problem situation, additional expansion of the rich description would not be warranted until this is clarified. Further, the definition and design of action arising from comparison and debate by Livestock Improvement Advisory, which would have involved the completion of one and potentially multiple iterations of SSM, could have been assessed and the methods of facilitating the process with Livestock Improvement Advisory reported on. Also, the process of bringing together the outcomes of the analysis of the situation as a culture and the logic-based stream of analysis to

define action that is both culturally feasible and systemically desirable could also have been undertaken and described.

6.4.3   Obtaining Problem-Owner' Perspectives

Interviews with individual and groups of problem-owners and the research of secondary data provided the information that led, through analysis, to the construction of the rich description. With the experience of having completed an analysis of the data, interviews could be structured more in line with the elements and ideas demanded of the analysis. Conscious awareness of the elements of structure, processes and climate would have helped to focus the interview questions and discussion. The same would apply for the elements related to the analyses of the social and political aspects.

In the time available, only a small percentage of the large number of problem owner' perspectives could be gained. Both, one-on-one and group interviews were undertaken. The information obtained from these and secondary data sources resulted in relevant systems being modelled that are considered appropriate to an exploratory and a diagnosis mode of comparison. This use of SSM is only the first of a number of iterations in the problem situation, models of an exploratory mode would have been adequate for initial debate by Livestock Improvement Advisory, particularly as there is uncertainty as to the intervention they are willing and able to make. In the first iteration of an SSM inquiry into a broad problem situation involving a large number of people, the aim in the finding-out phase is to obtain as many problem-owner' perspectives as possible. In addition to group discussions, rapid appraisal techniques such as Rapid Rural Appraisal (Beebe 1985; Chambers 1985) and Participatory Rural Appraisal (IIED and MYRADA 1991; Chambers 1992) could be used to gain an initial understanding of a broader range of people than was achieved in this project.

Due to time constraints a number of key perspectives have not been included in the rich description, for example, the AgITO central executive, representation from all dairy companies and careers advisers from secondary schools. The gaps in the rich description will be taken into account during the comparison phase.

6.4.4 Analysis of the Information Obtained

The identification of structure, process and climate in a problem situation was not included as a component of the SSM process of inquiry articulated by Checkland and Scholes (1990) and used in this research. However, identification of these elements in the situation was found to be important for the development of the rich description in this project. For a first time user of SSM, listing the elements of structure, process and climate identified in the situation, and those identified through the analyses of the political and social aspects of the situation, was found, also, to assist the researcher gain a familiarity with the elements. In addition, the lists provided a valuable working data base that could be reflected upon and modified as the inquiry process progressed. Without these lists the volume of data generated would have been problematic.

In a situation where SSM is used as a component of a research project, the construction of the rich description and the analysis of the information may be better achieved by using a more systematic and rigorous qualitative data analysis technique. The use of a qualitative analysis soft ware package such as NUD.IST (QSR 1994) would have enabled the data to have been sorted into the categories including: structure, process and climate; roles, norms and values; tasks and issues. The use of a qualitative data analysis technique would have made the researcher's analysis more explicit, more open to critique and less subject to potential bias. The use of NUD.IST would also have made it easier for the researcher to show the chain of evidence that was used in the construction of the relevant systems. In a non-research situation, in which the need for documentation and justification of the process of inquiry is not required, the value of such a tool would be diminished. In practice, the process of finding-out would ideally be more participative and the analysis based more on debate and discussion among a number of people.

6.4.5 The Research Journal

An action research framework of plan, act, observe and reflect was used as the basis for commenting on the use of SSM and the research project in general. Linked with the action research framework a research journal was kept. A structure that clearly differentiated the reflection related specifically to the methods within the methodology, the ideas and assumptions underpinning the methodology, the research process and the problem situation would have made the journal a more useful contribution to this research.

6.5 The Appropriateness of Soft Systems Approaches in the New Zealand Dairy Industry

The scope of the use of SSM in this project was a 'finding out' phase and the development of a rich description, and the naming, selection and modelling of relevant human activity systems. As only a single partial iteration of SSM was used in the on-farm labour situation, the conclusions that can be drawn in relation to the second research objective are limited.

SSM is a powerful approach that is useful for structuring a complex problem situation so that the situation and the different perspectives of the situation can be understood. The understanding that is obtained is structured in a way that will support debate to define action to improve the situation at an industry, regional, community and farm business level. However, a number of factors associated with the methodology suggest that the adoption of this approach by practitioners may meet with some resistance. The terminology is confusing and makes learning and understanding of the methodology difficult. Furthermore, articulations of the approach in the literature are sometimes contradictory and not well described.

The use of SSM in this project is importantly defined by its application in the New Zealand dairy industry context. In terms of comparing the appropriateness of SSM in an industry as opposed to an organisation, limited conclusions can be drawn as the researcher has only had experience in applying SSM in an industry. However, the factors that have defined this use of SSM have been the large number of problem-owners in the situation and the need, in order to define action, to limit the focus for debate to one group of decision-takers. These factors could apply equally to a large organisation as to an industry. In an organisation, the formal decision making processes and hierarchies of decision takers will be more explicit and responsibility for primary tasks more clearly allocated to individuals and/or groups. However, these explicit structures within an organisation do not necessarily correspond to the issues and tasks that are relevant to the problem situation. The nature of the problem situation is more likely to be the critical factor in defining the appropriateness of the use of soft systems approaches rather than the organisational formality of the context. In this use of SSM in the dairy industry, the identification of a primary decision taker in order to focus the selection and construction of the relevant systems was the most significant adaptation of the approach required in this context. This was able to be justified due to the emphasis placed on obtaining a broad cross section of problem-owner' perspectives in the rich description theat will inform the comparison and debate phases.

The literature discussed in Chapter Two argued that conclusions drawn about the use of any systems approach can only relate to the specific use of that approach in that problem situation. However, some wider implications for other uses of soft systems approach in the New Zealand dairy industry are made. Soft systems approaches were developed for problems involving people involved in purposeful human activity in a situation considered problematic by at least one person in the situation. The approaches are useful in problem situations that are hard to define and include many interrelated component issues, which are perceived differently by people. Given that the New Zealand dairy industry is made up of a large group of people involved in purposeful activity, soft systems approaches are by definition appropriate to problem situations in this context. The outcomes of this use of SSM in the dairy industry support the appropriateness of soft systems approaches in this context.

6.6   Future Research

Completing the cycle of SSM initiated in this project will be a primary aim for research following this study. The systems models developed in Chapter Five will be used to initiate, and structure, debate by Livestock Improvement Advisory in order to define action to improve the on-farm labour situation. An investigation of the 'Comparison' and 'Defining Action' phases of SSM will complement, and build on the findings from this project and provide the basis for further investigation into SSM and the on-farm labour situation. Undertaking these phases in an action research framework will enhance the understanding of the process that is used.

A goal of the broader FFR project is to develop and adapt systems approaches for use by field staff of Livestock Improvement Advisory. Given Livestock Improvement Advisory's current activities at the farm business level any application of SSM by them is likely to be at this level Research to investigate and adapt the use of SSM for use by Livestock Improvement Advisory staff for use with individual farm business situation would complement the current activities of Livestock Improvement Advisory. Further research is also required to develop methods that enable Livestock Improvement Advisory staff to gain practical experience in the use of SSM, within a time frame and environment that is suited to their current employment demands. A clearer articulation of 'how to use SSM' will be an essential component of these methods.

A number of research topics were identified from the project that do not necessarily involve the use of SSM. The research identified individuals who have expertise in the management of on-farm labour

at an individual farm level and across a number of farms. A case study approach could be used to study in detail the process used by these individuals. Models could be developed to represent successful labour management processes. Such models could be used by Livestock Improvement Advisory staff as the basis for assessing and improving the labour management processes used by the farmer clients.

This project also highlighted the paucity of information that exists on the on-farm labour situation in the New Zealand dairy industry. Survey research could be used to assess the magnitude of the labour shortage in the dairy sector at a national and regional basis and to assess the employment needs of dairy farmers in the dairy sector.

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APPENDIX I

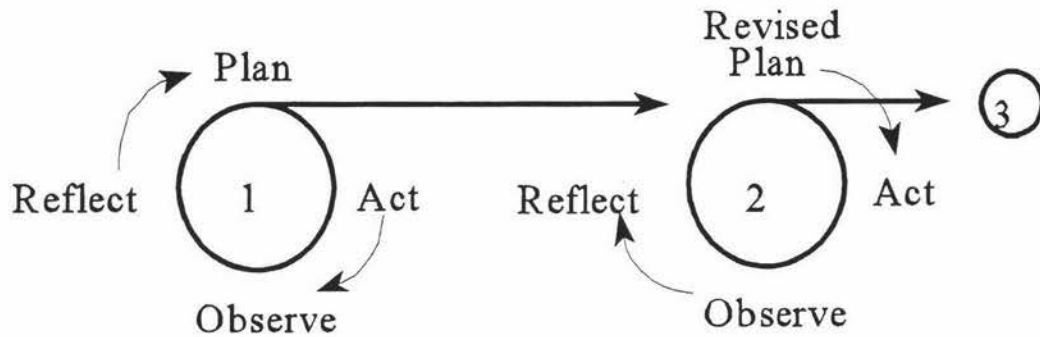# The Action Research Cycle

Figure AI   The action research spiral (adapted from Kemmis and McTaggart 1988: 11; Zuber Skerritt 1993: 47).

The action research process can be formally conceptualised as an iterative cycle of planning, action and observation. Reflection of the results of that action then leads to the revision of the initial plans and the beginning of a new cycle of research (Zuber-Skerritt 1993).

APPENDIX II

The Emerging Methodology

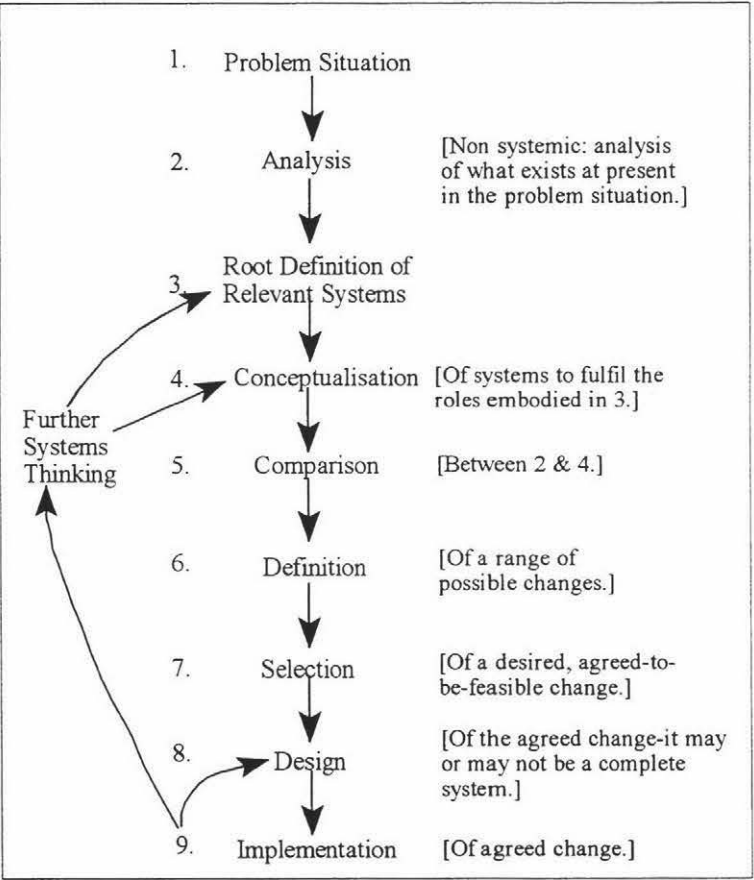The initial representation of SSM as a nine step process of inquiry (Checkland 1972).

Figure AII   The emerging methodology (Checkland 1972: 98).

APPENDIX III

The Process of SSM

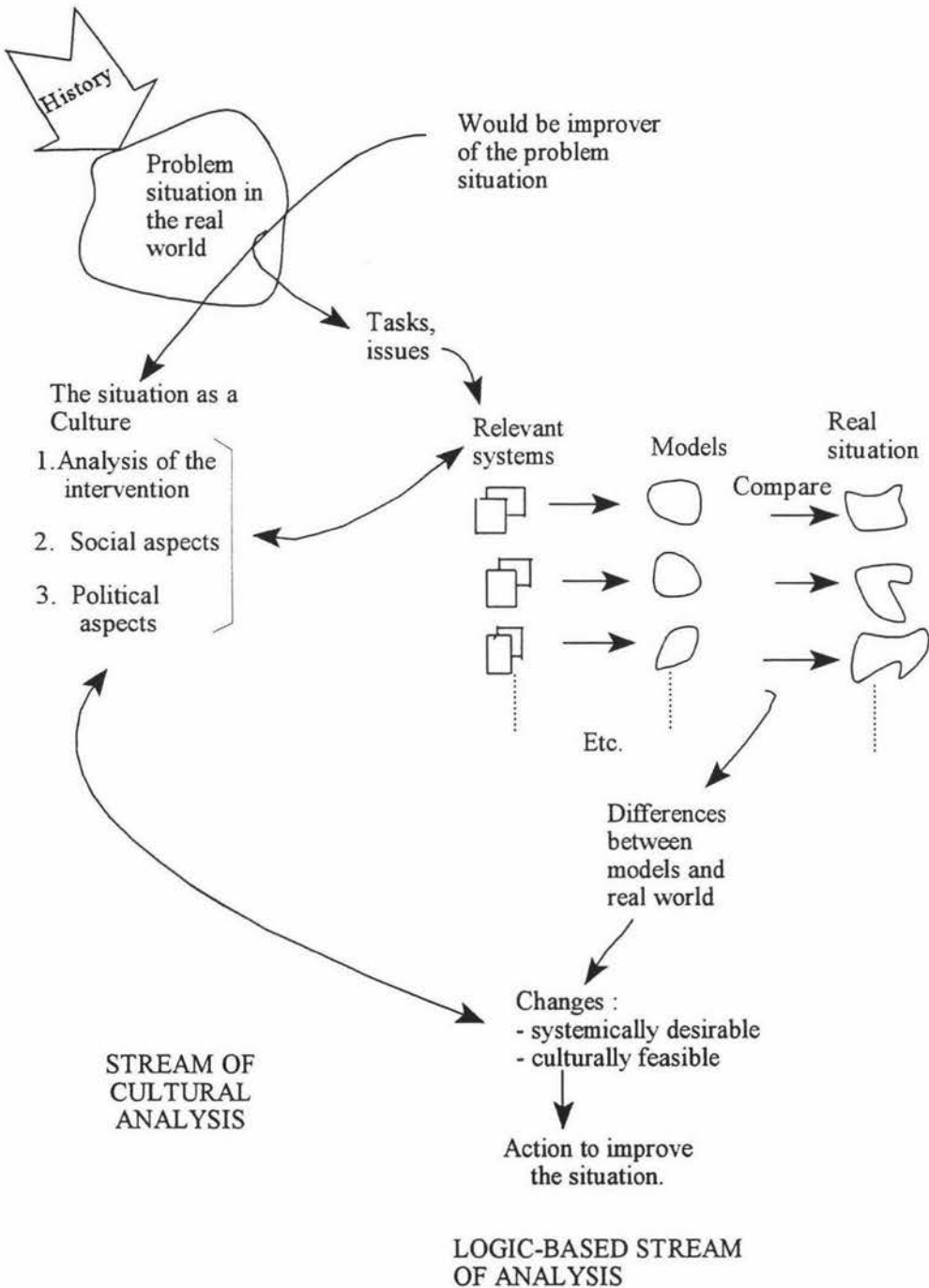Checkland and Scholes (1990) representation of the 'developed' version of SSM.

Figure AIII   The 'developed' version of SSM (source Checkland and and Scholes 1990: 29).

APPENDIX IV

SSM's epistemology: the language through which its process makes sense

Soft Systems Methodology	
Real world	The unfolding interacting flux of events and ideas experienced as everyday life.
Systems thinking world	The world in which conscious reflection on the 'real world' using systems ideas takes place.
Problem situation	A real-world situation in which there is a sense of unease, a feeling that things could be better than they are, or some perceived problem requiring attention.
Analyses One,	*Analysis One:* examination of the intervention or interaction in terms of the roles; 'client' (caused the study to take place), 'problem solver' (undertakes the enquiry) and 'problem owner' (plausible roles from which the situation can be viewed, chosen by the 'problem solver').
Two and,	*Analysis Two:* examination of the social (cultural) characteristics of the problem situation via interacting roles (social positions), norms (expected behaviour in roles) and values (by which role-holders are judged).
Three	*Analysis Three:* examination of the power-related (political) aspects of the problem situation via elucidation of the 'commodities' of power in the situation.
Rich pictures	Pictorial/diagrammatic representations of the situation's entities (structures), processes, relationships and issues.
Root definitions	Concise verbal definitions expressing the nature of purposeful activity systems regarded as relevant to exploring the problem situation. A full RD would take the form: do X by Y in order to achieve Z.
CATWOE	Elements considered in formulating root definitions. The core is expressed in T (transformation of some entity into a changed form of that entity) according to a declared *Weltanschauung*, W. C (customers): victims or beneficiaries of T. A (actors): those who carry out the activities. O (owner): the person or group who could abolish the system. E: (the environmental constraints which the system takes as given).
The 5 Es	Criteria by which T would be judged: Efficacy (does the means work?); Efficiency (are minimum resources used?); Effectiveness (does the T help the attainment of longer term goals related to O's expectations?); Ethicality (is T a moral thing to do?); Elegance (is T aesthetically pleasing?).

Conceptual model	The structured set of activities necessary to realise the root definition and CATWOE, consisting of an operational subsystem and a monitoring and control subsystem based on the Es.
Comparison	Setting the conceptual models against the perceived real world in order to generate debate about perceptions of it and changes to it which would be regarded as beneficial.
Desirable and feasible changes	Possible changes which are (systemically) desirable on the basis of the learned relevance of the relevant systems, and (culturally) feasible for the people in the situation at this time.
Action	Real-world action (as opposed to activity in conceptual models) to improve the problem situation as a result of operation of the learning cycle for which this epistemology provides a language.

Use of SSM

The system to use SSM	The language and structure of Figure AIV provides an epistemology which makes sense of the process of using SSM.

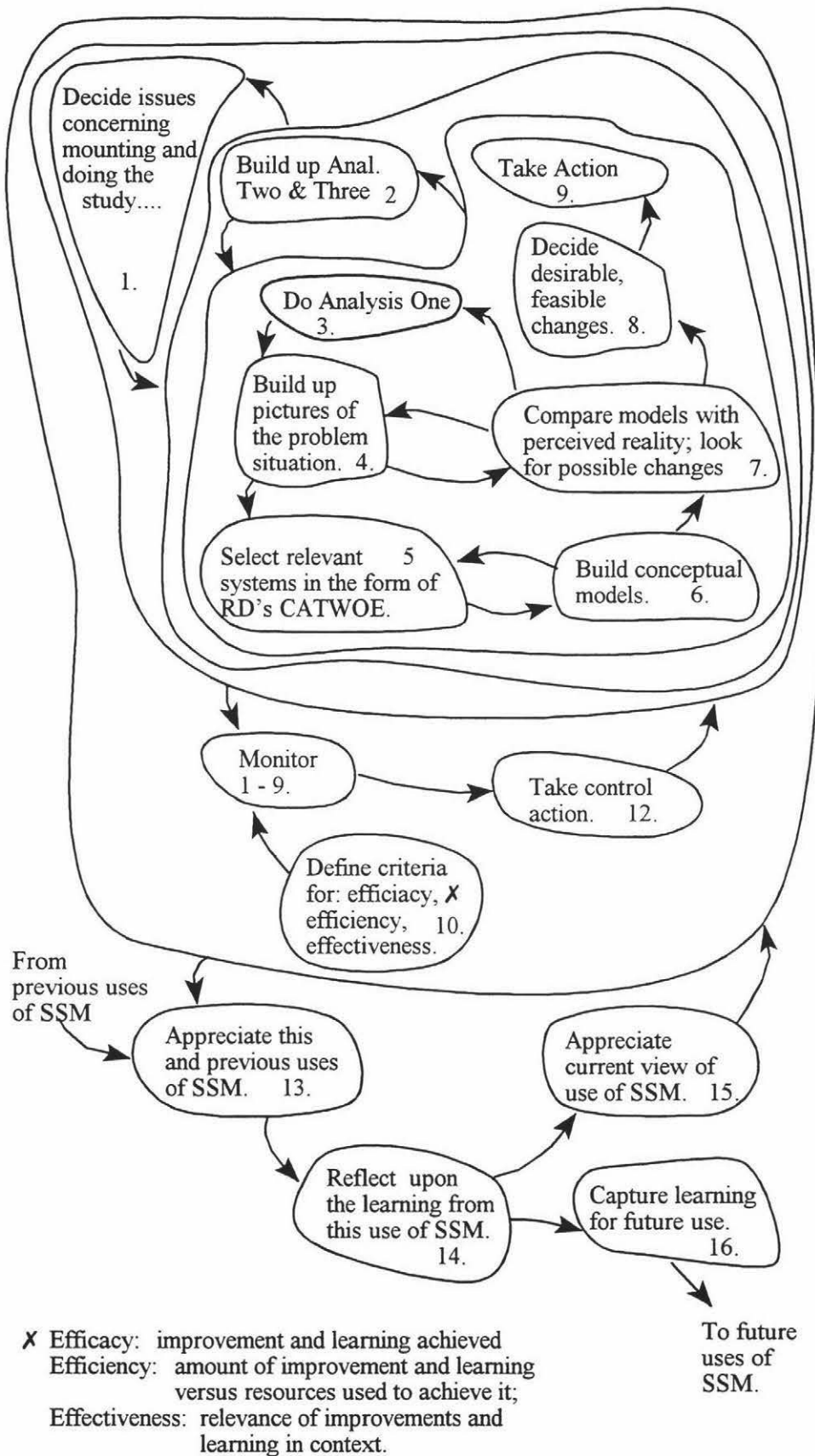(Source Checkland and Scholes 1990: 288-289).

Figure AIV   The system to use SSM (source Checkland and Scholes 1990: 294).

APPENDIX V

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APPENDIX VI

Analysis of Structure, Process, and Climate.

Appendix VI. I   Elements of Structures Idenitified in the On-farm Labour Situation.

NATIONAL STRUCTURES:

Pool of job seekers
- school leavers
- job seekers with some training and higher educational qualifications

Social and career expectations of school leavers.
Pool of Employers seeking employees
Job and employment market.
Employment agencies.

Unemployment in New Zealand
- cycle of low and medium unemployment rates

Educational Institutions
- High Schools
- Polytechnics
- Universities

Industry and Government funded schemes for the unemployed
- TOPS schemes

New Zealand Qualifications Authority

NATIONAL INDUSTRY STRUCTURES:

NZDB
- Executive and CEO
- Board of Directors: 11 farmer members and one Government appointed member.
- is part of the New Zealand dairy industry

Dairy companies
- trend towards fewer and larger companies.

Livestock Improvement Corporation:
- part of the New Zealand dairy industry and funded by dairy industry.
- Livestock Improvement Advisory is part of LIC.

Federated Farmers
- National dairy section
- national and regional committees
- national and regional farmer representation.

Image of New Zealand dairy industry
- historical/ current

Ag ITO national decision making/ management structure
- Executive and CEO
- Board of directors
- NZDB representation on board
- National administration office
- centralised funding and administration

Ag ITO funding
- Non compulsory funding from Industry
- established in 1995 from FETA & ETSA
- 80% funded by ETSA
- Voluntary 20% industry funding of this 80% dairy industry and remainder other primary industry funding bodies
- total funding $4m.

Dairy Industry Data Bases:
- LIC
- Statistics New Zealand

Servicing Sector to Dairy Farming:
- retail and manufacturing companies
- Agricultural consultancy companies
- Livestock Improvement Advisory
- LIC Dairy Breeding Services
- Financial institutions.

Major Dairying regions
- major dairy employment centres
- farm sizes on average differ between regions
- demand for labour greater in some regions
- wage rates between regions differ

Dairy Farming Community
- farmer networks and contacts
- demographics

Industry communications and information transfer systems:
- Dairy Exporter
- Media

Declining real returns to farmers
- required to milk more cows to maintain standard of living
- higher labour demands
- increasing farm size
- ownership of multiple farms in and between dairying districts and Islands

Farm ownership
- family partnerships
- corporate absentee owners
- family business

Farm management
- owner operators
- sharemilkers
- full time staff
- management structure

On-farm employment positions
- permanent
- semi-permanent
- casual/ seasonal labour

Goals and expectations
- farm owners
- herd owners
- farm staff
- sharemilkers

Pool of dairy farm employees
- school leavers less than 20 years of age.
- experienced over 20 year olds, herd managers and lower order share milkers
- experienced 50/50 sharemilkers (200 cows) (200 cows)
- mature inexperienced people whom have made a career move.

Ex- dairy farm employees.

Pool of employers of dairy farm staff:
- farmer owner operators/ experienced..inexperienced
- corporate/absentee owners
- sharemilkers
- farm managers of large properties
- large family farming operators

Dairy Farm Labour Market
Dairy Farm wage structure.
Dairy farm career and employment structures.

Employment contractual arrangements and Guidelines
- Formal employments contracts

- Employment Contracts Act
- Statutory holidays act
- Sharemilkers act
- Occupational health and safety

Informal contracts
- job descriptions and responsibilities
- hand shake

Dairy farm Education and Training Schemes
- TOPS schemes
- Ag ITO courses
- LIAdvisory facilitated short Courses and Workshops
- Seamless Education Package.

Dairy Farming Educational and Training Institutions
- Regional Polytechnics
- Massey and Lincoln University
- Regional Training Institutions: Taratahi, Smedley etc,

Labour demand patterns on-farm.

Image of dairy farming jobs and employment

Dairy farm staff Employment services
- New Zealand Employment Services
- Farmlink (New Plymouth).

Role of woman
- women marrying older, retaining off farm careers
- higher work and lifestyle expectations
- means demand for labour higher to replace wives role
- larger farms more pressure on wives to work on farm, can't afford to employ labour
- choice employ labour to live in house and feed or work on farm and in shed

Conditions of employment
- live in house with farm family
- living and working with boss
- traditionally poor wages for long hours
- anti-social work hours, limited social life or opportunity to play sport, off farm interests

Conditions of Employing
- living and working with worker
- feed and house and support young person just left home
- supervision/ delegation of responsibility

Skills/ experience recognition for staff:
- employment position hold
- degree sought after by employers
- NZQA qualifications held
- employment record
- past employers abilities and status
- family links in district/ networks

Employer Status and Recognition:
- production levels
- number and size of farms
- role and contribution to community activities
- dairy farming career progression (myth)

Hierarchy of staff employed
- someone able to milk cows and do as told
- herd managers
- lower order sharemilkers
- higher order sharemilkers
- higher educational qualifications not a pre requisite
- work for parents

Farm employment structures:
- single labour unit, young, inexperienced, cheap, live in.
- single labour unit, some experience and ability to take responsibility, live in sleep out or separate accommodation
- multiple employment, single men in own accommodation on farm
- married greater responsibility
- sharemilker/ no milking
- bring son home onto farm

Legend of dairy farmers:
- start at the bottom, young and with very little equity
- rosy cheeked, partially literate, toil all hours given
- sacrifice and hard work, sub standard accommodation, family helping on the farm, home alone children while both parents milk, creche for kids in calf pen,
- finally achieve farm ownership
- incredible long term focus and clear goals

Livestock Improvement Advisory
- Regionally based CO's and Farmwise Consultants.

Pool of employers
- farm owners and herd owners
- large properties with multiple employees
- smaller/ marginal farms with single employee

Sharemilking structure.
- 50/50
- lower order becoming more prevalent due to changes in regulatory requirement and legislation.

Regional Structures:

Dairy farm service sector regionally based.
- Agricultural consultants and advisors
- Retail and manufacturing sectors
- Veterinary and animal health

Dairy Company management decision making structure:
- Executive and CEO
- Board of directors comprising elected farmer representatives.

Dairy company Ownership structure:
- Farmer supplier shareholders

Regional company communication and information transfer structures.

Historical structure of regional dairy industry and dairy company.

On-farm production levels and costs of production.
- Development costs
- Size of land titles

Dairy farming regions proximity to social clubs, facilities
- regional and district differences
- issue in Canterbury, distance from main centres
- local sports and social clubs, YFC,

Regional Dairy land prices are influenced by
- dairy company payout
- price of land
- competition for land
- climate and productivity patterns and costs
- profitability and productivity of farming operations
- willingness of people to move into the areas

Image of dairy farming as a job and career:
- myth of dairy farmer

Location of farming communities relative to main service centres.
Traditional land use and land type.
Farm expansion.
Farm conversions to dairying.

Ag ITO
- Field Officer
- local committee
- cadets/ trainees
- farmer trainers
- contracted training providers
- NZQA moderators

Regional on-farm training
- trainees
- farmer trainers
- support networks for trainees and trainers

Farmer communication and information networks
Employment networks and services
Age and drive of dairy farmer.
Farm employee salaries and remuneration packages.

On-farm Structures

Long Term Employers of Staff
- established employment systems
- established staff management systems
- body of experience to guide actions as employer
- established networks in region
- established employee pool

Accommodation On farm
- in house with owner operator and family
- separate accommodation

Age, motivation and experience of dairy farmer.

Farm employee salaries and remuneration packages.
Farm sizes and cow numbers

New young people employed in the industry
- expectations higher than in the past
- more mobile with vehicles

Seasonal income fluctuations.
Economies of scale in dairy industry: on farm and at company level.

Young farm labour priorities/ expectations
- own and drive a car
- relationship/ social life

Structures In Region X Dairy Situation

X Dairy Industry
- X a back water, unappealing to those not born in the district

- difficult to attract new people into district
- strong regional identity

Farming community
- long history of dairy farming
- strong family and community links to region
- farmer-farmer networks strong
- people know people and histories well
- many farmers cash rich, Hawera 5th highest banking throughput in New Zealand.
- life dictated by milking times for cows

High land prices and small land titles
- due to long settlement of area
- means only neighbours and locals are able to afford to buy in the region.
- influenced a shift out of the region by farmers wishing to expand.
- more difficult for sharemilkers to purchase land in the district
- more opportunities outside of district for sharemilkers.
- prices also linked to weather and land characteristics, reliable rainfall
- consistent high pay out from dairy company

Long and well established dairy industry...
- well established infra structure to support farmers
- well established culture of farming networks and practice
- people have long memories and don't forget easily
- family based hierarchies and status in district
- conservative farmers, and attitudes towards social relationships and race..e.g. de facto relationships frowned upon

YDairy Company Management and decision making structure:
- Executive and CEO
- Board of directors elected farmer representatives.

Y Dairy company Ownership structure:
- Land owning supplier shareholders

- strong competitive company
- high relative pay out to farmer suppliers
- uncompromising stand on maximising returns to suppliers
- lean mean image

Company Information and communication structures.

Appendix VI. II   Elements of Process Identified in the On-farm Labour Situation

NATIONAL PROCESS

- School leavers are directed into career and further study options by parents, peers teachers, and careers advisors in relation to their academic abilities.

- School leavers choose job and career options in relation to how well the job meets their goals and aspirations: short term goals.

- Entry into higher education facilities is dependent on academic ability.

- People gain employment by answering advertisements in newspapers through, employment agencies and through personal contacts and door knocking.

- Pools of prospective employees are concentrated in the rural sectors.

- NZQA do what ???

- Industry based training schemes are funded 80% by Government and 20% by Industry?

- The image of dairy farm work as a career is influenced by the bad press poor employers in the industry get.

DAIRY INDUSTRY PROCESS

- NZDB fund a large proportion of the industry funding portion of Ag ITO. The Board has a representative on the Ag ITO board. Who is it??

- Industry funded support, advice and training is provided by LIAdvisory through discussion groups and short courses.

- Funding of and resourcing of training in dairy farming industry.

- Federated Farmers role unclear. Federated Farmers represent and are advocates for land owners and share milkers in the dairy industry.

- Amalgamated Workers Union has a very small farm staff membership.

- Funding from Dairy companies directly reflects the number of cadets that are signed up with the Ag ITO in the region.

- Recruitment of young people into the dairy industry is not actively pursued by the industry.

- Recruitment and identification of people for on-farm work is undertaken by farmers seeking employees through advertisements in local press, informal contacts and to a very limited extent via employment agencies. Polytechs are a source of employees.

- Industry communication and information occurs through recognised industry publications such as Dairy exporter, through verbal interaction between the farming community, shed and company meetings.(Conflict: sharemilkers and) Dairy companies mainly concerned with communicating with their shareholders. (Land owners).

- Recording and monitoring the figures relating to farm staff and employment details is not a formal official task of any one in the dairy industry. The Ag ITO record figures relating to cadets and Statistics New Zealand can provide labour numbers on a regional basis.??

- A local committee of people support and assist the Ag ITO field officer. The committees structure has not recognised membership criteria and also has limited power and no resources.

- Ag ITO fund and tender out training of cadets and TOPS schemes.

- New Zealand dairy industry produces, processes, coordinates the marketing and sale of milk based products in an internationally recognised and efficient manner.

- Land and farm acquisition is undertaken by existing farmers, corporate or syndicates and sharemilkers.

- Farmers are increasing the size of herds and land area owned by buying neighbouring farms or moving to a district in which it is easier to expand their operations.

- Farmers (with farm staff) milk cows and productively farm land.

- Farm staff leave the industry .

- Accumulation off assets attained by working in the industry from a young age or in another career.

- Communication of recognised skills and qualifications to employers is achieved through informal farmer networks and documentation of past work experience.

- Career advancement of farm staff supported and facilitated by farming community and servicing industry.

- Skills, informal qualifications and career recognition is attributed to individuals by other farmers and their peers.

- Formal qualifications are attributed to farm trainees by the formal training bodies: Ag ITO's, Polytechs, Universities.

- Dairy farmers employ, manage and replace staff.

- Dairy farmers train, and support the career progression of farm staff.

- Livestock Improvement Advisory staff fund and provide training through discussions groups and courses/workshops.

- Farmers purchasing and developing properties in new dairying areas such as Canterbury are people with the capital and the drive to undertake the move. They are people looking to expand and progress their farming businesses.

- Farmers purchasing farms in areas with a well established dairy industry are predominantly those whom currently farm in the regions and/or have the capital to do so.

- People who are attaining farm ownership before they are 30 will generally be from farming families.

- People who attain dairy farm ownership whom have little assistance from family money are hard working, very focussed and committed people.

- People attaining farm ownership having worked their way up through the career ranks are hard working, committed and respected people in the dairy industry.

- Accepted good staff management practices are defined by the farming community, employees demands, Government guidelines such as Employment Contracts act. Etc.

- Dairy farming as a job and a career is promoted to school leavers by careers advisors, Ag ITO field officers, Livestock Improvement Advisory CO's, and informal and personal relationships of school leavers.

- The people who are tutoring young people in the Polytech and TOPS courses are retired farmers, and people with a practical agricultural background.??

- Social focus and life of farm staff is provided by the local sports clubs and farming community social activities.

- Mentoring and support for farm staff provided by farm employers, Ag ITO field officers in some regions to a limited extent, peers, parents and friends.

- The running and management of the dairy farm business is undertaken by farming families:

REGIONAL

- Process of selecting, facilitating the employment process is done by farmers, farming partnerships, employment brokers such as Ag consultants.

- Purchase of dairy farm land in Taranaki predominantly by existing Taranaki farmers.

- Ag ITO employs field officers whom coordinate and support cadet training schemes and Ag ITO initiatives at a regional level.

- Matching of farm staff needs with farm staff attributes undertaken by farmers, and employment brokers, to a limited extent employment services, Polytech tutors, and training bodies.

- Mentoring and support services assisting young people choose their careers and jobs.

- Farm consultants operate and manage a stable of employees for their clients, they also support the advancement of employees through the career progression scheme.

- Training needs of staff on farms are met by employers, supplemented by external study.

- Mediation and resolution of conflicts between employees and employers is undertaken by farmers themselves, and outside mediators if situation very bad.

- Employer has the power to employ and sack employees.

- Quality and accountability for the industries investment in training is based on the number of cadets that sign up for the scheme. It is not assessed on the basis of how many complete and stay in the industry.

- Wage and salary and employment conditions are established by employers (and or with their consultants) and employees.

- Minimum standard employment contracts are provided by Federated Farmers.

- Employees have the right to accept the conditions of employment or reject them and leave the position.

- Farmer representation in industry decision making represented via farmer elected boards of directors of boards of Dairy companies, LIC, NZDB.

- Staff consultants employed by large farmers with multiple employees, progressive owner operators, absentee owners, and problem situations that need to be sorted out.

- Long term farm management and consultancy support for absentee owners and farm syndication.

- On-farm management of staff undertaken by husband and wife team, managers in assigned role, dependent on age of staff and position.

- Regional training initiatives for cadets is facilitated by the regional field officer. Liaison and communication between Ag trainers in a region is sometimes facilitated by the regional field officers.

ON-FARM

- Accommodation for farm staff is provided by the employer.

- School leavers accommodation and welfare is often provided within the family home and by both husband and wife.

Region

- The Ag ITO committee in Taranaki includes a senior Livestock Improvement Advisory CO, Dairy Company Director, ex. NZQA moderator. Unusual to have representative of Livestock Improvement Advisory on committee or company representative.

Appendix VI. III Elements of Climate Identified in the On-farm Labour Situation

- Opportunities for working on farm and gaining a career in dairy farming are increasing and the infra structures and framework to support this exists within the farming communities.

- Dairy farming as a career attracts and requires no formal qualifications. Those educational and training qualifications that are available are not valued highly within the farming community.

- Those skills attained through formal training are not well recognised or valued by employers in the dairy farming industry.

- Conflict between off-farm training and on-farm training in that those working on farms are gaining practical skills that are valued by other farmers and also earning money, those off trained do not earn money..have to pay for the right to gain skills that may not be rewarded by employers.

- Is a mis match between the formal training funded institutions and who is predominantly doing the training and supporting of young and new people in the industry.

- Is it the job of Livestock Improvement Advisory to train and support the training of people in dairy farming. If so should they be competing with other bodies..or are they seen to be supporting the strong farmer based processes.

- The accountability and effectiveness of this mode of training is questioned and of major concern to some people in the industry.

- There formal job description of Ag ITO FO's does not match well the perceived needs of the industry training. Association of these schemes with TOPS is not a positive reflection on the scheme.

- Support for trainees and cadets provided informally by field officers and by other people in the farming community.

- Funding of training through formal organisational channels and through the tendering and funding of training contracts..including TOPS schemes.

- Informal training provided by farming community is funded by the farming community on an individual basis and through the on -going informal support of the community.

- Matching of staff to employers is a task done with varying degrees of effectiveness by farmers. Consultants working for their clients have a better understanding of their clients needs than an employment service. Some consultants have established procedures.

- It is becoming more and more difficult for sharemilker to attain land ownership...the opportunities for management positions on large properties are increasing.

- The opportunity also for a person to enter the industry with no equity or experience and attain farm ownership is also becoming more difficult.

- There are less sharemilkers in the pool to choose from..do not know why.??

- There are less people in the pool of prospective employees to choose from.

- Perception that there is an image problem with the dairy industry that is putting young people off entering the industry.

- Mentoring and services which advise young people in to jobs perceive dairy farming as a job for less able students ..but in fact the industry does want to employ these people..they do not tend to reward people with qualifications unless in a family farm situation.

- The role farm consultant play in keeping a pool of good employees and managing them between clients is a task that works well and is utilised and of benefit to all parties, the consultants, client farmers and employees.

- Formal structures and legal processes are only instigated in extreme cases. A lot of informal networks and advisors exist in communities whom provide advice and help in these circumstances.

- Profile of farmers whom are clients of consultants is unknown but thought and assumed by consultant to be the above average, cut above the rest farmer. Most clients are in a position to employ lower order sharemilkers.

- Conflict between conditions of employment and expectations of young staff, they want access to social clubs, Macdonalds, a life off the farm. More mobile & aware of what peers in town and in other careers are being paid and the hours they work.

- Nature of milking cows and farm work demands work over long hours. On a single owner operator unit there is limited flexibility to accommodate the different needs of workers.

- Rewards and returns from farming different for sharemilkers and farm owners relative to their workers. Incentive for farm staff to work long hours for little pay not the same as for owners.

- The expectations and reasons for working on farm for workers are different to that of owners and sharemilkers.

- Traditional path to farm ownership becoming more difficult, people likely to be older when attain ownership which means milking cows for longer, sacrifices made for longer, greater commitment to goal required. This does not how ever change the expectations and needs of farm staff. The sacrifices being made by farm owners and sharemilkers can not be passed on to farm staff.

- Management and needs of young staff require different skills and input to older more experienced staff.

- Relationship between male boss and worker may not provide all that is required in a young trainees needs.

- Cost of joining Federated Farmers as a member prohibitive to some farmers and workers? $400+ per annum. Whoever pays the fee can belong.

- Cost of attending courses at Polytech are expensive.

- Dairy Board unlikely to perceive labour situation as something they need to contribute money to..it is a farmer problem.

- Acknowledgement and recognition of dairy farming skills and qualifications not transferable or acknowledged outside of industry. This has negative impact on image of dairy farm work,

- Farmers are poor employers:
  - like to be own boss
  - not trained in staff management
  - don't recognise or complement 'workers'.

- Employees needs are not all financial, some recognition and personal satisfaction, these also not being met in some cases.

- Married couples, partners demand to retain own careers, limits where can buy a farm, close to main centre.

- Mismatch between myth of dairy farming career advancement and opportunities. Perception if don't own land / sharemilker does not have same prestige as farm owner.

- Dairy board unlikely to perceive the on-farm labour issue as something they need to act on until it directly impacts on their operations and objectives.

- Opportunities still exist for motivated and focussed people to move up through the career ranks in the dairy sector, but they are declining and the task of accumulating sufficient assets to purchase a herd and then a farm are becoming increasingly difficult.

- Farmer's who are under more financial pressure have difficulty paying staff. Labour is a large item of expenditure on the farm budget.

- Farms employing one labour unit have less ability to work time off and other conditions of employment compared to people on larger farms and multiple employees.

- Farming business large enough to employ multiple staff are generally able to provide separate accommodation for staff, therefore less pressure on the home unit in having to accommodate and feed a single labour unit in the home. Two labour units tend to be easier to manage than one.

- It is also likely that individuals on larger properties whom are in a position to employ more than one staff unit have had staff management experience in the past. Also these employers have made a decision to expand the farming operation to a point knowing that additional labour was a requirement and have made a decision to do that.

- Owner operator single labour unit employment situations can be very successful partnerships. The close relationship between farm trainer and trainee can be a very productive training experience for the farm trainee. It also provides company for the single owner operator which also may be important.

- Farm business In a 'transitional' phase tend to be the employment situations that are most likely to be have problems. Farmers whom cannot afford to employ more than one labour unit, may have to accommodate them in their own homes. May also be inexperienced in managing staff and providing clear instructions and job descriptions to the labour unit.

- Farms in the transitional phase of being too large for a single owner operator but too small to be able to support the employment of an experienced person requiring on farm separate accommodation. The labour sought for these situations tend to be younger people with limited farming experience whom have recently left school. 16 to 19 year olds whom may not have lived or worked away from home before. Additional pressure is often placed on the family employers to accommodate and respond to the needs of this individual in terms not only of feeding but also in term of relationship and personal advice.

- Single owner operator farmers may also be accustomed to working on their own, having things done the way they want them done.

- Married couples or working partnerships in an employment situation require conditions of employment and reward systems to that of single employees.

- Increasing numbers of partners whom work off farm are less willing to forgo their careers to also work on the farm. This is likely to place greater demand on farm employment positions in close vicinity to main centres. It may also place additional pressure on farmer employers whom wish to employ 1.5 labour units.

- Also becoming less acceptable is to have the single farm labour unit living in the house with the farm family from the perspective of both the employee and employer family. This places additional demands on employers to provide separate accommodation.

- Expectations of young people are for money, in order to buy a car and time and money in which to form relationships and socialise. With increased mobility, there is increased awareness of conditions of employment and wages available from other careers ad job prospects. The comparison between farm work and options in other areas is more explicit.

- Acceptance of unemployment as a legitimate option to work is also impacting on the number of people willing to consider milking cows.

- Many employers do not want nor can they afford to employ, experienced qualified people. They are in situations in which they want a labour unit that is cheap but can milk cows, do as they are instructed and not make too many mistakes.

- Dairy farming sector does generally not value higher educational qualifications and Ag based training. Experience in farming is valued.

- The traditional dairy farming career path demands that asset accumulation is paramount if progression to sharemilking and or farm ownership is sought. Off -farm training and attainment of higher qualifications cost money and time that may have been spent gaining practical experience in the dairy sector and accumulating assets.

- There is a conflict between the perceived need to attract higher qualified people into the sector and the willingness of the sector to recognise and reward these higher qualifications.

- Employment needs of farmer s will be different as will the demands and needs of employees. Management systems will need to be tailored to the specific employment situations that exist.

- Farmer employers under more financial pressure (sharemilkers, heavily indebted farm owners) are more likely to demand more form their workers. There is the danger that in these situations employees will be exploited, also the opportunity for employees to work with innovative and motivated people who will succeed in the dairy sector.

- Seasonal demand for labour on-farms often met by the employment of labour in tome for peak work loads calving. First employment experiences for young inexperienced employee may colour their impressions of dairy farm employment. From perspective of employer, if inexperienced person survives and sticks out calving and spring then they are worthy of continued employment.

- Hassles associated with employing staff are a major factor in decisions by farmers to expand or retrench and potentially sell their farming operations. "Innovative" farmers who move to new regions such as Canterbury accept that labour employment and management is a component of their job description. With the current shortage of labour in some of these regions employees can afford to be selective in their choice of employment.

APPENDIX VII

Analysis of the Social Aspects of the On-Farm Labour Situation

Analysis of the social aspects of the situation involved a consideration of the roles, norms and values that were identified as influencing the purposeful human activity undertaken within the situation (Checkland and Scholes 1990). Outcomes of the analysis are presented in Table AI below.

Roles	Norms	Values
Good employer	• trainer and teacher of staff • nurturer • conflict mediator /negotiator • high performing farmer • accommodates needs of employee • fair • respects staff as people • a team approach to work • staff valued in ways other than $'s: recognition, responsibility. • sense of humour • accepts staff make mistakes • popular and respected in local community • do not advertise for staff	• judged by level of community respect and recognition afforded • level of popularity in community • integrity and honest • recognised in community as skilled staff manager • advice sought by other farmers and employees • conforms to community 'code of accepted practice' • degree publically acknowledges and values staff • social and farming industry contacts • career advancement support able to give employees • historical treatment of staff
Poor employer../ dog tucker boss	• exploits workers • boss / worker relationship • supervisor & disciplinarian • sucks staff dry and spits them out • poor communicator • staff = dogs body • tally's mistakes of worker • does not seek to improve staff management skills • conflict unresolved, festers • reluctant employers	As for 'Good employer'.
Young people	• willing workers • seek social life, relationships and cars • tend to be good intentioned but irresponsible	• degree conform with working ethics of community • involvement in community, sport etc. • adults preconceptions of behaviour of youth

Table AI   The social systems analysis of the on-farm labour situation. Page 1 of 4.

Roles	Norms	Values
Top Employee	• goes the extra distance • commitment to farming • values the work experience not the income • has long term commitment to industry • respects employers abilities • responsive to learning • honest, trustworthy, open • survives calving with humour • fits in with employer and social group	• degree conforms to community and employers expectations of employee behaviour • behaviour judged according to local work ethic • degree 'fits in' with employer, colleagues. Social acceptability. • conformity with ethnic, marital etc. norms of employer • how well 'fits' employment needs of employer • degree challenges accepted farming practices and position of employer
Poor worker	• works to 'rule' • not a team player • resents supervision and advise • unaware of traditional work ethics • sees it as a job not a career in the industry • short term employment on many farms	As for 'Top Employee'
Top farmer	• involved in community activities • use Agricultural consultants, attend discussion groups and actively seek ways of educating and developing their skills • above average production achieved	• size of farm, level of farming success relative to others in district • recognition and reputation in district
Non-public leading farmer	• good solid citizen • community involvement/ selflessness • quiet contributor • attained farm ownership and position through hard work, not handed to him/her on a plate • attained farm ownership • good neighbour • above average production levels achieved	• traditional behaviour and values • family reputation and standing in district • social status and family hierarchies in district • successes in farming and other endeavours eg sport. • acceptance and conformity to community standards of practice • path by which attained current position in farming
Dairy cockie's wife:	• super women • housekeeper, mother, staff mediator, relief milker and calf rearer • voluntary community worker	• conformity to traditional/ accepted role of woman. • degree of support given to career of farming husband • level of involvement in community • farming experience and ability

Table AI   The social systems analysis of the on-farm labour situation. Page 2 of 4.

Roles	Norms	Values
Public Leading Farmer	• holds elected positions in industry and or community • prepared to speak out in public • community involvement • involved in politics	• status and standing in community: may be based on sporting and or business/farming achievement. • respect and standing in industry hierarchy • social and industry contacts and networks
Local	• born and bred in district • community involvement • family connections • work in dairy farming or in some way support dairy farming rural community • supporter of local activities	• conforms to behavioural and values of rural community • level of commitment to district and community above and beyond personal short term gain • conformity to local ethnic, marital etc. norms • sporting prowess
Farmer representatives	• representative of farming community in company decision making • in touch with farming community feelings and views • hold elected positions	• degree to which actions support and conform with views of individuals and farming community • level of communication and active involvement with farming community • degree driven by personal ambition and/or commitment to community and/ or money • grounding and affinity with mud on the boot farming • degree to which statements criticise or positively comment on dairy sector
Training providers/ discussion group facilitators	• run short courses, workshops for farmers • operate discussion groups funded by industry • more temporary in community • ex-farmers, less experienced consultants, part time position	• experience of individual and standing in community • degree to which a local • how well conforms with expectations of dairy farm sector in region
Industry spokes people/ commentators.	• key figures recognised by media as legitimate representatives of dairy farming views • may or may not be elected farmer representatives • perceive industry as an entity with a responsibility to act as a single entity with common purpose and goals.	• degree to which comments reflect view and sentiment of farming community • degree to which actions support and conform with views of individuals and farming community degree driven by personal ambition and/or commitment to community and/ or money • grounding and affinity with mud on the boot farming

Table AI   The social systems analysis of the on-farm labour situation. Page 3 of 4.

Roles	Norms	Values
Them in Wellington e.g. Dairy Board members, politicians, Federated Farmers, Ag ITO Executive. etc.	• in positions of decision making at industry, government or organisational level situated in Wellington. 'Head office people'. • make decisions that impact on dairy farming sector and industry • politically active	As for farmer representatives.
Farm Consultants	• paid to provide farm management advise • service business needs of client • resident in community • mediator in employment and other disputes • provider of technical advice and information • retain core of long term clients • limited discussion group involvement	• extent to which considered a local • reputation and experience in position • reputation and standing of clients that are serviced by consultant • personal attributes, humour, integrity, • how well matches relationship needs of client • number of clients and size of business • operating as independent or within industry, or larger organisational, funded structure
NZDB and Dairy Companies.	• industry and dairy sector leadership	• business performance and performance in terms of maintaining the health and well being of the industry as a whole. • degree support cooperative spirit of industry

Table AI   The social systems analysis of the on-farm labour situation. Page 4 of 4.

APPENDIX VIII

Analysis of the Political Aspects of the On-Farm Labour Situation

The guidelines provided for the consideration of the political component of a situation are to identify through what commodities power is manifest in the situation, and how these commodities are obtained, used and preserved (Checkland and Scholes 1990). Table AII indicates the commodities of power identified as being associated with a particular role, entity or relationship that is relevant to the problem situation.

Entity	Commodity and how they are used and preserved
Farmer employer	• employment position held/ employer or employee • family history in dairy sector in region • ability to employ, sack and or discontinue employment contract with employuee • reputation and standing in community • land ownership (ultimate right over staff and sharemilkers). • degree of ownership in land and farm • decision making influence (implicit and explicit wife and husband) • influence through contacts in the community, region and industry • farming experience
Dairy farm employee	• power endowed in temrs of the choice of positions on farms they can currently choose from • have the power to discontinue current employment position and move to another position • current staff shortgae means employees are in a stronfger position to bargain for wages and concditions of employment • time employed on farm family background in district, contacts • seniority and position of responsibility in multiple employee situation • level of commitment to farming industry (sharemilker compared to casual worker)

Table AII   The political systems analysis of the on-farm labour situation. Page 1 of 3.

Entity	Commodity and how they are used and preserved
The Dairy Industry	• land owning farmers only have voting rights in company and industry • position as elected representative of farming community • power of individual farmers over decision making at company and industry level declining as companies and industry expand and direct contact with decision makers and representatives in decision making positions becomes more difficult, less opportunity for influence other than through formal democratic channels • formal decision making structures in place within industry via representation on boards of directors of dairy companies and in industry • farmers with larger herds and greater supplier of milk have influence at company level • larger dairy companies have greater influence in industry
Dairy companies	• farmer representation on Boards of directors • power over farmers through Quality standards set and penalties for non compliance • farmers in some situations now able to choose which company to supply to and to therefore potentially negotiate terms
Ag ITO/ training	• representative of Dairy Board on Board of directors of Ag ITO Board. • Dairy companies have power over Ag ITO through voluntary funding scheme. • local Ag ITO committees have power over Ag ITO field officer depending on level of respect of both parties for each other. • Local Ag ITO committee have no resources and no formal power. • limited involvement of Livestock Improvement Advisory staff at committee level • influence within communities dependent on charisma and respect afforded individual field officer in district
Federated Farmers	• elected advocates for farming community at National Government level. • main lobbying group for dairy farmers and sharemilker • limited representation of farm employees other than sharemilkers • Farmer membership voluntary • Farmer members elect representatives
Community	• respect and status in community. Role based power. • charisma and personality influential and sporting ability. • success in farming business contributes to standing and influence in community • power gained through nature of involvement and interaction with community, also in some cases through right of birth
Service sector/ Agricultural consultants etc.	• farmers can choose to pay for services or not • consultants have influence over client group and through their access and knowledge of employees and the statutory requirement of employing and employment management.

Table AII   The political systems analysis of the on-farm labour situation. Page 2 of 3.

Entity	Commodity and how they are used and preserved
NZDB	• political influence at Government level based on historical performance of dairy industry relative to other agricultural industries, however in recent years role as single seller of milk products increasingly being questioned • other influence unclear • NZDB authority over Dairy companies and dairy farmers legislated by act of parliament and as role of single seller of milk supplied • farmers have influence as a group through cooperative ownership structure of industry, lobbying powers.
Livestock Improvement Advisory	• limited formal power in industry, gained predominantly through individual involvement with farming community • no formal political power within industry • influence through feedback and documentation fed back to board and NZDB • influence at community level dependent on respect and standing of individual CO's and Consultants with farming community. Locals. • no formal influence with Dairy Companies. Informal influence dependent on individuals in Livestock Improvement Advisory. • influence through discussion groups operated and facilitated by Livestock Improvement Advisory staff • limited perceived role in 'on-farm training' • involvement with Ag ITO at National level unclear, limited involvement at regional level • influence in terms of types of farmers tend to be involved with (top farmers). • dairy farmer as a group have influence over activities of LIC and Livestock Improvement Advisory through lobbying and through farmer representation on Board of Directors • farmers as a group also have influence over Livestock Improvement Advisory field staff, they can choose to support and attend activities organised by CO's, and can choose to pay for services of Farm Wise consultants. • LIC and NZDB have influence through funding and ownership
Prospective and current employees	• power through choice of employment options across industries and work places and between employers within dairy industry.

Table AII   The political system analysis of the on-farm labour situation. Page 3 of 3.

APPENDIX IX

Rich Pictures of the On-Farm Labour Problem Situation.

Figures AV to AX   Rich pictures developed from the analysis of information obtained from problem-owner interviews and secondary data sources. The rich pictures are a component of the representation of the rich description of the on-farm labour situation.
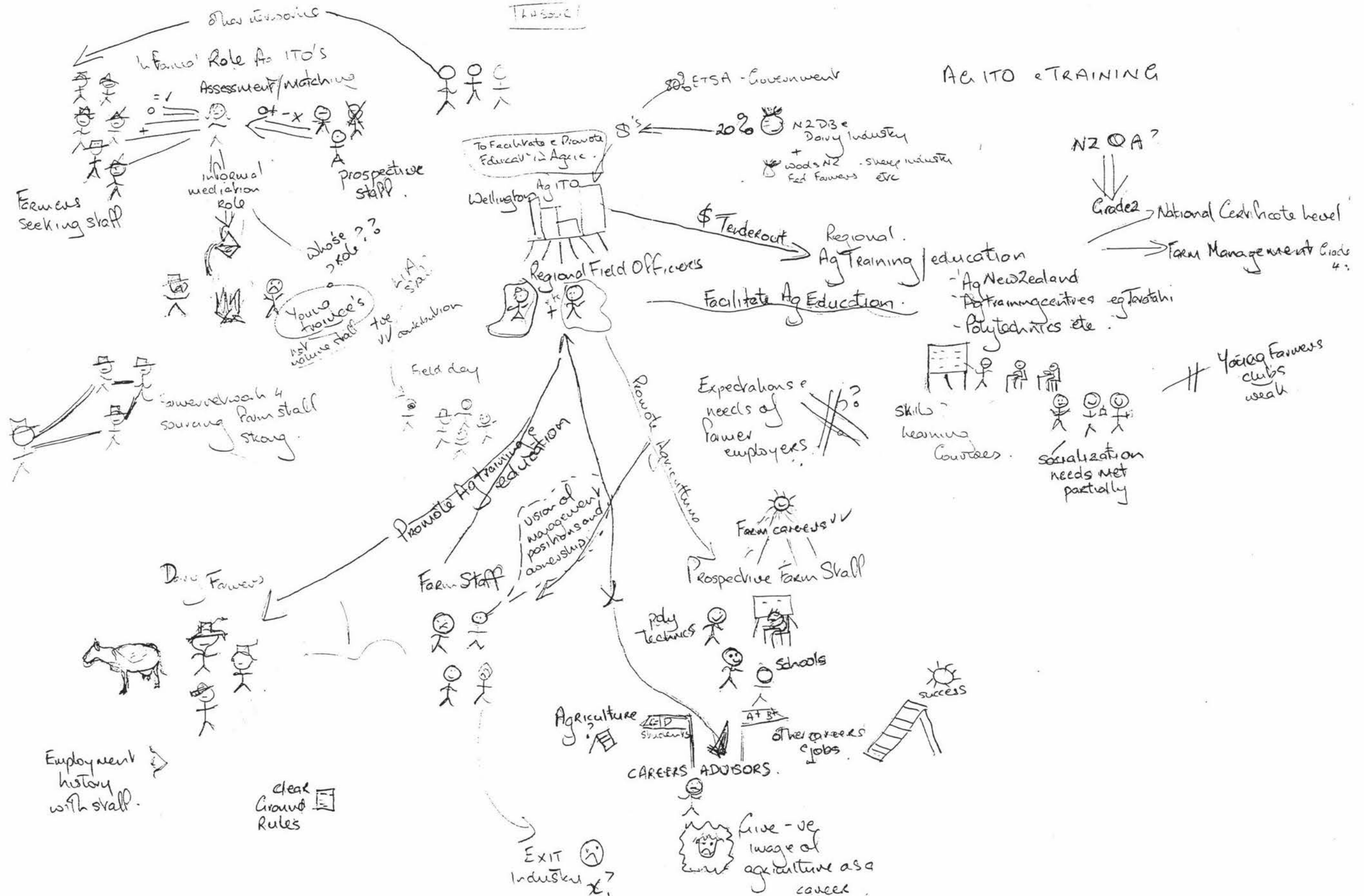
Figure AV   A rich picture developed from a single interveiw with a problem-owner.
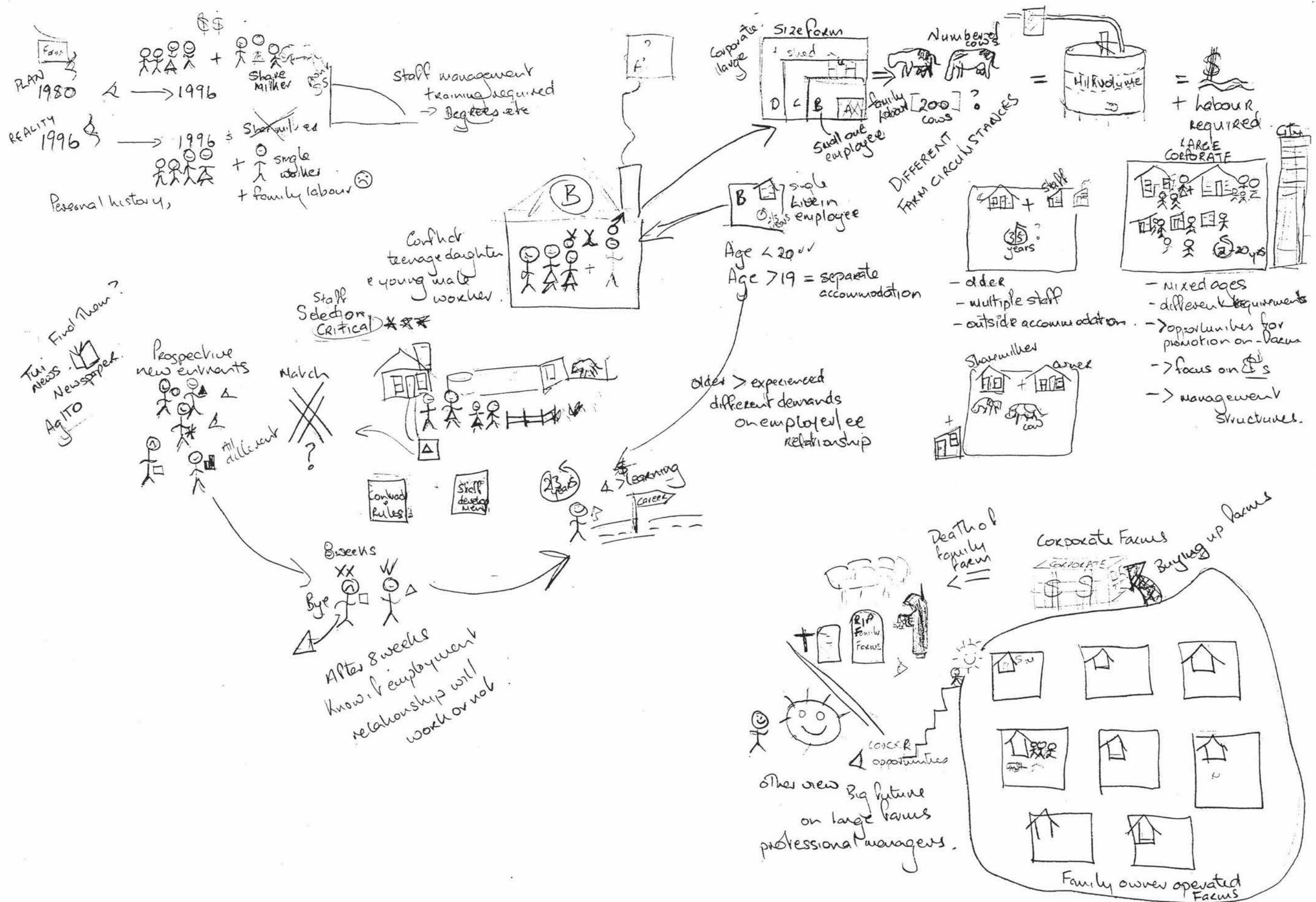
Figure AVI   A rich picture developed from a single interveiw with a problem-owner.
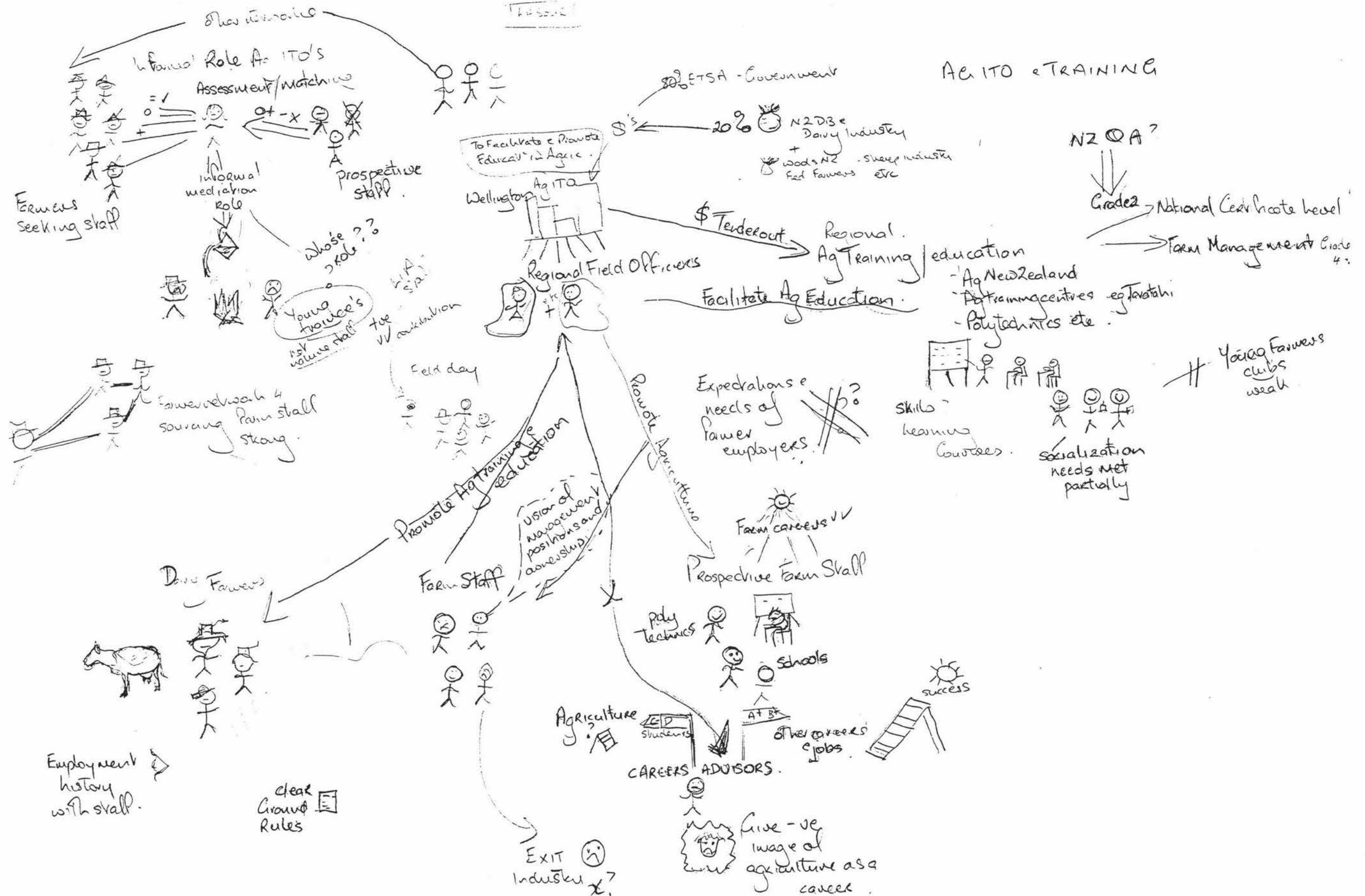
Figure AVII   A rich picture developed from a single interview with a problem-owner.
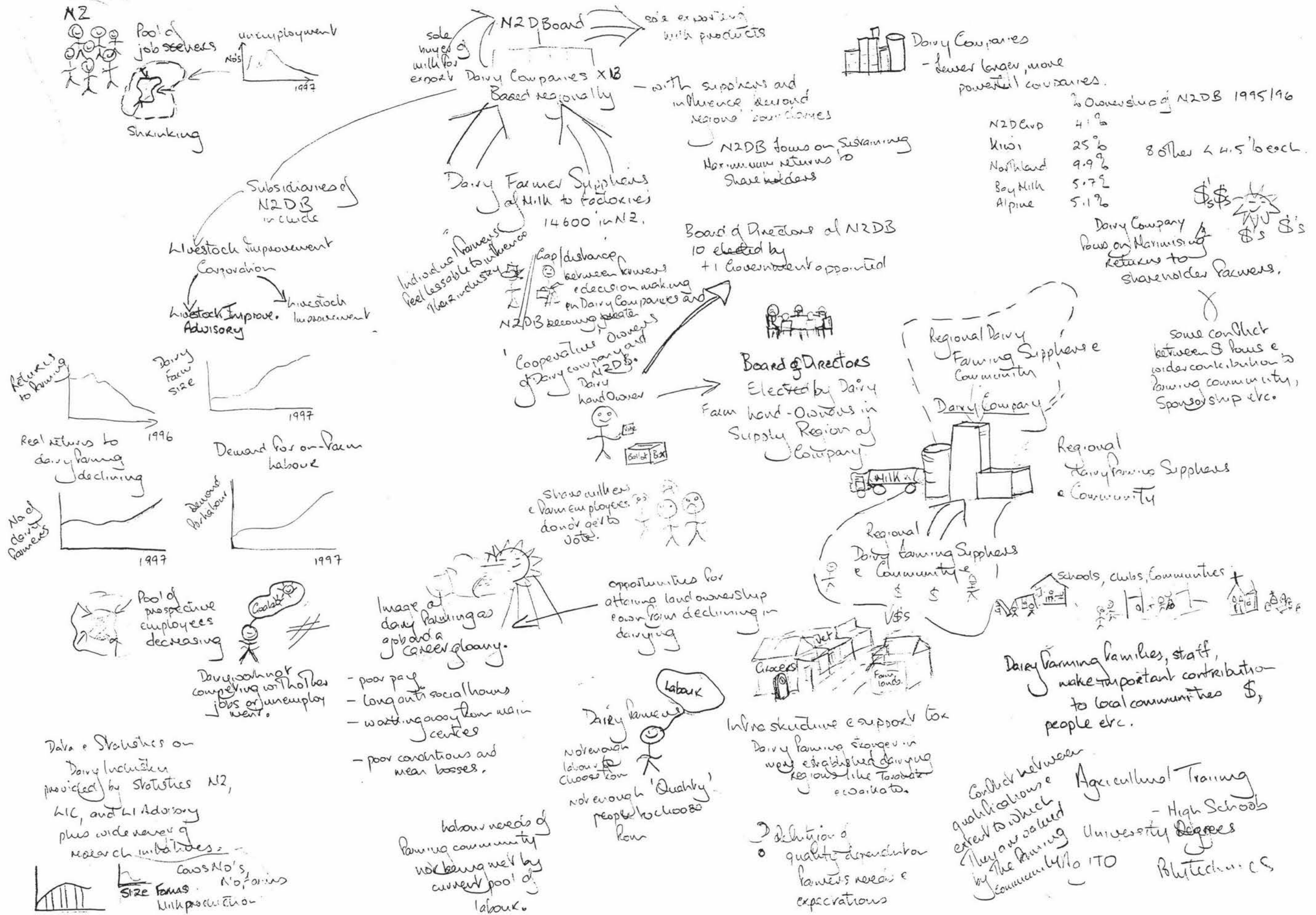
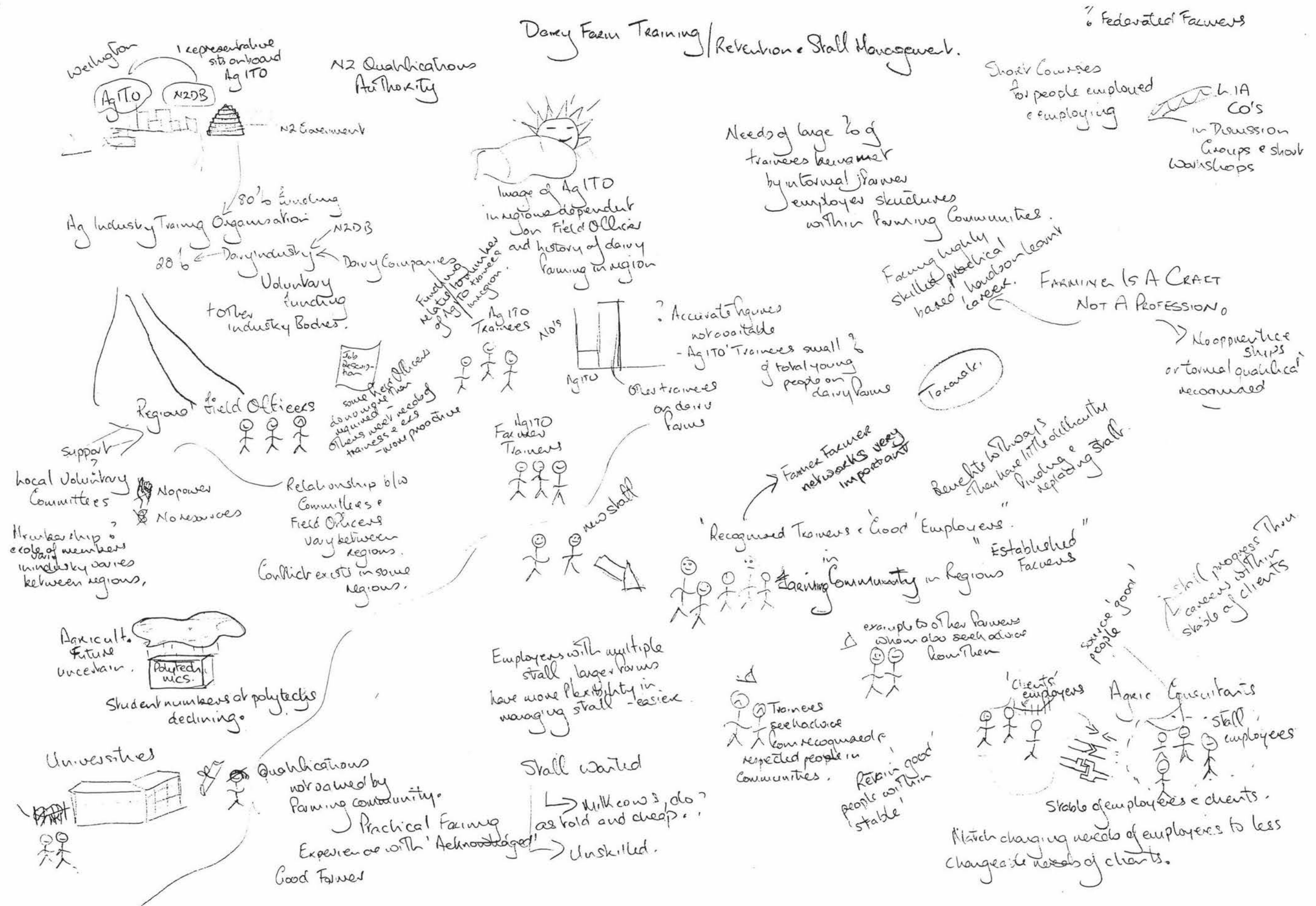Figure AVIII   A combined rich picture developed during the SSM inquiry.

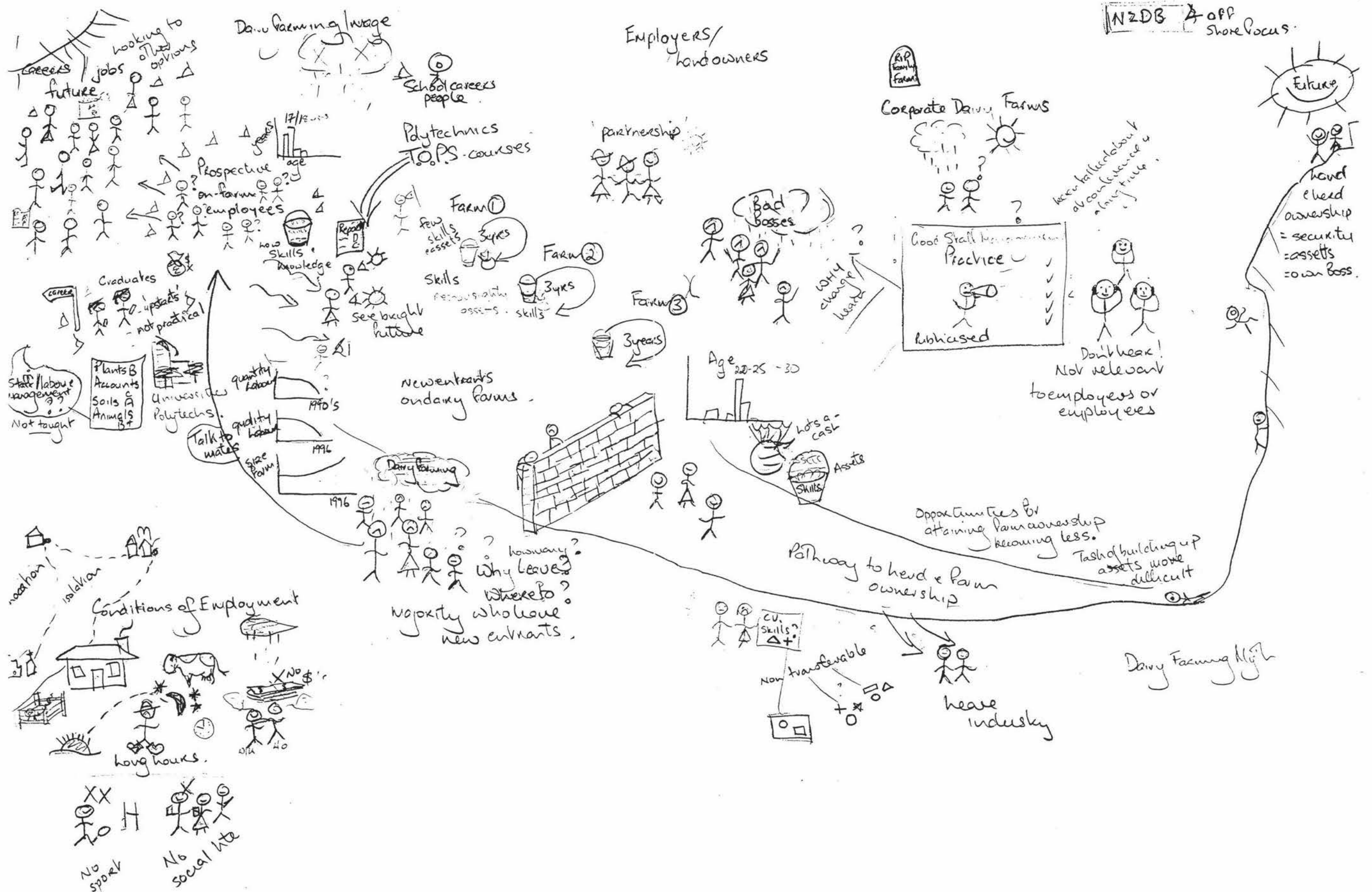Figure AIX   A combined rich picture developed during the SSM inquiry.

Figure AX   A combined rich picture developed during the SSM inquiry.

APPENDIX X

Named Relevant Systems

Relevant systems named from conscious reflection on the rich-description. Systems are grouped as primary-task and issue-based systems within general problem areas.

Problem Area	Relevant Systems
The quality and quantity of employees for dairy farm work is less than that required by dairy farm employers.	Primary Task: • System that advises and channels school leavers into further education and career areas. • Systems that assess and channel students into subject areas. • Education providing system. • Employer and employee introducing systems. • Employee attribute and job specification matching system. • Job marketing and advertising system. • Dairy production management and milk harvesting system. • Herd management system. • Sharemilking system. • Employer selection and employment of staff system. • Farm ownership system. • Condition of employment defining system. Issue Based: • Income sourcing system. • Income generation system. • Employment generating system. • Dairy farm work avoidance system. • Job seekers employment expectation building system. • Dairy farm employee seeking system. • System to poach staff off other farm employers • A system to identify and define regional factors contributing to labour issue. • A system that enables newcomers to the industry access to the farmer community and intelligence networks on employers. • A system to identify and filter out the poor employers from the employment market place. • Dairy farm work image enhancing system. • System to retain skilled and motivated people in the dairy sector. • A system to compete with other employment options. • Dairy farm income increasing system. • System to promote dairy sector careers to schools career advisors • A system to define the attributes and qualities of farm employees sought by the dairy farming sector. • A system to provide higher Agricultural qualifications that will be valued and sought after by dairy farming employees. • A system which bestows qualification criteria recognised

Problem Area	Relevant Systems
The quality and quantity of employees for dairy farm work is less than that required by dairy farm employers.	and valued by employers in sectors other than the dairy farming sector.
Poor Image of Dairy Farming as a Short and Long Term career.	Primary Task: • Dairy Industry promotion and media communication system. • Media and Public communication system. • Community word-of mouth. Issue Based: • Dairy sector image enhancing system. • Traditional dairy farmer employer myth dispelling system. • System to publicise cases of good treatment of farm employers. • System to recognise and appreciate career satisfaction in dairy sector positions not involving or leading to herd or farm ownership. • Staff management qualification acquiring system. • Corporate/large business employment condition myth dispelling system. • A system to identify and filter out the poor employers from the employment market place. • A system to canvass school leaver perceptions of dairy farm careers and jobs. • Regional provision of social and community facilities to accommodate and facilitate the social and recreational needs of farm employees.
Training of Staff in Skills Demanded by The Dairy Sector.	Primary Task: • Nationally coordinated agricultural training system. • A Government and Industry funding system for Ag training. • A system of training funded by farmers and trainees. • NZQA standardisation and provision of industry qualifications system.?? • Training providers selection and funding system. • Ag ITO system to support the management and vocational training of farm trainees and farmer trainers at a regional level. • Local Ag ITO committee support of regional field officer system. • Regional vocational training provision system. • Farming community based training and career advancement system. • Training and support system for dairy farm trainees and farmer trainers. • Livestock Improvement Advisory provision of information and facilitation and organisation of discussion and learning group system. • LIA communication link between NZDB, LIC, research and farming sector system.

Problem Area	Relevant Systems
Training of Staff in Skills Demanded by The Dairy Sector.	Issue Based: • Inexpensive labour reducing system. • Employee to milk cows and do as they are told with minimum initiative employing system. • System to support the farmer based training and trainer structures that exist in the dairy farming sector. • A system to match Ag ITO field officer attributes with needs of farm trainees and farmer trainers. • A system to create and enhance the partnership between local Ag ITO committees and Ag ITO Field officers. • A system to define current role of Ag ITO at a national and regional level. • An Ag ITO system to respond to the regional training and employment needs of the dairy sector. • A system to identity the needs of farmer trainers and employers with respect to employee management. • System to define vocational education and training needs of dairy farming sector • A system to define the trainee and trainer needs of regions. • A nationally coordinated farming sector and Ag ITO training and support system for farm trainers and trainees. • A system that acknowledges standardises the Qualification scheme for people across industries.
Staff management of dairy farm staff. Relationship management between employer and employee.	Primary Task: • Dairy farm production and profit generating system. • Lifestyle providing system. • Herd ownership system. • Farm ownership attainment system. • Farm expansion and land purchase system. • Dairy farm business re-location and establishment system. • On-farm employment managing system. • Dairy sector employee need creation system. • Employer-employee working relationship ending system. • Work and responsibility delegation system. • Herd management system. • Farm management system. • Accommodation and meal providing system. • Employee sourcing and selection/rejection system. • Servicing of employment needs of dairy farmers. • Services that match employer's labour needs with prospective employees skills and needs system. • System that defines legal and recommended staff management practices and legal and statutory obligations of employer and employee.

Problem Area	Relevant Systems
Staff management of dairy farm staff. Relationship management between employer and employee.	<u>Issue based:</u> • On-farm and regional system to match and manage the seasonal labour demand with labour supply. • Employee sacking system. • Milk harvesting and 'do as you are told' system. • Inexpensive labour input reducing system. • Community based intelligence and communication systems that recognises and communicates the attributes of dairy farmer employers and employees. • Community based system that recognises and acknowledges employer and employee attributes. • Career advancement system. • System for accumulation of assets in the dairy sector leading to herd and then farm ownership. • Security attaining and maintaining system. • System to manage business and personal goal attainment systems. • Community based system that supports people through dairy farming career and ownership system. • 2 to 3 year training on-farm placement and replacement employment system. • Farmer operated system that successfully employs and retains staff. • Efficient and profitable management of dairy farm businesses in line with personal and business objectives of farm owner. • Staff management system whereby goals and work aspirations of farm employers and employees are met. • Mentoring and advisory system for farm employees, and employers. • Employees rewarded and valued for contribution to management and operation of dairy farm business system. • Humour maintaining system. • Family harmony maintaining system. • Accommodation and meal providing system. • Team building system. • Maintained and up to date facilities and machinery system. • A car and petrol financing system. • A social life allowing and financing system. • A leaving home transition to first job support system. • Employer/employee partnership enhancing system. • Employment contract setting system. • System to recognise skill and aptitude of people working in the dairy farm sector. • Mediation and conflict resolution system for employee and employer situations. • System by which farmers adapt and modify their employment and labour operations to meet the demands and needs of the changing employment situation in NZ. • System to promote and increase awareness of legal and statutory requirement of employers and employees. • A system to define and promote accepted 'best' practices for staff management. • A system to increase the number of farm employment

Problem Area	Relevant Systems
Staff management of dairy farm staff. Relationship management between employer and employee.	systems operating "good' staff management practices. • National and regional system to match dairy farming sector demand for labour with supply. • A system to sustainably increase the profitability and productivity of dairy farming businesses. • Conflict resolution and mediation need avoidance system.
Farmer Representation in decision making and change in the dairy industry.	Primary Task: • NZDB industry intelligence and decision making system. • Farmer representation in NZDB and Dairy Company management and decision making system. • Dairy farming sector political representation, communication and advocacy system. • Farming leader recognition system. • Dairy Company shareholder return generating system. • Dairy Company milk collection, processing and selling system. • Public media and communication transfer systems. • Industry members communication and information transfer system. • Farming community communication and support networks. • System to change and modify farming systems in response to factors outside the control of the farm business. Issue Based: • System through which influence is bought on decision making at Dairy Company and Dairy Board level. • System to acknowledge and include sharemilkers and farm staff in industry decision making. • Land owner, sharemilker and farm staff representation in NZDB, LIC, and Dairy Company management and decision making system. • System to measure and monitor the contribution of sharemilkers and farm staff to farm businesses and the dairy sector as a whole. • System to acknowledge and promote the contribution and role of farm workers and sharemilkers in the dairy industry. • NZ dairy industry image enhancing and promotion system.
Definition of The Labour Problem and Ownership of the Problem.	Primary Task: • Dairy Company problem identification and addressing system. • NZDB decision making and industry related project funding system. • NZDB business objective setting and attainment system. • Livestock Improvement Advisory inter-sector communication system. • Livestock Improvement Advisory dairy farmer discussion group and information transfer system.

Problem Area	Relevant Systems
Definition of The Labour Problem and Ownership of the Problem.	Issue Based: • System to appreciate and communicate farming sector problems. • A system to clarify the on-farm labour situation. • A system to identify the decision makers most influential to the problem area. • System to define rate of, and reasons for attrition of people from the dairy farming sector. • System to identify and influence key actors in the dairy sector. • System for allocating and attracting funds to support the alleviation of a problem or change that will improve a situation in the dairy farming sector. • System that records and monitors the dynamics and performance of the human component of the dairy farming sector. • System to prioritise component area of concern within problem situation.

Table AIII.   Primary-task and issue based relevant systems grouped under nominal problem area

headings from the on-farm labour situation.