PARTICIPATORY ACTION RESEARCH TO IMPROVE THE LIVELIHOOD OF RURAL PEOPLE THROUGH LIVESTOCK PRODUCTION IN SOUTH SULAWESI, INDONESIA

by

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A thesis presented to the University of Western Sydney in partial fulfillment of the requirements for the degree of Doctor of Philosophy

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ABSTRACT

This research was conducted within the context of smallholder livestock production and government attempts to improve this through a transfer of technology approach. Participatory action research (PAR) was used to enable action for change to emerge, while the research provided understanding and a basis for this action. Tombolo village in South Sulawesi, Indonesia was the location for this research, which first identified the problems and needs of the farmers, and then participatively developed strategies to meet these needs. Fodder security throughout the year was found to be the major constraint to cattle production. Forage technology was introduced, including fodder tree legumes and grasses, resulting in improved livestock production and many associated livelihood benefits. The introduction of these new technologies was adapted by stakeholders to local issues and needs.

The extension services had previously aimed to improve livestock production through breeding and veterinary health measures, and had assumed that sufficient fodder was available for livestock. The formation of a learning group of farmers, who used group discussion to set their own agenda, was employed to identify this shortcoming, and how to sustainably overcome it. Through this process, participants were able to apply their experience and enhance their cognitive skills to find new meanings and knowledge to plan and take actions to improve their practice and situation.

This thesis documents the process of change required to move from a “Transfer of Technology” approach to a “learning approach”. The research has shown that there is considerable potential for the application of PAR to rural community development in Indonesia. More specifically in Tombolo village PAR enabled farmers and extension staff to be empowered by becoming active participants in the research process and take action to improve their own practice. It helped them to analyse the situation to make the technology more appropriate, while also learning how to change the extension methods used to wards one in which all stakeholders became partners in developing their situation.
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<td>AARD</td>
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<td>FSR&amp;D</td>
<td>Farming Systems Research and Development</td>
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<td>T&amp;V</td>
<td>Training and Visit</td>
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<td>PRA</td>
<td>Participatory Rural Appraisal</td>
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<td>PAR</td>
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<td>TOT</td>
<td>Transfer of Technology</td>
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<td>AR</td>
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<td>AI</td>
<td>Artificial Insemination</td>
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<td>IPM</td>
<td>Integrated Pest Management</td>
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<td>FSR</td>
<td>Farming Systems Research</td>
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<td>RRFH</td>
<td>Regular Research Field Hearing</td>
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<td>REL</td>
<td>Research and Extension Linkage</td>
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<td>CAE</td>
<td>Centre of Agricultural Extension</td>
</tr>
<tr>
<td>R&amp;D</td>
<td>Research and Development</td>
</tr>
<tr>
<td>FF</td>
<td>Farmer First</td>
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<td>FBF</td>
<td>Farmer Back to farmer</td>
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<tr>
<td>BFF</td>
<td>Beyond Farmer First</td>
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<tr>
<td>AEA</td>
<td>Agro Ecosystem Analysis</td>
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<td>VEW</td>
<td>Village Extension Workers</td>
</tr>
<tr>
<td>A&amp;E</td>
<td>Agricultural and Extension</td>
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<tr>
<td>SSM</td>
<td>Soft Systems Methodology</td>
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<td>NGO</td>
<td>Non Government Organisation</td>
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CHAPTER I

INTRODUCTION

This study can be conceptualised as a “learning experience” about the application of a learning approach for improving livestock production in Bantaeng district in South Sulawesi, Indonesia. The thesis describes the application of Participatory Action Research (PAR) as a methodological framework to explore farming practices and livestock development work in the study area. The thesis explores the philosophical and theoretical framework of this approach in the context of smallholder livestock farmers and rural development. The case study in particular concerns the smallholder livestock farming system in Tombolo village, in which farmers, together with a small research team and supported by staff of the livestock services and other extension agents, collaborated and engaged in learning how to take action to improve their practice related to livestock production.

The current practices of government-led livestock development work in Indonesia follow a “top down” approach model, in which to solve farmers’ production problems, the researcher develops technology and then uses extension agents to transmit such technology to farmers. In this context “objective scientific facts” are believed by development workers to be the “true knowledge,” and knowledge associated with “economic indicators” is expected to solve farmers production problems (Rogers 1983). In Indonesia, technology development is the responsibility of the Agency of Agriculture Research and Development (AARD), under the administrative authority of the Minister of Agriculture, who has the political mandate to develop the necessary technology. The specialist departments of Food-crops, Animal husbandry and Fisheries are mandated to transfer this technology to farmers in collaboration with the agricultural extension agency (more details of this hierarchical framework will be described in the next chapter). The current practice of Agency of Agricultural Research and Development (AARD) is to carry out research based on the Farming Systems Research and Development (FSR&D) model, while the current practices of the extension agents are based on the Training and Visit (T&V) approach for extension. Although this system has been successful to some degree in improving livestock production, there remains a poor adoption of technology by farmers, which has become the major concern of the livestock development services and the extension agency in the study area.
Chambers (1992b) has recognised that the poor adoption of technology by smallholder farmers can be caused by the ignorance of farmers about the process of technology development itself. This argument is supported by Jiggins (1993), who asserts that the worldview based on the metaphor of “linear progress” is no longer an appropriate guide to wise action to solve farmers’ production problems. Pretty (1995b) has also argued that problems are subject to various interpretations by different people. This means that when trying to solve farmers’ production problems, the researchers’ views of developed technology alone cannot be the only ones used to solve farmers’ production problems. In this sense, the farmers’ perspectives need to be included in the process of the development of the technology itself.

Technology transfer is currently based on a positivist paradigm that ignores the social realities that includes human activity systems as being a part of the farming systems in which such technology is being used (Pretty 1995a). Taking all social realities and human activity systems into consideration leads to the emergence of a “people and process” oriented approach, based on the constructivist and critical paradigms (Bawden 1989; Bawden 1991a; Maturana 1988). These approaches recognise all realities as social constructions which can be improved through reflection and interpretation by participants (Kolb 1984; Jackson 1993).

Including farmers in the learning process, particularly in the process of technology development, has potential to improve the practices of concern as well as the situation where the practice is carried out (Bawden 1991a). Furthermore, encouraging participants to reflect critically on their experiences based on their own constructs helps them to understand their situation better and can also reveal different perspectives with which to see the world, and thereby generate new knowledge to inform action (Freire 1972; Flood 1991). The process of “naming the reality” is a learning process that leads to the empowerment of participants, as well as increasing their self esteem and helping them to become responsible for their own development (Kemmis & McTaggart 1988; Chambers 1997b; Pretty 1998; Kemmis & McTaggart 2000). In addition, Korten (1980) points out that the successful development process needs to move from a “blueprint design” to a “learning design”, with participants building new knowledge from the learning experiences, resulting in the building of institutional capacity through such action.

All this implies that there is a need for livestock development agencies to strengthen their working relationships with farmers through mutual learning in order to develop a
common understanding about problems and what ought to be done to improve a situation (Bawden et al 1990).

This study uses a post-positivist, constructivist paradigm to explore the limitations of the “transfer of technology” model, and employs a learning approach to help participants to generate relevant knowledge to inform action and improve their situation. Furthermore, the critical reflection associated with this approach also helps participants to learn from the learning process itself, giving them more understanding of their own situation and their relationship to the wider environment (Bawden 1997).

1.1. The motivation behind this thesis

My first journey to learn

My motivation for this thesis began after I graduated from the University of Hasanuddin, South Sulawesi, Indonesia in April 1988. In the same year in October, I was accepted to work at the Regional Office of the Department of Agricultural in South Sulawesi, Indonesia, as a senior extension officer at the provincial level; my official activities were to implement government policies and programs, either administrative or field work, as well as to train my colleagues and farmers. At the same time, I was involved in several research projects that were being conducted by local government, that applied a descriptive approach (formal questionnaire technique). On one occasion, I went to villages to collect data using a formal questionnaire and to interview the farmers. After the interview, one of the villagers asked me “why so many people come and go to the village to interviews us, ask us so many questions, and some of the questions I found were the same, but nothing ever happens with us? I don’t feel any change in my life from the results from those interviews”. At that time, I thought such a question was just a common question asked by ordinary people, but after I completed the interview and I went back to my office to analyse the information I had collected, I thought that those people in the village were right; myself as interviewer had benefited from all those questions that I asked them, but how about them? They got “nothing”! I myself did not realise that the research that I had done was not changing the villagers’ lives. For this reason I asked myself whether there was a type of research that could result in any “changes” to the lives of the people who were involved in it. At that time, I did not have any knowledge about an action research approach. This experience made me dream about conducting research that would benefit the people who were involved in it. This became my “first dream” in relation to learning.
My second journey to learn

My second journey began in 1992 when I had the opportunity to study abroad, to undertake my Master of Applied Science degree in Systems Agriculture at the University of Western Sydney, (previously called UWS-Hawkesbury). I was pleased with Hawkesbury’s approach as it was what I was looking for, and I said to myself “my first dream has become true”. During my year at Hawkesbury, I learnt many things, but of particular importance was understanding the concept of the “learning approach”, the concept of systems, of development, of communication competence, as well as the opportunity to review and update specific knowledge by undertaking elective courses that related to my interest and knowledge, such as farming systems research and animal production.

I completed my studies at Hawkesbury at the end of 1992, and went back home with my “second dream to continue learning” to apply what I had gained from my learning experiences at Hawkesbury to my work situation. Back home, I was posted at the farming system division in the same office, and I became involved in several projects of agricultural and livestock development, such as a Poverty Alleviation Project, an Agribusiness Development Project, and an Integrated Small Farmers Development Project. At the same time I still continued to train my colleagues and farmers. For six years, I was involved in such projects aimed at improving livestock production and the livelihood of farmers in the target area. Through these experiences I proved the concepts that I had gained from my learning experience at Hawkesbury, that agriculture was not just about the production of food and the management of the resources base to ensure this output, but that agriculture was also about people (King, 2000). Agriculture is a complicated activity system and always changes. Many projects conducted by agricultural departments in South Sulawesi Indonesia were unsuccessful in improving agricultural and livestock production, and in enhancing the livelihood of farmers, because the development workers who were appointed to plan and transmit knowledge to farmers had not taken into account the people in the development process. From this experience I developed another “dream in relation to learning”: to undertake my own project in order to improve this situation as well as to improve livestock production and the work of the livestock development department in South Sulawesi.
My third journey to learn

I returned to Australia in 1999, giving me the opportunity to eventuate my “third dream in relation to learning”. I was accepted to undertake a doctoral study in Systems Agriculture at the University of Western Sydney. Although I had knowledge about the systems approach to agriculture, I still needed to improve my knowledge about implementing it. Professor Roger Packham introduced me to the works of Paulo Freire, Peter Senge and Richard Bawden, Kurt Lewin, David, A Kolb, Donald, A Schon and R.W. Revans about “praxis” and “learning”, the work of Gerald Midgley on systemic intervention, the work of S. Brookfield critical thinking, as well as the work of J. Theis and Grady about doing fieldwork with “Participatory Rural Appraisal” (PRA). Professor, N. Sriskandarajah, expanded my ideas on research as intervention and the concept of participation; he then introduced me to the work of Bob Dick, William, F. Whyte, Julies, N. Pretty, Robert Chambers, and David Korten. Furthermore, I then came across the work of John. Thomson and Ian Scoones, S.Kemmis and R. McTaggart, Zuber- Skerritt, Jenice Jiggins, N Rolling, Fals Borda, A, Rahman, M. Salner, Biggs, and J, Farrington, David Russel and Ray Ison and others (see Chapter 3). These concepts from this literature influenced my thinking to see new ways of viewing the agricultural domain, and I then applied these concepts to my own project in order to actualise my dream. I believe that to improve a problematic situation in relation to agricultural production including livestock production needs a methodology that involves working with people. The methodology also requires the abilities of analysis in communication, critical thinking, conceptualisation, and, much more importantly, the participation of the people so as to bring about changes in the situation being studied. A key principle here is that people have a right to shape their own development, and that there are many benefits to having them involved in the research process.

As a development practitioner, I questioned myself as to why certain technology innovations aimed at improving farmers’ production were adopted by farmers, while others were not. Also, why did the methodology of research and extension in livestock development not fulfill the need of the farmers? Thus, from this standpoint, my mission to undertake this study was to do something that would bring about changes for improvement in the situation.
1.2. Structure of the thesis

The fieldwork for this study was carried out over 18 months in the Bantaeng District of South Sulawesi, Indonesia in association with farmers and livestock development workers. The field research work was divided into three interrelated stages:

1. *Understanding and exploration stage*, carried out from June to September 1999, which included problem identification, data collection, analysis and identification of possible solution. This stage ended with the holding of a workshop on how to improve the situation.

2. *Developing and implementation stage*, carried out from December 1999 to July 2000. The purpose of this stage was to follow up the results of stage I, and to set up action plans with participants and to take action. This period included developing a model of planting forage, plot demonstration, monitoring the forage plot demonstration and field visit to demonstration plots.

3. *Evaluation stage*, carried out from December 2000 to May 2001. The focus was reflecting on participants’ learning experience and project outcomes.

The thesis describes these activities, and also provides a literature review on the theoretical and philosophical tradition of the methodology that informed the research.

The thesis is divided into 10 chapters.

**Chapter One**, provides a general overview of the study, briefly describes why this study is relevant and describes the process used to undertake the study. I, also briefly describes the motivation behind this study.

**Chapter Two** describes the general background of this study including the shift in development thinking on research and extension in agriculture. This Chapter also describes the objective and the aims of the study.

**Chapter Three** describes in detail the emergence of PAR, which was the overall methodology chosen for this study, but also examines other associated theoretical frameworks that informed this study. I also provide the argument for and against positivism and constructivism to show their relevance to PAR and discuss the validity and reliability of action research. The methods, and technique from PRA used in this study however, are introduced in detail throughout subsequent chapters.

**Chapter Four and Chapter Five** describe the process and outcomes of the first phase of exploratory fieldwork in Bantaeng District, South Sulawesi, Indonesia. These chapters document the process of problem identification, problem definition and possibilities for intervention.
Chapter Four describes the process of setting up and commencing the PAR including forming the action research team, the learning group of farmers, and establishing the relationships between the AR team, farmers and development workers. This chapter also discusses in detail the process of gathering the information using PRA methods.

Chapter Five describes the outcomes of the initial exploration of the study area, the problems and needs of farmers, farmers’ production practices, the socio-economy context of the farmers, and the ecology of the area.

Chapter Six describes the collaboration between farmers, the research team and development workers to develop appropriate forage technology, as an intervention to solve farmers’ production problems. This included developing a model of planting forage, plot demonstrations, field visits and training on forage management. The process of developing forage technology was carried out using the concepts of the “learning approach” which I introduced in a workshop. Participants were also encouraged to critique the conventional technology transfer approach that had been used in the study area and to suggest new strategies for improving farming and livestock development work in the study area.

Chapter Seven demonstrate the evaluation processes that were carried out during this project and reflect on and discusses the overall project and its achievement. I give details of the process and outcomes of that participatory evaluation exercise. I discuss the “learning experiences” of participants and how the results of their experiences could be used in further activities.

Chapter Eight is a general discussion of the process and results of the whole study, with a specific focus on the application of PAR as an alternative approach to the transfer of technology model, together with the general “learning approach” to development. I also discuss the possible challenges to this approach.

Chapter Nine describes the implications of the learning approach for livestock development in Indonesia. This includes guidelines for application of the learning approach for livestock development workers who want to use this approach. I also discuss the authenticity of this learning approach and the possibility for sustainable livestock development.

Chapter Ten offers some conclusion to this study. This includes the possibilities and challenges of implementing a “learning approach” to livestock development work in Indonesia.
CHAPTER 2

BACKGROUND TO THE STUDY:
Agricultural Research and Extension in Indonesia

2.1. Introduction

Livestock are an integral part of agricultural development in Indonesia. They form the largest non-rice farming activity and they also play an important role in the rural economy. Livestock are a source of human food, enhance crop production and provide additional economic goods and services as well as cash income. Livestock in rural areas are used for the survival and well being of the people, alongside all the other activities which make up the livelihood systems of the people who keep these animals (Bayer & Bayer 1992; Devendra 1997; Dixson et al 2001).

In the final year of the five-year development plan of Indonesia (REPELITA V 1989-1994) the livestock sub sector contributed about 2.22% of National Gross Domestic Product (GDP) and livestock production was increasing at a rate of 3.64% per year. Although the livestock production was increasing, it still could not fulfil the market need, because the consumption of livestock products was increasing, such that meat consumption increased 5.6%, eggs 10.4 % and milk 12.2% (Dirjen Peternakan 1992).

Most of such livestock production was contributed by smallholder\(^1\) farmers, who were the majority of livestock keepers in Indonesia. In South Sulawesi for example, smallholder livestock farmers owned about 80 percent of the total livestock population. Therefore, smallholders could make a large contribution to meet national food needs.

From these observations, therefore, in planning any livestock development program, particular attention should be given to smallholder farmers, because these can be seen as the sources of livestock production into the future.

Although smallholder farmers are the major source of livestock production, their systems are not high input. Smallholder farmers seek diversity rather than specialisation. They care for numerous different crops and animals to provide their

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\(^1\) Smallholder refers to a farmer who owns less than 1 Hectare of land, who practises integrated mixed farming, combining crops and livestock, and possibly fish, and who depends on their family for labour purposes.
various household needs and to insure against production risk. Bayer and Bayer (1992) classified the livestock keepers globally according to mobility and sources of livelihoods (see Table 2.1)

**Table 2.1** Classification of livestock keepers (adapted from Bayer & Bayer 1992, p.32)

<table>
<thead>
<tr>
<th>No</th>
<th>Mobility</th>
<th>No home base; year-round movement of animals</th>
<th>Home base; seasonal movement of animals</th>
<th>Home base; local movement or confinement of animals</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Full time livestock husbandry</td>
<td>Nomadic pastoralists</td>
<td>Transhuman pastoralist</td>
<td>Sedentary pastoralists</td>
</tr>
<tr>
<td>2</td>
<td>Livestock husbandry with subsidiary cropping</td>
<td></td>
<td>Transhuman agro pastoralist</td>
<td>Sedentary agro pastoralists</td>
</tr>
<tr>
<td>3</td>
<td>Cropping with subsidiary livestock husbandry</td>
<td></td>
<td></td>
<td>Livestock keeping</td>
</tr>
<tr>
<td>4</td>
<td>Livestock husbandry subsidiary to non cropping activities</td>
<td></td>
<td></td>
<td>Farmers</td>
</tr>
</tbody>
</table>

The Directorate General of Livestock Services of the Ministry of Agriculture of Indonesia has described the division of livestock keepers in terms of farm purposes, as follows:

1. Mixed farming, mostly based on crops with livestock as a supplement (subsistence) activity. Farmers’ income from livestock/animal husbandry is less than 30% (subsistence)

2. Real mixed farming with livestock and crops more or less equal. Farmers’ income from livestock is about 30%-70% (mixed farming)

3. Livestock based farming systems with crops as additional activity. Farming of livestock is more or less commercial, with income from livestock 70% - 100% (commercial farming/livestock based)

4. Livestock as special industrialised effort with proper business systems implemented. Farmers’ income from livestock is 100% (industry)” (Nari 1992, p: 28)

From these classifications, smallholders are generally placed in the “subsistence and mixed farming systems”, classification (1) above.

These classifications of animal keeping should be the basis for the implementation of livestock development policies and projects. In the past, many policies were made and projects initiated which were based on false assumptions about livestock keepers’ aims and how decisions were made within the production unit, the livestock-keeping
household (Bayer & Bayer 1992; Irvin 1992). Furthermore, policies and projects did not take into account the technical competence differences among farmers (Udo & Cornelissen 1998).

Research and development have contributed hardly anything towards smallholder farming systems. Therefore, in a bid to enhance the livelihood of smallholders, governments in many developing countries like Indonesia have become the key player in increasing the yield of crops and in increasing livestock production through improvement of the technologies that farmers have adopted. These technologies include: (1) “high yielding varieties of crops and breeds of farm animals, (2) application of external inputs (fertilisers and other agro-chemicals), and (3) marketing and credit policies to integrate farmers into the market economy” (Pretty 1995, p.3). Furthermore, these technologies are usually designed as “technology packages” that are delivered to farmers through agricultural extension. Extension agents collaborate with local agricultural services to synchronise these technologies with the existing agricultural programs and then transfer them to farmers by advising and assisting farmers to improve their methods of production and marketing. In this context, farmers must adopt the “total package” to enjoy its benefits.

The applications of such technology packages have been successful in increasing the yield in cereals such as wheat, rice and maize. For example, Indonesian farmers have achieved remarkable self-sufficiency in rice production through BIMAS (Bimbingan Massal), meaning a mass guidance program. BIMAS programs consisted of (1) introduction of high yielding varieties, (2) use of chemical fertilizers, (3) pest and disease control and use of pesticides, (4) better cultivation methods and (5) improved water control. Similarly, livestock development has been sometimes successful in increasing meat or milk output (Bayer & Bayer 1992; Hasibuan 1992; Udo & Cornelissen 1998). However, these technologies required heavy external input. For example, the high yield of wheat and rice has been achieved on irrigated fields where heavy quantities of fertilisers were applied.

To improve quality of animal breeding, and to increase the cattle population, artificial insemination (AI) services have been established in developing countries such as Indonesia, but the results were poor due to the requirement of expensive equipment and inputs such as liquid nitrogen. This sort of high-tech bias, heavily promoted by the government technocrats and donor community, often proved unreliable and unsustainable. The conception rate of AI in Indonesia is below 50% (de Hann 1992).
This has been achieved by resource rich farmers who could afford to purchase additional inputs, and who can better simulate research station conditions (Mayfield 1985; Busch 1996). Furthermore, farmers have found some technologies unfruitful, too risky, too labour-intensive or impossible to implement (Henk & Cornelissen 1998).

The traditional strategy for implementation of these technologies to farmers in agricultural extension in Indonesia has been the transfer of technology model (TOT), also called the adoption diffusion model. TOT has become the common term for the overall rural development paradigm and thus the dominating role of the expert as the tool of the adoption diffusion mode has come to be based on more than just a practical goal of scientists and governments. This TOT model has been applied not only to physical technology, but also to procedures and their sequencing (Chambers 1997). This can be called a model ‘T’ approach to agriculture that requires standard package for its implementation (Chamber 1992). However, agricultural development practitioners have now begun to notice that the technologies developed from scientific study alone might not be accepted and applied by most farmers. The TOT approach, or standard package model, has proved to be successful only under certain conditions. The TOT framework can be seen to lack local relevance – the complex and dynamic context in which smallholder farmers live and work, needs to be considered. These contexts need to be continuously defined and updated with changing times and environment (Chambers 1991; 1997; Pretty & Chambers 1994; Pretty 1994)

Pretty (1994; 1995a; 1995b) has noted that the generation of technology to transfer to farmers is grounded in the enlightenment tradition of positivism or rationalism. In this philosophical context, science seeks to discover, predict and control natural phenomena. The researchers identify the problems and then they design the technologies that they believe farmers ‘should’ adopt to solve the identified problems. Furthermore, once the technology is delivered to the farmers, the development task is considered to have been finished. The researchers do not specifically investigate further to re-assess their technologies in the contexts of the farmers; rather they adopt the “design and defend” attitude to their innovation (Amezah 1998). Such kinds of technologies became equated with good technology, because they were validated on a research station with hard scientific facts, and such science is equated with “true” knowledge (Pretty 1994). Modifications and rejections of these recommendations by farmers are not taken to be in any way related to the contextual inappropriateness of these technologies (Chambers 1991).
2.2. The paradigm of agriculture research and development in Indonesia

A paradigm represents a particular conceptual framework through which a community of researchers operates, and generates a particular interpretation of, reality (Kuhn 1970; Guba & Lincoln 1986). It includes models of research, standard rules of inquiry and a set of techniques and methods, all of which ensure that any theoretical knowledge that is produced will be consistent with the view of reality that the paradigm supports. The “paradigm shift” is a scientific revolution brought about by the “conversion” of the research community. It entails changes in conducting research such that the nature and scope of the whole enterprise are perceived in an entirely different manner. Therefore, the change of paradigm from one to another is a matter of ‘conversion’, and it reflects a commitment to new values, and beliefs in particular ways of interpreting reality.

There has been a scientific revolution in agriculture research and development in Indonesia over the last 25 years, from its commodity-based approach of the 1970s to the present application of a farming systems approach that is concerned with benefits to smallholder farmers. Goto and Mayrowani (2001) review the farming systems research literature and analyse the changes according to research objectives and focuses. Beginning in the early seventies the research objectives were focused on maximising yield (through component technology integration). Then they moved to focus on maximising farm income, crop-livestock systems; rice-fish systems and the enhancement of farm family welfare in 1980; and most recently, to sustaining a natural resources base through low input use, such as integrated pest management (IPM) (Rolling & Van de Fliert 1998), introducing forage to the farming systems (Devendra 1997; Horne et al 2000; Stür et al 2000). In addition, these authors introduce the concepts of greater involvement of farmers and extension workers in undertaking research: the linking of on-station research, on-farm research and farmer participatory experiments. Table 2.2 illustrates this overview of agricultural research in Indonesia.
Table 2.2. Overview of trends in agricultural research in Indonesia (adapted from Goto and Mayrowani 2001). See section 2.3.1-2.3.4 for information on each example.

<table>
<thead>
<tr>
<th>Year</th>
<th>Research focus and objectives</th>
<th>Types of on-farm research and farmer participation</th>
<th>Agricultural Policy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1960s</td>
<td>Germplasm enhancement improvement; Yield maximisation through component technology experiment</td>
<td>Researcher managed; experiment conducted in research station. None or limited farmer participation</td>
<td>Maximise rice yield</td>
</tr>
<tr>
<td>1970s</td>
<td>Cropping system research; Maximise crop income through multiple cropping experiment</td>
<td>Research-managed and researcher implemented on farm experiments; Research designed and farmer implemented on farm experiment. Farmers are observers or labourers</td>
<td>Rice intensification (BIMAS, INMAS, etc) Green revolution; meat and dairying production</td>
</tr>
<tr>
<td>1980s</td>
<td>On farm research- integrated farming systems. Crop-livestock agro-forestry; rice-fish. Maximise Farm Income</td>
<td>Researcher-designed and farmer implemented; Farmers are collaborator in the experiment.</td>
<td>1984 Rice self sufficient Agricultural diversification</td>
</tr>
<tr>
<td>1990s</td>
<td>Sustainability and equity. Sustain natural resources through land conservation and low input used</td>
<td>Farmer participatory experiment. For example, IPM in irrigated lowland</td>
<td>Agribusiness development</td>
</tr>
</tbody>
</table>

Moreover, since the mid 1990s, agricultural research and development in Indonesia moved forward to be more focused on natural resources and to be community based. This was due to the criticism of the technology transfer model and the lack of feedback from extension workers and farmers to the research station. I argue in this thesis that technologies have to be modified to the local circumstances, including socio-economic conditions, and for potential beneficiaries to be used alongside development workers in this context, to enable holistic understanding as to why such technologies may be adopted by the farmers and their families. An understanding of the farmers’ situations and the participation of farmers in decision making are significant points towards development of appropriate ideas for changes and hence achieving a greater adoption of technologies.

2.3. Research focus and objective for agricultural extension in Indonesia

All agricultural research in Indonesia is under the administrative direction of the agency for agricultural research and development (AARD). This agency administers the activities of seven autonomous research institutes, which are differentiated according to commodities, food crops, animal husbandry, fisheries, industrial crops and forestry. Although within AARD there were several research institutes of related to these
commodities, the focus of research during the period 1960s to 1980s was mostly on crop production, and little attention was given to other non-crop commodities such as livestock.

2.3.1. Technology research: Maximising rice and non-rice yield (1960s)

In the 1960s, the focus of agricultural research in Indonesia was on maximising production, particularly rice yield, in order to meet the heavy demand for staple foods. At the same time, the green revolution with the development of “miracle” seeds had occupied scientists in Indonesia focusing their research on increasing the rice yield per unit of land, through component technology research. Farmers increased yield two or three times higher than traditional varieties. However, the success of this achievement was heavily criticised at the farm level in that it failed to impart adequate attention to equity, because it concentrated on irrigated rice land. In addition, the diversity of farmers’ conditions, particularly the highly complex and risk prone production conditions where smallholder farmers were located, were ignored by the green revolution (Chambers & Ghidyal 1989; Chambers 1992).

Similar to food crops, the focus of research in animal husbandry carried out during this period was mostly on genetic improvement. These technologies were adopted directly from developed countries to developing countries but were found to be benefit mainly to large-scale livestock enterprises.

2.3.2. Maximising crop yields, livestock production and income (1970s)

During this era the focus of research was similar to that in the Green Revolution era, but the research shifted from laboratory research (on-station research) to the farmers’ field, which had the same environments as the experimental station. In food crops for example, the researchers conducted multiple cropping systems in farmers’ fields both in wet and dry land areas, that are environments similar to the research station. This substantial shift aimed to help farmers to increase their income through maximisation of land use through the year. The introduction of high yielding, short maturing rice varieties and the use of better cultural management practices enabled farmers to grow additional crops before and after rice. Cropping systems research was designed to evaluate new varieties (rice and non-rice) and to improve cropping patterns and management practices. The methodology focused more on component technology such as fertiliser rates and cultivation techniques, which were designed, managed and
implemented by researchers or farmers. In fact, this period was heavily dominated by agronomic interests.

Livestock research was left a step behind the food-crops, with the researchers dominantly focused on food crops (Devendra 1997). However, baseline data on livestock production at a village level was collected to identify the major problems of farmers and to test simple solutions to identified problems (Petheram et al 1982; Petheram 1995).

2.3.3. Farming system research: Maximising farm income (early 1980s)

After several years testing the performance of improved cropping systems, scientists realised that small farming households did not deal with rice alone but rather with combinations or mixtures of enterprise such as livestock, fish and agro-forestry. The inclusion of livestock as a component of research began in this period. In Indonesia, farming systems typically consist of smallholdings with interacting crop and livestock subsystems. Farming systems are complex, therefore they need the adoption of a systems perspective in which interaction between activities can be accounted for. For this reason, in the early 1980s the AARD recommended the use of Farming System Research as an approach to doing on-farm research to benefit smallholder farmers.

In the 1980s, AARD realised that scientists from different disciplines must work as a team to understand a farm as an integrated system, rather than study separate components within that system. Thus in 1982, AARD established the research group KEPAS (Kelompok Peneliti Agro Ekosistem) that consisted of researchers from AARD and major universities. This was the first systematic interdisciplinary research effort on farmers fields in Indonesia history (McIntosh & Effendi 1986). Under this research group, there was further support for the participation of farmers in technology development, so that the results would be consistent across the physical, biological and socio-economic aspects of a farming system. This meant that farmers helped to identify the research problems as well as taking part in testing possible solutions. As Shaner et al (1982) state, farming systems research and development (FSR&D) is an approach to agricultural research and development that views the whole farm as a system and focuses on (1) the interdependencies between components under the control of members of the farm household and (2) how these components interact with the physical, biophysical and socio-economic factors not under the household control. The main aim of FSR was to increase productivity in the context of the farm in a holistic manner,
including the societal goals which those households currently practiced. Increased productivity would be served by developing relevant improved technologies together with complementary policies that increased the welfare of farming households in ways that were useful and acceptable to them and society as a whole (Norman 1980).

Regarding the objectives of FSR during the period of 1982-1990, the AARD changed the focus of their research from traditional classic commodity research programs to a farming system research program (AARD, 1994). The major achievements were (1) increasing cropping intensity; (2) adoption of high yielding varieties, fertilizer application, other farming practices, and (3) inclusion of non-crop elements such as chickens, goats, cattle, ducks, fish and trees to increase the overall farm income in the study areas. Another example of the inclusion of livestock to research was the small ruminant collaborative research support program (SRCRSP) which undertook the field-testing of packages of improvement the small-ruminant that were small ruminant amongst smallholder farms in West Java (Sabriani et al 1985). This project was known as RRFH (regular research field hearing) where scientists and farmers collaborated in undertaking on-farm research (Knipscheer & Suradisastra 1985). Although the RRFH approach focused on farmers’ participation in the research process, it had limitations in the appreciation of farmers’ local knowledge and attitudes.

2.3.4. Farming system research: Resources and community based (1990s)

Consistent with the objectives of FSR the improvement of family welfare in relation to agriculture was considered an important issue which needed to be addressed. Therefore, a new initiative of the Agency of Agricultural Research and Development (AARD) was to establish the Assessment Institute for Agriculture Technology (AIATs) at the provincial level with aims to:

1. Accelerate agricultural technology transfer
2. Provide technology services to local people, and
3. Improve optimisation of research resources utilisation in the region (AARD 1995).

The reasons behind the establishment of AITAs came from the over-centralization and commodity-focused research occurring within AARD.

Although these represented a shift in research focus and objectives, the solution to farmers’ problems was seen still in production-oriented research, in which development
workers and livestock services assumed that the best solutions came from the scientists alone.

2.4. Livestock extension in Indonesia

Livestock extension plays an important role in the achievement of livestock development in Indonesia. Livestock extension activities are implemented by the Directorate General of Livestock Services (DGLS) within the policies of the Ministry of Agriculture. Formal livestock extension activities began in the 1970s. However informal livestock extension has been carried out since PELITA (Five year development stage) I & II, when livestock was not considered to be a high priority in agricultural development.

The model of livestock extension that has been applied was the research and extension linkage model (REL) of technology transfer that was based on agricultural extension policy. Agricultural policy was guided by the “joint decree” of the Minister of Home Affairs and the Minister of Agriculture in 1991. Under this decree a range of agricultural (including livestock) extension policies were established.

Extension activities aim to improve the knowledge, skills and attitudes of farmers by supporting various programs of agricultural development. The activities of the agricultural extension services were decided at a national level and were the responsibility of the head of the Centre of Agricultural Extension (CAE). Administratively, the head of the centre was under the guidance of the Secretary General, and technically under the guidance of the respective Directorate General (food crops, livestock etc).

At provincial level, the responsibility was laid with the governors of the respective provinces. Technical guidance was conducted by Dinas Tk I (provincial office of agricultural sub-sectors), which monitored and evaluated the extension activities in the respective provinces.

At the district level, the responsibility lay with the Bupati (head of the district). The head of Dinas Tk II (district office agricultural sub-sector) assisted the Bupati in coordinating the agricultural and extension activities. Agricultural extension stations (Balai Penyuluhan Pertanian/BPP) support the extension activities. The field extension activities were carried out by the penyuluhan pertanian lapangan /PPL (field extension workers). These field workers were stationed in wilayah kerja penyuluhan pertanian /WKPP (working territory of agricultural extension) and were responsible to the Head of
the *Dinas Tk II*. The livestock extension activities were developed through annual consultation with the *BPP* (agricultural extension station), *Dinas peternakan Tk II* (District Livestock Services). District leaders obtained information from the headman and farmer group leaders. Figure 2.1 illustrates this mechanism of agricultural extension activities in Indonesia.

**Figure 2.1.** Mechanisms of agricultural extension in Indonesia.

### 2.5. Research approach in agricultural extension

There is an emerging change in worldview and methodology in research and extension. This is due to the number of failures of technology transfer in relation to
sustaining agricultural production (Korten 1980; Whyte 1991; Chambers, 1993; Fisher 1993; Jiggins 1993). The traditional agricultural extension assumed that any problems arising in agriculture could only be solved and improved with innovations produced from the research station. Orskov (1999) pointed out that most extension only reached the educated and rich farmers. Typically, the approach used to production agriculture rather than subsistence agriculture (Packham 2001b). The approach also ignored the local knowledge and farmers’ contributions to agricultural technology development, and ignored the political and cultural contexts within which technical developments occur (Vanclay & Lawrence 1995).

This current paradigm of approaches (learning approach or participative approach) has shifted from expert control of knowledge generation, to increasing the capacity of local stakeholders to learn and adapt to complex and changing situations. The development of research approaches for rural development recognises the significance of involving both people and their context in the development process as an essential component of improvement (Chambers 1993; Rahman 1993; Chambers & Pretty, 1994). This new approach to extension was based on adult learning concepts as well as a farmer-first and bottom-up approach. This new model ensured farmers became responsible for determining and setting priorities to research and extension. According to Macadam (1997) the extension needs to place more emphasis on:

1. An ethos and practice of local community empowerment and self-help
2. A local cross industry, rather than national single-industry focus
3. The creation of linkages between farmers, business and communities in the local area with networking to wider national and international entities
4. A reorientation of government policy and services to mesh with the community orientation and facilitate development of appropriate infrastructure
5. Development of local industries which meet the economic needs of rural communities and which are ecologically sustainable.

The challenge in this arena is one of how to bring together the knowledge and research capacity of farmers and scientists in an interactive way. This new approach in extension involves activities where farmers, extensionists and researchers work together in the identification, generation and testing of the new technology and practices. The relationship is based on collaborative learning and critical dialogue.

McCall (1987) distinguished three levels of participation that commonly found in research & extension:
1. as a means to facilitate the implementation of external interventions;
2. as a means to mediate in decision making and policy formulation of external intervention
3. as an end in itself, the empowerment of social groups towards access and control over resources and decision making

Practically, in agricultural extension, participation is often used as a means to mediate in decision making of external intervention, where participation means that farmers are expected to provide their time and physical labour as their contribution to problem solving. Singh (2000) observed that in reality, the participation of farmers occurs according to the desire of extension agencies. Farmers may be involved at all stages of the process, but only as per the desire of the agency. Their participation is confined to “benefit sharing or the evaluation stage” (Singh 2000, p. 53).

In terms of farmer participation, this thesis makes a fairly arbitrary split between the participatory model on one hand, and TOT on the other, and these models summarised in Table 2.3, together with a model that attempts to align them both, called “decision-driven” (Chambers et al 1989, p. 182). Moreover, the farmer participatory model (farmer first) is compared to the model of PAR (beyond farmer first) that was employed in this study.

**Table 2.3.** The shift of approach in agricultural and extension (adapted from Chambers et al 1989)

<table>
<thead>
<tr>
<th></th>
<th>Transfer Technology</th>
<th>Farmer Participatory</th>
<th>Decision (user) Driven</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Objective</td>
<td>Transfer technology</td>
<td>Empower farmer</td>
<td>Provide policy management information</td>
</tr>
<tr>
<td>Analysis of need and Priorities by</td>
<td>Outsider</td>
<td>Farmers assisted by outsider</td>
<td>Policy makers and manager</td>
</tr>
<tr>
<td>Primary R&amp;D location</td>
<td>Experiment station, laboratory, greenhouse</td>
<td>Farmer field condition</td>
<td>Both</td>
</tr>
<tr>
<td>Main R&amp;D practice</td>
<td>Precepts message packages</td>
<td>Principal methods, basket of choices</td>
<td>Knowledge and ownership of knowledge (not only to farmers)</td>
</tr>
<tr>
<td>The menu</td>
<td>Fixed</td>
<td>A la carte</td>
<td>Blended</td>
</tr>
</tbody>
</table>
2.5.1. Transfer of technology model (top-down approach)

The dominant paradigm for agricultural Research and Development (R&D) in Indonesia has been the transfer of technology (TOT) model. In this model, the researchers are seen as the principal sources of new ideas and technologies. Research scientists develop technological innovations on research stations that are then transmitted by extension workers, and farmers are expected to adopt those technologies. The principle of the model is one-way flow of improved technologies from researchers through extension to farmers, or a top-down communication system. This communication system was based on the theoretical model of diffusion of innovation (Rogers 1983). Although this model was successful in distributing some “packages” of technologies (seed-fertilizer-pesticide-credit) and has produced dramatic success, it has failed in many areas, particularly in developing countries. As Anandajayasekeram (1997, p.2) observed, many resource-poor farmers were in unfavorable environment, such as rain fed areas and did not benefit from the seed-fertiliser revolution. Moreover, this TOT model has limitations in explaining farmers’ behaviour and social factors affecting how farms operate. These include the role of women in farm decision-making and the life stages that influence decisions to adopt new technology and practices. For these reasons it has been substantially rejected as primary model for extension today (Vanclay & Lawrence 1995; Ison & Russell 2000). Past approaches considered rural agricultural practice as a largely technical activity, rather than as social praxis (Cornwall et al 1994; Pretty & Chambers 1994; Bawden 1995a). Solving farmers’ production problems was often (in TOT) based on a single technology, while the problematic agricultural issues tend to be complex, and often require the adoption of systems thinking and whole farm planning (Packham 2001b). This can be seen as an accumulative learning process rather than the adoption of innovation (Röling 1993).

With these observations came a realisation that there is a need to consider the interrelationship between technology and environment. Therefore, a better understanding of farmers’ circumstances and their greater involvement in decisions related to the proposed technologies is needed. There is also a need to recognise farmers’ knowledge and capacity as well as to improve the interaction between extensionists and farmers.

Because, livestock and other non-rice crops were part of farming activities, scientists could not longer afford to isolate rice from the other farm activities that affect resource use.
2.5.2. Farmers first

After the era of the green revolution in Indonesia, most research in agriculture was undertaken under the model of farming systems research (FSR). In the development of FSR, several types of FSR emerged to complement each other, and to be more participatory in their approach, such as the “farmer back to farmer” model (FBF) (Rhoades and Booth 1982). This approach dealt with on-farm research and attempted to include farmers in the different levels of research in order to get their feedback on the proposed technological intervention. The focus was on the development of agricultural technology to increase productivity. This model saw agricultural research and development as a process that started with an understanding of the farmers’ circumstances. The model shifted from a “trickle down” approach, to the facilitation of group interaction and problem solving at the local level, to participative decision making with farmers. Here, the researchers concentrated on the participation of the farmers in the process of technology generation, from diagnosis of farmer’s problem, to developing potential solutions to problems as well as testing and adaptation on their farms. In this context, research begins and ends with farmers. The FBF model was successfully used to improve seed storage systems (Rhoades & Booth 1982).

Chambers and Ghildyal (1985) proposed the “farmers first” model, to overcome the limitations of traditional research methodology and philosophy, and to complement the FBF to better serve farmers through putting first, farmers’ family priorities, including knowledge (Chambers et al 1989). In this model, the investigation and analysis are conducted largely by farmers themselves, who at the same time, share their knowledge and insight with outsiders. Through this knowledge sharing, the outsider can learn directly from rural people, to understand their knowledge systems and elicit their technical knowledge (Chambers 1992). Chambers (1992, 1994) further suggested that rapid rural appraisal (RRA) could be used to gather what needed to be known. Among the techniques in RRA are direct observation, interviews, mapping ranking procedures, diagrams and others.

The Farmer First approach emphasises “farming systems description” and the specification of boundaries, linkages and components, in order to define the scope of technology development. In this context, the researcher identifies farmers and works with them to enhance their capacity (Cornwall et al 1994). The assumptions are that the rural community shares a common vision and discourse that is open to consensus
solutions. Farmer First approaches include Farming Systems Research (FSR), Agro-ecosystems Analysis (AEA) and Rapid Rural Appraisal (RRA). The limitation of these approaches is in the efficient extraction of information without necessarily any real increase in understanding of how learning about rural livelihood systems occurs. Jiggins (1993) noted that although this model had a problem solving orientation and linkages within the social interaction perspective, it had limits in its capacity to address natural resources problems or social issues. She further concluded that this model “largely replicates TOT practice” (Jiggins 1993, p.188).

2.5.3. Beyond farmers first

Beyond Farmer First (BFF) is an approach that views of farmers as “situated agents” who are active in local knowledge generation, coping with change, and negotiating access to resources and decision making discourse, in particular socio-political and agro-ecological contexts. Furthermore, the relationship between outsider and insider would be collaborative and one in which farmers become partners in activities, thereby involving the “grass roots” in the research process. This is consistent with Packham (2001b) who states that praxis and effective leadership are appropriate responses to this paradigm shift in research and extension. He characterises this paradigm by a widespread dissatisfaction with the pre-existing situation; conceptualisation of an alternative based on shared values; facilitation of theory-informed practice in the local context, and critical reflection on it; the internal capacity of the system to translate opportunities for reform into protocols and procedures; the imprimatur of the owners’ of the system, and access to needed resources.

The BFF approach has an emphasis on learning as an outcome of the research. In addition, the BFF structures a very rigorous process of learning through experiences, constructing answers to question that are highly significant to the inquirers. It emphasises improving human potential and capabilities as a way of empowering participants in order to improve their practices. One example of the BFF approach is Participatory Action Research (PAR) (Scoones & Thompson 1994).

In participatory action research, critical thinking is introduced to the learning process to encourage participants to question the contextual validity of knowledge that is generated through the inquiry process. This methodology emphasises the importance of “people participation” in problem identification and diagnoses, strategic planning, implementation and evaluation for improvement. This process seems appropriate for
agricultural extension because it follows a systems approach, which starts with the farmers’ knowledge, attitudes and practices, and then the results from this process are used for planning and evaluation purposes, involving the farmers in a participative way. Table 2.4 compares the three extension approaches introduced in this section.

### Table 2.4. Beyond Farmer First: Challenging the populist view (Adapted from Scoones & Thompson 1994, p. 22)

<table>
<thead>
<tr>
<th>Transfer of Technology (ToT)</th>
<th>Populist approaches: Farmer First</th>
<th>Beyond Farmer First</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assumptions</td>
<td>Specialisation and reductionism, dominant power on professionalism.</td>
<td>Populist ideal of common goals, interests and power among “farmers” and communities</td>
</tr>
<tr>
<td></td>
<td>“Stock’ of uniform, systematized, local knowledge available for assimilation and incorporation.</td>
<td>Multi-layered, fragmentary, diffuse knowledge with complex, inequitable, discontinuous interaction between (local and external) actors and networks.</td>
</tr>
<tr>
<td>Process</td>
<td>Scientists determine research priority, conduct research in the laboratory and on research station, generate package of technology which are successful according to their criteria, and then hand these over to extension to transfer to farmer.</td>
<td>‘Farmer’ or ‘community’ consensus solutions to identified problems.</td>
</tr>
<tr>
<td></td>
<td>Managed intervention designed solutions and planned outcomes with farmer involvement in planning and implementation.</td>
<td>Process learning and planning with dynamic and adaptive implementation of negotiated outcomes; collaborative work requiring dialogue, negotiation, empowerment.</td>
</tr>
<tr>
<td>Role of outsider</td>
<td>Dominant concepts, values, method and behavior. Higher status in controlled condition. Teacher and trainer.</td>
<td>Invisible information collector, documenter of RPK; planner of intervention; manager of implementation; more recently; facilitator, initiator, catalyst.</td>
</tr>
<tr>
<td>Role of insider</td>
<td>Passive recipients of package.</td>
<td>Reactive respondent, passive participants</td>
</tr>
<tr>
<td>Style of investigation</td>
<td>Positivist, hard systems</td>
<td>Positivist, hard systems research (FSR, AEA, RRA, some PRA, FPR and PTD)</td>
</tr>
</tbody>
</table>

These approaches imply that the extension process needs to take into account the diversity of farmer groups, diversity of farmers’ resources and the complexity of the agricultural process (Engel et al 1992). Shifting from teaching to learning in extension method requires dialogue through which ideas are shared and learning occurs. In this context the focus is on how we learn, rather than what we learn, and focusing on individual exploration and experiences (Cornwall et al 1994)
2.6. The problem statements

The agricultural sectors (food crops, livestock, estates crops and fisheries) is still the major source of productivity, employment, and income generation in Indonesia rural economy. Growth in the agricultural sector is required to stimulate increased incomes, employment and living standards of smallholders and to assure more equitable distribution of the benefits of development, while also meeting domestic demand and increasing foreign exchange earnings.

At the village level, the dissemination of technologies was through village extension workers (VEW), and was based on the training and visit (T&V) system (Rogers 1982) or diffusion of technology (Van den Ban & Hawkins 1988). Both crop and livestock information was distributed through a single extension agent during a regular visit schedule. Here, the role of the extension workers was as a “technology messenger” and this system is still very much alive in Indonesia. In some places this model has been successful to improve livestock production. However, this model has been predominantly operated as a one-to-one activity, with individual officers attempting to change the behaviour of individual farmers (Vanclay & Lawrence 1995). As experienced, the results of livestock extension in this way have often been poor (de Haan 1992). Similar case studies cited by Amezah (1998), and Carr (1989) observed that farmers often failed to adopt new technologies, but the researchers and extensionists still continued to develop and transfer them to farmers. Ameur (1994) works on extension systems in developing countries including Indonesia concluded that the model of technology transfer was still rigid on the network of top-down initiatives.

This thesis argues that any attempt to improve the livelihood of smallholder farmers has to include the participation of all stakeholders in the process, and that these attempts should be tied to the immediate world and activities of the rural people. As in most developing countries like Indonesia, developing better and more productive livestock farming should lead to higher cash income as well as improved nutrition. Therefore, a PAR approach that ensures farmers’ participation provides a good starting point for intervention and exploration. There is a need for a strong partnership between researcher, development workers and farmers. In this approach, the boundaries between researchers, development workers and farmers are broken down and development workers act as catalysts.

In this thesis I describe a PAR project undertaken in the context of smallholder livestock farmers in South Sulawesi Indonesia, in which I worked with development
workers (extensionists and staff of livestock services) to enhance the livelihoods of these farmers and to improve the work of livestock development.

2.7. The objectives and thesis challenges

The domination of the transfer of technology approach to agricultural & extension (A&E) is still alive in Indonesia and has not been responsive to the needs of smallholder livestock farmers. The extension associated with the livestock services department needs to improve the way they deal with farmers’ problems. The literature suggests that problems as well as solutions can not be seen as essentially technical alone, but have to do with the way we relate to each other and the world around us. There is a lack of feedback between farmers and the institutions which serve the needs of farmers. Therefore, there is a need for changes in direction in dealing with smallholder farmers’ problems (King, 2000)

One aspect of this change is to facilitate farmers to solve their own problems and to enable them to adapt and respond to new problems as they are faced. Facilitating a learning approach is appropriate to this process. However, this is a challenge to the traditional top-down extension approach that predominates today. It is therefore the objective of this research to introduce a learning approach through the process of PAR, and in cooperating concepts of experiential learning, action learning and adult learning as a relevant way to assist farmers and development workers to enhance the livelihood of farmers as well as to improve the livestock industries in part of Indonesia.

As an agricultural officer employed by the Ministry of Agriculture, I often trained farmers and other agricultural officers and attempted to improve my ability to work with people. At the beginning of this study I inquired into farmers’ problems and designed possible solutions to improve the farmer’s situation as well as improving livestock development in the study area. It was found from the exploratory stage of this study that a key problematic issue perceived by farmers was a scarcity of fodder for animal feeding. As a traditional way to solve farmers’ problems, the development workers (livestock services and extensionists) were looking for technologies that had been developed by scientists that have been applied successfully in other regions, with the goal of introducing them to the farmers in order to solve their problems. This thesis moves beyond this tradition. It involves farmers in all stages of problem solving to find possible solutions that are appropriate to their circumstances. This PAR approach begins with participatory diagnosis with the broad community, including women;
planning and finding out possible solutions, evaluating the alternative solutions, implementing the proposed solutions (action); and evaluating the action. The core principles behind this process were active decision making by farmers at all stages of problems solving and a consideration of farmers’ local knowledge and local circumstances, while also providing farmers with technical input and facilitation by government staff (livestock services and extensionists). Dialogue played an essential role in this process, with participants taking turns to share, understand and assess their statements for collective actions.

In order to actualise this process, I studied the literature to find the theories that supported these concepts. Various theories concerning this included:

1. The concept of people-centered development
2. The nature of knowledge about human activity systems
3. The relationship between researcher and researched
4. How knowledge is constructed based on a problem solving concept.

2.7.1. The aims to the study

1. To engage in PAR as an approach to improving the conditions of some smallholder livestock farmers in South Sulawesi, Indonesia
2. To examine the role of livestock production in South Sulawesi
3. To arrive at information useful for policy makers in designing rural development programs.

2.7.2. Specific research objectives of this study are

1. To shift extension practice from a top down approach (trickle-down) to the facilitation of group interaction and problem solving at the local level (participative decision making with farmers)
2. To give control to farmers to design and implement their own development proposals
3. To learn about the relationships between problems and contextual issues in a collaborative way (farmers, development workers and researchers)
4. To learn how to implement action based on knowledge generated from the learning process
5. To learn from the research process, to guide future activities of the people who participated in this study
6. To reflect on the theoretical underpinnings and the lessons learnt from this study, for the benefit of farmers and livestock development workers in South Sulawesi Indonesia.

In this study therefore, I explore three interconnected questions with regards to the specific aims above:

1. Can PAR methodology contribute to any improvement in the problem situation in the study area?
2. What are the lessons learnt from its use?
3. What are the constraints and challenges of PAR in South Sulawesi Indonesia.

I do believe that development will come from the people themselves, using their skill and ability to solve their problems. It is important to help them to identify their problems and find ways to solve them. To assist in this process we must also show them their own potential and how to use it. I cannot believe that we can help the people improve their quality of life without their involvement, their participation, their collaboration and their cooperation. My belief that community development shall come from the ideas of communities themselves (Korten 1980), has guided the development of my research approach and objectives.

2.8. Conclusion

The main focus of livestock development in Indonesia has been for technological solutions to farmers’ problems leading to a production orientation. This model is very much technology transfer to farmers where technology is designed in a research station and transferred by extension workers to farmers with farmers expected to adopt such technology. Based on this linear model of knowledge, however, most of the technologies identified have been rejected due to lack of appropriateness. They also can be conceived as becoming an “end in themselves” rather than as a means of increasing production.

Such an approach has been identified to be insufficient to solve farmers’ problems because of a lack of respect for and use of the farmers’ knowledge and circumstances. Chambers (1989; 1997) has argued that the primary focus of agriculture and development in developing countries needs to be underpinned by: (a) learning with farmers, so as to lead to empowerment, and (b) developing the institutional capacity of farmers through participative action as well as developing new knowledge. Here,
experiences and knowledge of stakeholders are used to solve problems, leading to improved situations.
CHAPTER 3

THEORETICAL AND METHODOLOGICAL FRAMEWORKS

3.1. Introduction

In this chapter I explore the literature on the philosophical position, theoretical framework and the methodological tradition that informed this study. I also discuss the issues of the authenticity of action research. In selecting an appropriate research methodology for the study, I chose Participatory Action Research (PAR) as a methodological framework to achieve an enhancement of the livelihoods of some smallholder farmers in South Sulawesi, Indonesia, through the improvement of livestock production. This process of improvement was carried out through a learning approach.

The concepts of experiential learning and action learning are discussed and can be seen as the basis or central tenet of PAR. The theory of adult learning is also discussed as the basic concept of the extension approach. Furthermore, systems thinking and farmer participation are two fundamental perspectives that have contributed to the development of the learning approach that occurred in this study.

A livelihood problem situation involves interaction between the households concerned and the availability of assets, including those emanating from intervention through agricultural research and development. My aim in undertaking this approach was to explore the possibilities for improving the situation of smallholder livestock farmers in Indonesia through encouraging them to be active participants in the process of decision-making about their own development, particularly through dialogue about the process of knowledge delivery in extension systems. In this context, action learning was used to drive the participants to develop their skills, whereas PAR guided the participants to observe changes through its cycle.

An important aspect of this study was to bring about changes in agricultural development, particularly the livestock development approach generally followed in Indonesia, from its dominant top-down approach towards a more meaningful bottom-up approach. As an agricultural officer, I saw the impossibility of solving problems of mass poverty through agricultural production intervention without involving the stakeholders in the development process. Hence, I initially examined the social problems of stakeholders, and then took the stakeholders along a journey to the realisation of their
hopes and ideas to improve their situation. My perception here was that this could be achieved through shared experiences and collaboration. The participative learning that occurred in this study was concerned with encouraging farmers and agricultural development workers to:

1. Develop their critical consciousness concerning the conditioned nature of any kind of improvement
2. Be active participants in the process of improvement
3. Generate critical knowledge about their experiences in order to take informed actions to improve their own situation

My choice of the particular methodology and methods to use in the situation of farmers in Tombolo village, reflected my interest in facilitating participative learning to encourage them to use their local resources, knowledge and abilities to improve their condition. Accordingly, working strategies were formed that helped farmers, development workers and myself to work collaboratively and engage in a learning process.

3.2. Paradigm held

Denzin and Lincoln (2000, p.18) explain that a researcher approaches the world with a set of ideas, a framework (theory, ontology) that specifies a set of questions (epistemology) that he or she then examines in specific ways (methodology, analysis). Exploring both ontological and epistemological assumptions is useful for choosing methodology in research.

Ontology is a branch of philosophy that is concerned with the nature of reality. That is, it represents the particular view of reality held about the situation in question. An example of this is that reality consists of objects in relationship with one another (Midgley 2000).

Two main ontological possibilities for research are that reality is observable by the researcher, who has little impact, if any, on the object being observed; and the second is that reality consists of an individual’s mental lenses, or paradigm, of the objects with which they engage, and that engagement impacts on the observer and the situation being observed (Guba & Lincoln 1989).

Epistemology, in contrast, is concerned with the nature of knowledge. An example of this statement is that we can only know “our personal constructs, no external reality”(Midgley 2000, p. 23). This is also related to the relationship between the
researcher and what can be researched (Denzin & Lincoln 2000). This relationship is well described in Kemmis and McTaggart (2000).

Figure 3.1 depicts the differences in this relationship and suggests that knowledge produced from the relationship can be seen as objective or subjective. An objective relationship means that researcher orientation to the object aims to maintain a perspective of “true to the object”. A subjective relationship however, means that the researcher acts as a first person and has a strong need to study the object in a personal way.

![Figure 3.1. Combinations of different traditions of research (adapted from Kemmis and McTaggart, 2000, p. 575 )](image)

These views between objective and subjective or between individual and social and subject/object dualism are still argued about in social inquiry. However, Habermas (1976; 1984), Kemmis and McTaggart (2000) and Midgley (2000) see that the individual, the social, and the objective and the subjective are related aspects of human life and practice to be understood “dialectically”. In this context, people should engage in “communicative action” where they set up ‘ideal speech situations’, situations free of power relations, and allowing open debate. Through this process, rational argument can take place that involves statements about and challenges to, information relating to reality, in all of the natural, social, and internal worlds (Midgley 2000, p.28). In addition, Freire (1972) asserts that the dialectical relationship that a researcher creates with the object of inquiry defines the meaning of objective and subjective in human
inquiry. He further concludes that this dialectical relationship becomes the basis of critical reflection methods.

What we perceive as real knowledge is dependent on our perspectives or paradigms. As presented in Figure 3.1, different paradigms produce different ways of approaching reality. Chambers (1993, p. 2) uses the word paradigm to mean “a coherent and mutually supportive pattern of concepts, values, and actions amenable to wide application”. Guba and Lincoln (1989, p.85) refer to paradigms as “a basic belief”, a set of assumptions we are willing to make, which serve as touchstones in guiding our activities. Thus, paradigms are basic belief systems; they cannot be proven or disproved, but they represent the most fundamental position we are willing to take (Guba & Lincoln 1989). Michael Quinn Patton (1978, p.302) in Guba and Lincoln (1989, p. 43) state that:

A paradigm is a worldview, a general perspective, a way of breaking down the complexity of the real world. As such, paradigms are deeply embedded in the socialization of adherents and practitioners; paradigms tell them what is important, legitimate, and reasonable. Paradigms are also normative, telling the practitioner what to do without the necessity of long existential or epistemological consideration. But it is this aspect of paradigms that constitutes both - their strength in that it makes action possible, their weakness in that the very reason for action is hidden in the unquestioned assumption of the paradigms.

Paradigms can thus be understood as beliefs and values that control our interpretation, judgment, behaviour and action. Kuhn (1970) stated that our interpretation is guided by our paradigms and our constructs are interpretations that support our view. Churchman (1971) also noted that what we do in this world is determined by the way we see it. Maturana and Varela (1988) see paradigms as a more complex and a changing way of viewing the world. They assert that paradigms are determined by the way we see the world, but that in turn, the way in which we see the world is controlled by our paradigms, which then change according to the meaning we make of our experiences and action. Further, a paradigm is a configuration of theories, questions, methods, and procedures that share values and themes. These configurations, which are developed in response to historical and cultural conditions, provide a conceptual framework for seeing and making sense of the social world we create and live in (Popkewitz 1984 in Maguire 1987, p.10). Based on these statements Maguire
(1987) concludes that a paradigm provides “places to stand” from which to view reality, it also shapes the form and purpose of investigating social reality.

Guba and Lincoln (1989) classifies paradigms into two main streams which have dominated scientific research, namely positivism and constructivism. They explain ontological, epistemological and methodological differences between both positivism and constructivism (see Table 3.1).

**Table 3.1.** The differences between positivist and constructivist paradigm (Guba & Lincoln 1989)

<table>
<thead>
<tr>
<th></th>
<th>Positivism</th>
<th>Constructivism</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ontologically</strong></td>
<td>Positivism is usually associated to realism. It</td>
<td>Constructionism denies the (knowability of the) existence of an objective reality, asserting instead that the realities are social constructions of the mind and that there are as many constructions as there are individuals (although clearly many constructions will be shared). In Constructionism, models have status as perception reality.</td>
</tr>
<tr>
<td></td>
<td>presume that reality really exists and can be</td>
<td></td>
</tr>
<tr>
<td></td>
<td>discovered through experimental testing. In the</td>
<td></td>
</tr>
<tr>
<td></td>
<td>positivist paradigm the models have status as</td>
<td></td>
</tr>
<tr>
<td></td>
<td>representation of reality.</td>
<td></td>
</tr>
<tr>
<td><strong>Epistemologically</strong></td>
<td>The researcher is detached from what is</td>
<td>Constructionism denies the possibility of subject-object dualism, suggesting that the findings of study exist precisely because there is an interaction between the observed that literally creates from that inquiry.</td>
</tr>
<tr>
<td></td>
<td>researched, neither influencing or interdependent on the other</td>
<td></td>
</tr>
<tr>
<td><strong>Methodologically</strong></td>
<td>Positivism is usually allied to experimental</td>
<td>Constructivism rejects the manipulative approach (within positivism)...and substitutes for it a hermeneutic / dialectic process that takes full advantages, and account of the observer/observed interaction to create a constructed reality that is as informed and sophisticated as it can be made at a particular point in time.</td>
</tr>
<tr>
<td></td>
<td>design</td>
<td></td>
</tr>
</tbody>
</table>

Some scientists have criticised the limitations of positivism or rationalism. They question the processes used to investigate the world by positivists, who believe that they must be detached from the world in order to discover natural “laws”. These investigators examine the world by developing research questions based on *a priori* theories, using the theory to collect data, and analysing the data based on questions to confirm or disprove the theory (Guba & Lincoln 1989). The consequence is that of an investigator with a high degree of control over the systems being studied (Pretty 1994).

In a positivist approach to agriculture, technologies (practices) are developed by scientists rooted in the objective knowledge generated from experimenting on the natural behaviour of plants or animals. These technologies are delivered to the farmers to adopt as a form of technocentrism (Sriskandarajah *et al* 1992). This ignores the relationship between the farmers and the context in which the farming is being done (Bawden 1991a; 1995a; Millar 1993).
New paradigms have now emerged as an alternative to the positivist paradigm. These paradigms emerge from advances in a wide range of disciplines and fields of investigation such as non-linear mathematics and chaos theory (Gleick 1987; Gould 1989); from quantum physics; from post-positivism (Philips 1990); from critical theory (Jackson 1991); from constructivist inquiry (Lincoln & Guba 1985; Guba 1990; Röling & Jiggins 1993); from soft-systems to contextual science (Checkland 1981; 1989; Russel & Ison 1991; Bawden 1994). Although these are all alternatives to positivism, they are not necessarily commensurable with each other (Guba 1990; Jackson 1991). The important thing here is the implication for how we go about finding out about the world, generating information, and so, taking action.

In determining the paradigm to hold in this study, I turned to the work of Guba and Lincoln (1989), on constructivism, centred on the five principles of Pretty’s alternative to positivist paradigm that are described below (Pretty 1994; 1995b). Constructivism places emphasis on lived experience of the researched as important factors in the interpretation process. Pretty (1995b) also looks at the paradigm in terms of the notion of sustainability in agricultural systems. Pretty summarises five principal differences between the emerging paradigm (post-positivism) and a positivist paradigm. These are that:

1. Any attempt precisely to define sustainability is flawed. It represents neither a fixed set of practices or technologies, nor a model to describe or impose on the world. The questions of defining what we are trying to achieve are part of the problem, as each individual has different objectives.
2. Problems are always open to interpretations. All actors have uniquely different perspectives on what is a problem and what constitutes improvement.
3. The resolution of one problem inevitably leads to the production of another problem – situation, as problem are endemic.
4. The key feature now becomes the capacity of actors continually to learn about these changing conditions, so that they can act quickly to transform existing activities.
5. Systems of learning and inquiry are needed to seek the multiple perspectives of the various stakeholders, encourage involvement and action and resolve conflicts for the common and future good. The view that there is only one epistemology (that is, the scientific one) is rejected. Participation and
collaboration become essential components of any such systems of inquiry, as any changes cannot be effected without the involvement of all stakeholders and the adequate representation of their views and perspectives (Pretty 1994; 1995b).

These two perspectives of post-positivist paradigms complement each other in creating opportunity, and encouraging stakeholders, including researchers and farmers to critique their own assumptions about their relationship between their knowledge and their context (Freire 1972; Mezirow 1990). The focus here is to involve stakeholders in the process of creating their own realities: knowledge about the problems, plans and actions to be undertaken for improvement.

This constructivism or post-positivism paradigm underpins the activities of this thesis. This includes the way I went about collecting data, interpreting it and reporting the findings. Thus I can describe how knowledge was produced and was to be used, as well as how changes were brought about in the study area.

My choice of a particular methodology and methods to employ in the situation of farmers and agricultural research and extension in Indonesia reflect my particular experience and views as described in Chapter 1. According to Habermas (1971), all human endeavours are conducted in satisfying three types of knowledge: technical, practical, and emancipatory. The vision that I was taking in this research was helping myself and stakeholders to: (a) find better ways to work together in a partnership in order to learn from each other to improve their own situation; (b) create critical knowledge, based on their own experiences and other local resources of farmers for situation improvement. I turned to the literature to find ways of determining the methodology that would be relevant and appropriate to my situation.

I found a number of authors useful for providing guidance (Freire 1972; Korten 1980; Fals Borda 1985). For example, the concept of community development, the concept of social construction of reality (Beggar & Luckham 1979) and the concept of Beyond Farmer First (Chambers 1983; Scoones & Thomson 1994)

The situation of a farmer who always becomes the object of the development process is seen as living in an “oppressed” reality. Farmers were seen as passive recipients of technologies, and information was delivered to them, as “passive” objects. The development workers insist that farmer problems can be solved by knowledge that is developed by scientists based on knowledge generated from experimentation and
observation. The methodology employed in this study considered how to move towards encouraging farmers to become “active subjects“ of their own development.

Beyond this, my particular methodology reflected on my position as an agricultural development worker who will often be required to facilitate participative learning. Therefore I required a methodology that enabled me to carry out my role as a development worker, creating changes through taking action in real life situations.

For these reasons I have chosen participatory action research as my overall methodology to approach the situation. This allowed both stakeholders and myself to communicate in a dialectical relationship (Figure 3.1). This situation resulted in changing the worldview of stakeholders in terms of the knowledge generated.

3.3. Participatory action research

Participatory action research was employed in this study, and is an acknowledged form of intervention within the tradition of action research. Many account of action research written post 1980 have “participation” as a central tenet. Within this tradition, the researcher carries out the research with emphasis on participation and with the subject of the research called a co-researcher (Carr & Kemmis 1986; Gaventa 1988; Whyte 1991; Kemmis & McTaggart 2000). Here the researcher (x) and the people under study (y) jointly work together in addressing the issues (z) (see Figure 3.2). For the purpose of the z, they (x, y) create a space for learning for situation improvement, through dialogue. The relationship between x and y is seen as an interactive and linguistic relationship, characterised by joint involvement, joint action and shared responsibility. This is a process of joint learning, about, how to, with and from whom (Ottoson 2001). Thus, everyone participating in the process is jointly involved in discovering reality as well as creating a new reality (Van Beinum 1998; Reason & Bradbury 2000).
Figure 3.2. The context of action research in this study

As Kemmis and McTaggart (1988) suggests, such research is not only a process of creating knowledge, but simultaneously an education and development of “conscientization” (Freire 1972) for mobilisation. They further assert that PAR is a form of “insider” research in which participants move from two thought positions: from the perspective of insider/subjective and outsider/objective (see Figure 3.1). The PAR applied in this study has not only the central tenet of participation but is expressly emancipatory.

This work stresses respect for and reliance upon the needs and expertise of practitioners and the people involved in the issues under study, and requires them to participate actively with a professional researcher(s) throughout the research process, from the initial design, to the final presentation of the results and discussion of the action implications (Whyte 1991).

I have used ideas about action research based on the ideas of Kemmis and McTaggart (1988; 2000); Dick (1993); Zuber-Skerritt (1995); Stringer (1996) and Greenwood and Levin (1998). Action research is a research paradigm explicitly concerned with the improvement of social situations through the taking of informed action and the development of relevant theory or knowledge, which is used to guide further action. Kurt Lewin developed an action research model in the mid-1940s to respond to the problems he perceived in social action (Kemmis & McTaggart, 1988). The approach has its origins in social and educational research, but this approach has also been advocated in a wide variety of domains, for example agricultural development, participatory development, community development, environmental management, and organisational development (Dash 1999).
Many authors who worked with action research, including Badwen (1985); Carr and Kemmis (1986); Elliot (1991); Greenwood and Levin (1998); Kemmis (1981); Stringer (1996), and Zuber-Skerritt (1995) refer to the original idea of action research as expressed by Kurt Lewin. But these authors also acknowledge the central role of participation. According to Lewin (1951) action research consists of analysis, fact-finding, conceptualisation, planning, execution and evaluation. This has been recognized as a spiral of steps. Figure 3.3 shows Lewin’s representation of the idea of action research. This process of a spiral of steps formulates the link between theory and practice. The notion of action research is as a continuous process of improvement whereby practice and theory inform each other developmentally. This approach enables people:

1. to investigate their problems and issues
2. to formulate powerful and sophisticated accounts of their situation
3. to devise plans to deal with the problems at hand (Stringer 1996, p. 15).

**Figure 3.3.** Series of three action research cycles which develop knowledge as the process continues (adapted from Zuber-Skerritt 1996, p. 95)

Action research also involves an integrated process that creates understanding and improvement of the “real world” problematic context, while researching how to understand and improve the way this is done, so it can be done more effectively in the future. Similarly, the spiraling action research process formulated by Elliot (1991) consists of a relationship between the analysis of practices (leading to proposed changes) and the implementation of changed practices (leading to increase understanding). However, Elliot (1991) emphasised an action research based on “self evaluation”, leading to increased understanding that begins with gathering and analysing data as part of initial planning. Cunningham (1993), in Dickens and Watkins (1999), describes action research in terms of a spectrum of activities that focus on research, planning, theorising, learning and development. In his view the action research
approach is broken down into a series of units that are interrelated. He also reports that the process includes learning and development, but he does not state explicitly whether or how action research leads to actions or changes. Argyris and Schon (1991) place action research in terms of action science, and emphasise relevant features from Lewin’s approach. His definition of action research was:

Action research takes its cues - its questions, puzzles, and problems - from the perceptions of practitioners within particular, local practice contexts. It bounds episodes of research according to the boundaries of local context. It builds descriptions and theories within the practices’ context itself, and tests them through “intervention experiments”- that is, through experiments that bear the double burden of testing hypotheses and effecting some (putatively) desirable change in the situation (Argyris & Schon 1991, p. 86).

In this definition, the interventions are experimental manipulations, and problem solving is the goal. Contribution to knowledge is also in the area of research intervention. Participants learn a mode of public, democratic reflection (the action science technology) and participate in solving self-diagnosed problems. In contrast to the previous authors, Bawden et al (1985) who worked with agricultural research paradigms, and which saw agriculture through a variety of problematic issues.

“I must know how to go about improving my ways of knowing how to improve problematic issues in agriculture! As I need theories about agriculture to inform the action I need to take to change the situation to hand, so I also need theories to inform the way I go about the way I go about generating the first set theories and practices. And I must be able and willing to critically examine my entire set of beliefs about the world, about the theories I hold about the world, about the theories I hold about the way I go about my practices for dealing with the world, and the state of the world itself. I must be critically concerned with my praxis as a methodical, methodological practitioner” (Bawden 1987 in Russel 1987, p. 40)

Bawden et al (1985) developed the concept of action research based on Kolb’s (1984) experiential learning model and Checkland’s (1981) SSM methodology concept (of informed debate about desirable and feasible changes in complex human activity systems). This action research concerned by Bawden (1991a) is known as “systemic action research”. This concept emphasizes involving the stakeholders in “finding out and taking action” about soft human issues in systems terms (Bawden et al 1985). According to Bawden (1997, p.12), “the focus is on the application of systems
principles to sets of human activities that need to be accomplished to result in the improvement of a complex and ‘messy’ situation. According to Sriskandarajah and Fisher (1992, p. 11), there are three key ideas in action research:

1. Action research involves the systematic application of a series of cycles of planning, action, reflection on outcomes and re-planning
2. Action research combines action and investigation. The investigation informs action and researchers learn from critical reflection on action
3. Action research is experimental and flexible. It encourages people to try things without great certainty about possible outcomes. But because of the built in process of continuing evaluation and re-planning, adjustment in action is made continually.

In my view, action research does not provide the solution to all problems, but it does provide a means for people to “get a handle” on their situation and formulate effective solutions to problems they face. The importance for me is action in the situation where the problems are tackled as a source of understanding and as a learning process. In this context the practitioners gain new insight about themselves in which their experiences result in their learning and the beginning of new action.

Although the basic idea of maintaining an effective relationship between theory and practice remains an integral part of action research, many authors argue that action research must focus on a group of people with vested interests in issues under consideration, all of whom participate in the action research (McTaggart 1991; Whyte 1991; Fisher 1995). Dickens and Watkins (1999) state that action research has two goals, to involve and to improve, whereas, Kemmis (1981) states that action research has the dual goals of improving practical problem situations and the discovery of knowledge about the way people live and act in their own context. Bawden et al (1985) pointed out that action research begins when the researcher joins an individual or group of people who are concerned about improving their situation. In proposing a model of action research, Bawden (1991a) pointed to five outcomes of action research:

1. The practices of the practitioner researcher is improved
2. The understanding of the practice by the practitioner is improved
3. The situation in which the practice is practiced is improved
4. The understanding by the practitioner of the situation in which the practices was practised is improved, and
5. The outcomes are subject to public review (Bawden 1991, p. 27).
Similarly Zuber-Skerritt (1995) assert that the outcomes of action research could be measured in 5 categories:

1. **Practical**; the results and insight gained from the research lead to practical improvements during and after the research process.

2. **Participative and collaborative**; the researcher doing research with and for people concerned with the practical problems.

3. **Emancipatory**; all people concerned are equal “participants” contributing to the inquiry.

4. **Interpretive**; the result of social inquiry based on the views and interpretations of the people involved in the inquiry. Research validity is achieved by certain methods such as interview and observation.

5. **Critical**; participants not only search for practical improvements in their work within the given socio-political constraints, but also act as critical and self-critical change-agents of those constraints.

She further noted that the planning phase of the action research consists of analyzing a complex situation and developing a strategic action plan. Action is implementing the plan - the practical testing phase. Observing is the monitoring of the results and reflection is reviewing the process for repeated modification. This review /reflection is the most critical phase of the process (see Figure 3.3).

Grundy (1982) and Kemmis and McTaggart (1988) classified action research into three categories: technical, practical and emancipatory. Technical action research is associated with a professional expert model in that it is “other” directed. Practical action research is self-directed by practitioners and usually promoted by the facilitator who is acting as a process consultant. Emancipatory action research is non-hierarchical, with all participants capable of facilitating the process and contributing collaboratively to the inquiry. The latest concept of AR is consistent to the PAR employed in this study, that is emphasis on the empowerment of farmers, through participatory activity in the research process from data collection to implementation action, and giving farmers a voice to set up their own agenda for their own development.

The advantage of this research over more traditional research is that it employs methods that are strongest in the case where the researcher also acts as a change agent. Dick (1993) notes that this research offers the opportunity for practitioners to achieve better research outcomes from their practices without undermining the practice they were researching.
Principally, participatory action research starts by dealing with everyday life experiences. It is applied to social situations by the participant to improve their own practice and their understanding of their own practice and the situation of concern. Thus, participatory action research is an interpretive methodology, which draws upon phenomenological, hermeneutical and critical theory inquiry. In this methodology data are derived from experience and action (phenomenology data) and complemented by data derived from interpretation and making sense (hermeneutic data) as a basis for planning and action (Guba & Lincoln 1989). Critical reflection is a most crucial part of action research, as it challenges the participants to question assumptions generated by phenomenological data and hermeneutic interpretation and in generating critical knowledge of strategies to be adopted for situation improvement (Kemmis & McTaggart 2000).

The PAR that was carried out in this study was concerned with the encouragement of participants to (a) generate knowledge from their experience through critical reflection on that experience in order to take action for situation improvement, and (b) create a learning atmosphere on the basis of collaboration, learning from each other (in order to improve the situation in a continuous process). This was done through several strategies:

1. Building a rich picture of the situation being studied
2. Reflecting on these experiences in order to make meaning about these with reference to the existing situation and other sources of information made available during the learning process
3. Applying knowledge that was created from critical reflection on the knowledge generation process, in order to (a) plan relevant actions; (b) implement these actions for situation improvement and (c) learn from the learning experiences for future action.

3.3.1. Participation

The nature of participation in terms of research and development often remains problematic (King 2000). This is evident through the enormous number of typologies, models and definitions of participation in the literature (Elden & Levin 1991; Oakley et al 1991; Guijt & Kaul Sha, 1998; Holland & Blackburn, 1998). Nevertheless, I have found some models particularly useful in characterising participation in research and
development. Chambers (1995, p 30) notes that there are three main ways, in which participation has been used, that is,

1. As a “cosmetic label”: to make whatever is proposed appear good
2. To describe a “co-opting practice”, to mobilise local labour, reduce cost where people participate in our project, and
3. To describe an empowering process which enables people to do their own analysis, to take command, to gain confidence, and to make their own decision.

Authentic participation in research means sharing in the way research is conceptualised, practised and brought to bear on the life-world (McTaggart 1997). It means ownership, that is, a responsible agency in the production of knowledge and improvement of practice. Rajesh Tandon (1988, p.13) identifies several determinants of authentic participation in research:

1. people’s role in setting the agenda of the inquiry
2. people’s participation in the data collection and analysis, and
3. people control over the use of outcomes and whole process.

Similarly to Tandon, Whyte (1991) describes participation in terms of people participating in the whole research process. He stated that members where the research is being undertaken, participate actively with the professional researcher throughout the research process from the initial design to the final presentation of the results and discussion of their actions implication (Whyte, 1991).

Furthermore, Stringer (1996, p.32) states participation in action research will be most effective when it:

1. Enables significant levels of active involvement
2. Enables people to perform significant tasks
3. Provides support for people as they learn to act for themselves
4. Encourages plans and activities that people are able to accomplish themselves
5. Deals personally with people rather than with their representatives or agents.

In the context of development, Lane (1995) states that the type of participation needs to be defined, because in the construction and implementation stage of a project, participation can be equated with cooperation and incorporated into pre-determined activities. In addition, in the entire project, participation needs to be considered in decision making, in implementation and maintenance, and in evaluation of both successes and failures.
Chambers (1995) states that the stress on the meaning of participation in an empowerment sense can also be understood in terms of a deep and more pervasive shift in development thinking, that is, to a “professional paradigm centered on people”: as summarised in Table 3.2.

Table 3.2. Differences between two paradigms: Things and people (Chambers1995, p. 32).

<table>
<thead>
<tr>
<th>Point of departure and references</th>
<th>Things</th>
<th>People</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mode</td>
<td>Blueprint</td>
<td>Process</td>
</tr>
<tr>
<td>Keyword</td>
<td>Planning</td>
<td>Participation</td>
</tr>
<tr>
<td>Goals</td>
<td>Pre-set, closed</td>
<td>Evolving, open</td>
</tr>
<tr>
<td>Decision making</td>
<td>Centralised</td>
<td>Decentralised</td>
</tr>
<tr>
<td>Analytical assumptions</td>
<td>Reductionist</td>
<td>Systems, holistic</td>
</tr>
<tr>
<td>Methods</td>
<td>Standardised</td>
<td>Diverse</td>
</tr>
<tr>
<td>Rules</td>
<td>Universal</td>
<td>Local</td>
</tr>
<tr>
<td>Technology</td>
<td>Fixed package</td>
<td>Varied basket</td>
</tr>
<tr>
<td></td>
<td>(table d'hote)</td>
<td>(a la carte)</td>
</tr>
<tr>
<td>Professional interaction with clients</td>
<td>Motivating</td>
<td>Enabling</td>
</tr>
<tr>
<td>Client seen as</td>
<td>Controlling</td>
<td>Empowering</td>
</tr>
<tr>
<td>Force flows</td>
<td>Beneficiaries</td>
<td>Actors, partners</td>
</tr>
<tr>
<td></td>
<td>Supply-push</td>
<td>Demand-pull</td>
</tr>
<tr>
<td>Outputs</td>
<td>Uniform</td>
<td>Diverse</td>
</tr>
<tr>
<td></td>
<td>Infrastructure</td>
<td>Capabilities</td>
</tr>
<tr>
<td>Planning and Action</td>
<td>Top-down</td>
<td>Bottom-up</td>
</tr>
</tbody>
</table>

Chambers (1995, p. 41) further asserts that there are many implications if the “paradigm of people” is to be implemented, that is:

1. To be used on any scale in an empowering mode, it implies widespread changes in bureaucratic procedures and culture, including participatory management
2. Projects concerned with people should become a process of learning, enabling and empowering, with open-ended time frames allowing for participation and changes
3. There is a need to change to more participatory and open-ended social science research, with more of the agenda, appraisal and analysis carried out by local people, and outcomes owned and shared by them
4. Determination of priorities should be much more by and through the analysis and experience of local people, weighted to give voice to women, weak and poor people
5. Teaching and training should move away from the lecture mode to shared learning, peer instructions, problems solving and social setting

Pretty (1994; 1995b) illustrates seven types of participation (Table 3.3). He further asserts that from this typology the term “participation” should not be accepted without
appropriate qualification. He concludes that great care must be taken when using the term “participation”.

**Table 3.3.** A typology of participation: How people participate in development programmes and projects (Pretty 1995b, p. 1252)

<table>
<thead>
<tr>
<th>Typology</th>
<th>Characteristic of each type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manipulative participation</td>
<td>Participation is simply a pretence, with people’s representatives official boards but who are un-elected and have no power</td>
</tr>
<tr>
<td>Passive participation</td>
<td>People participate by being told what has been decided or has already happened. It involves uni-lateral announcements by an administration of project management without any listening to people’s responses. The information being shared only belongs to external professionals.</td>
</tr>
<tr>
<td>Participation by consultation</td>
<td>People participate by being consulted or by answering questions. External agents define problems and information gathering processes, and so control analysis. Such a consultative process does not concede any share in decision making, and professionals are under no obligation to take on board people’s view.</td>
</tr>
<tr>
<td>Participation for material incentive</td>
<td>People participate by contributing resources, for example labour, in return for food, cash or other material incentives. Farmers may provide the field and labour, but are involved in neither experimentation nor the process of learning. It is very common to see this called participation, yet people have no stake in prolonging technologies or practices when the incentives end.</td>
</tr>
<tr>
<td>Functional participation</td>
<td>Participation seen by external agencies as a means to achieve project goals, especially reduced cost. People may participate by forming a group to meet predetermined objectives related to the project. Such involvement may be interactive and involve shared decision making, but tends to arise only after major decisions have already been made by external agents. At worst, local people may still only be co-opted to serve external goals.</td>
</tr>
<tr>
<td>Interactive participation</td>
<td>People participate in joint analysis, development of action plan and formation or strengthening of local institution. Participation is seen as a right, not just the means to achieve project goals. The process involves interdisciplinary methodologies that seek multiple perspectives and make use of systemic and structured learning processes. As group take control over local decisions and determines how available resources are used, they have a stake in maintaining structure or practice.</td>
</tr>
<tr>
<td>Self-mobilisation</td>
<td>People participate by taking initiatives independently of external institutions change systems. They develop contacts with external institutions for resources and technical advice they need, but retain control over how resources are used. Self-mobilisation can spread if government and NGO provide an enabling framework of support. Such self-initiated mobilisation may or may not challenge existing distribution of wealth or power.</td>
</tr>
</tbody>
</table>

Although the meaning of participation in community development is very broad and is attributed to various terms, the concept remains useful. A series of participatory research approaches are being employed to increase the involvement of the beneficiaries in development and research activities. The results of these mean there is an increasing awareness that more traditional research approaches frequently have led to inappropriate, irrelevant and unrepresentative decision-making (King 2000). Approaches such as farming systems research and extension (FRS-E) and participatory technology development (PTD) were developed to involve farmers in systemic research and extension activities. Today, the current trend in agricultural research and extension is for practitioners to facilitate participants to bring about changes through a learning process. (King 2000, Russel & Ison 2000).
PAR, for example, requires the participation of people in the research process (Kemmis & McTaggart 1988; Whyte 1991; Bawden 1995b). This is the nature of participatory action research because it lets the people join in the research process to explore the various perspectives of participants about the social system (Jackson 1993; McTaggart 1997). The practice involves collaboration between researcher and stakeholder. Knowledge generated from this collaboration is derived from the reflection about the values and realities of participants.

These theories of systems thinking and participation helped to form my thinking at the start of my research and had an important role in the designing of my research approach.

3.4. Associated theoretical frameworks

3.4.1. Phenomenology

Creswell (1998) explains that the phenomenological approach is primarily an attempt to understand empirical matters from the perspective of those being studied. Similarly, phenomenology described by Van Manen (1990, p. 10) is “the framework that supports systemic attempts to uncover and describe the internal meaning structures of lived experiences”. This process is carried out through direct investigation of phenomena revealed as past experience, without theories about their causal explanation (Spiegelberg, 1975). Phenomenology therefore recognizes the “importance of the context and the individual construction of perceptions and meaning in that context” (Smith 1997, p.75). In this way, phenomenological analysis is a suitable approach for “clarifying the foundation of knowledge in everyday life” (Berger & Luckham 1976, p. 34)

The benefit of applying phenomenology to support this study is in order to understand better what it is like for someone to experience something, that is, the essence of their subjective experience (Van Manen 1990; Creswell 1998). In this sense, it is to justify, by its emphasis on understanding, the internal insider/subjective experiences associated with observable reality (Henderson 1991). My intention here was to listen to the life stories of stakeholders without interrupting these stories with my pre-theoretical knowledge of their life and activities. The point that was obtained from this circumstance was that of having a better understanding of a particular past learning experience (tacit knowledge) of stakeholders, in order to make an interpretation that helped choose the dimensions of a new experience. According to Kolb (1984) and
Mezirow (1991) this situation is substantial in adult learning as it supports the use of the concrete experiences of learners as building blocks in the construction of social reality.

3.4.2. Hermeneutics

Hermeneutic means to “interpret” or “to understand”. According to Van Manen (1990) hermeneutics is the process by which individuals attach meaning to everyday experiences. In this sense it is focused on the interpretation of the reality lived by people. Heuristic data helps us to gain a deeper understanding to the building of a theory relating to the domain under study.

Action research deals with social reality, and therefore, data for it is based on the interpreting meaning of lived experience (Guba & Lincoln 1989; Stringer 1996), or experiential knowing (Malinen 2000). It is necessary to gain insight and understanding from the stakeholders’ experiential knowledge through dialogue with them. Here, stakeholders are invited to exercise their power of interpretation of their reality, and to put their knowledge and action in context (Bawden 1995a) in order to improve their understanding and generate critical knowledge about their practice and their reality (Reason 1990).

The relation of hermeneutic theory to this study to understand the life experience of farmers in conducting their farm activity and to understand the work of development workers in relation to their work to improve livestock production in this study area.

3.4.3 Critical Theory

Critical theory is a framework for questioning beliefs, assumption and interest through action and reflection on reality (Freire 1972), with the purpose of empowering the participants involved in the process. Freire’s conscientization is linked closely with Habermas’ (1971) critical intent and Mezirow’s (1991) “perspective transformation”, all of which involve learners becoming critically aware of how their assumptions about the world, their habitual ways of thinking and acting, constrain them. Habermas with his “critical intent”, is seen as promoting the disposition to investigate and reconstruct an aspect of the social and moral environment to achieve enlightenment and ultimately emancipation.

This critical process has been seen as enabling learners to see things differently or to change their own assumptions and beliefs about their contexts, making it possible for them to develop new interpretations of observed phenomena (Mingers 1980.) It also
recognises the reality of the dimension of individual context, which allows an individual to make sense of the interaction with various components of reality. New attitudes will come when they change their appreciation of the reality under study. The significance of critical theory to this study was in its focus on the political, and moral application of this study and the livelihood development process as a whole. Critical thinking is central to PAR. As Greenwood and Levin (1998, p. 86) assert that “AR methods aim to open horizons of discussion, to create space for collective reflection in which new description and analysis of important situations may be developed as the basis for new actions”.

3.5 Approaches to learning

3.5.1. Experiential Learning.

A key distinguishing feature and strength of action research is its spiral nature. This spiral nature of action research has been developed further, most notably by Kolb (1984). The cycle is known as the learning cycle or the experiential learning cycle. This model illustrates a cycle from experience to reflection to conceptualisation to application, with this cycle being continuously repeated. The learning commences with the learners having concrete experience (CE), and the learner then making time to reflect on this experience from different perspectives—reflective observation (RO). Feedback from others is an essential element at this stage. Furthermore the learner should be able to shape and re-shape, their idea, process or construct them, and integrate the new ideas into logical theories, engaging in abstract conceptualisation (AC). These generalisations and hypotheses are then tested in the new situation, through action-active experimentation (see Figure 3.4). The experiential cycle does not involves doing but also reflecting, processing, thinking and understanding. Accordingly, experiential learning involves learners in two main processes of finding out and taking actions, and these can be considered to take place in either the concrete world or the abstract world (Bawden 1995b; Brown & Packham 1999).
Figure 3.4. Kolb’s learning cycle (adapted from King 2000, p. 87)

Fry et al (1999, p.26) develop this with a description of experiential learning that puts it within the constructivist paradigm:

“Experiential learning is based on the notion that ideas are not fixed or unchangeable elements of thought but are formed and re-formed through experience. It is also a continuous process, often represented as cyclical, and being based on experience, implying that we all bring to learning situations our own ideas and beliefs at different levels of elaboration”.

With regard to these concepts of a learning cycle, the basic assumptions mean that experiential learning is re-learning. It involves the modification of earlier constructions: re-organization, re-construction, re-defining, re-thinking, re-shaping, re-interpretation and re-formulation (Malinen 2000, p.75). The experiential learning cycle has the intention of helping people to develop their own personal constructs. This is done through four activities: observing (what is there?), making sense (what does it mean?), planning (what might we do?) and acting (how will we do it?). Kolb provides major insight into experiential learning which he describes as “the process whereby knowledge is created through the transformation of experiences “(Kolb 1984, p.38).

Experiential learning is a process of using our innate critical intelligence to inform action, and then developing social action, a process, which becomes a praxis through which people may consistently live their social values. It is not only a question of adding something to one’s knowledge or changing meaning, but the reconstruction
process modifies the adult personal knowledge of the world holistically (Malinen 2000). In relation to this Jackson (1993, p. 7) has posited:

“The experiential learning cycle is an action research model that can be used to generate knowledge and action in rural development”.

Hence, action research has the intent of social-political action aimed at improving a social system while learning from such action (Kemmis & McTaggart 1988), as opposed to the intent of learning from personal experience associated with experiential learning (Kolb 1984; Mezirow 1990).

Malinen (2000) reviews the work of five major experiential learning theories by Schon (1983); Kolb (1984); Revans (1985) and Mezirow (1990) and concluded that experiential learning involves first order and second order experience. First order experiences are past-lived experiences. They are tacit or implicit. Second order experiences occur when individuals reconsider their existing knowledge and reflect on their experience. Third order experience or “Third order epistemic learning” (Bawden 1995b; Salner 1986) leads to change in the process of second order experience. “It helps the individual to form, examine and perhaps habits acquired by second order learning, as well as learning that she/he can and does unconsciously achieve by second learning” (Brown & Packham 1999, p 10).

A connection between first order and second order experience must be made when someone comes to learn through second order experience. This connection of experiences is sufficient for experiential learning to occur. The essential components of experiential learning that are relevant to the context of this study are second order experience and third order experience, reflection and dialogue. These components of experiential learning provide potentially greater opportunities for helping stakeholders (farmers and development workers) learn from experience in order to gain a better understanding of their practice, and then produce knowledge for improvement.

3.5.2. Reflection in learning

What is the role of reflection in this process of reconstruction? Reflection is the basic component of experiential learning and is often described as a complementary process to action. Boud et al (1985) see reflection as a generic term for those intellectual and affective activities in which individuals engage to explore their experience in order to lead to new understanding and appreciation. Accordingly, Mezirow (1991) describes reflection as a critical process for the learner to learn. He asserts that reflection enables
learners to correct distortions in their beliefs and errors in problem solving. Reflection has a main role to play in transforming and integrating new experiences and understanding with previous/existing knowledge. Brown and Packham (1999, p. 207) further assert that this activity is often viewed as a very passive and overly navel gazing activity. However, in reality, this activity can work well if the learner is engaged and proactive in the process.

Several authors such as King and Kitchener (1994), Mezirow (1991) and Van Manen (1997) note that there are different types of reflection. Mezirow, for instance, identifies three types of reflection that link to “three levels of learning”, learning, meta-learning and epistemic learning:

1. Content reflection, which relate to examination of the problems; it is similar to first level learning that is learning about the matter to hand without conscious attention to the particular learning strategy in use
2. Process reflection, which involves checking on the problem solving strategies that are being used; this is equal to meta learning that is learning about learning. It is how we learn how to put them into practices
3. Premise reflection, which takes place when the problem itself is questioned. This is similar to epistemic learning, that is, learning about what can be learnt” (Bawden 1995b, p. 28; Mezirow 1991, p.104).

King and Kitchener’s (1994) stages of reflection range from the (non-reflective) view that “what is believed is true”, and that knowledge is absolutely certain, to the ability to make reflective judgment through the process of rational inquiry. Argyris (1983) has taken this type of reflection further, and that there is “single loop learning” and “double loop learning”. Single loop learning corresponds with the learning cycle depicted above and double loop learning follows the same process but at a higher level of conception: a meta-level. It means that there are the “first order issues”, relating to the situation we are exploring and there are the ‘second order issues’ relating to the way we are inquiring into the first order issues. Moreover, the outcomes of reflection in experiential learning can include new perspective of experiences, changes in behaviour, readiness for the application of new knowledge, and commitment to action.

Schon (1983) identifies two forms of reflection based on the idea of “reflective practitioners”. The first is reflection on action that occurs after the actions and works through conscious attention to a previous action. This reflection requires time for learners to process their experiences before moving on, and the attention focuses on the
insights, and the learning outcomes made from the experiences. Therefore, from this experience the learners can describe the values, strategies and assumption that make up their theories of action (Packham 1997).

Scon’s (1983) second type of reflection is an unconscious or conscious act that takes place while the action is occurring. This is often termed “reflection in action”. This adjustment is made by the practitioner while practising their practices (Bawden 1991b) to optimise their activities. It happens within the context of the situations based on the learners’ accumulated knowledge. It is to describe the norm we are using (Packham 1997). Schon (1987, p. 22) suggests that practitioners demonstrate it as competence in dealing with ”unique, uncertain, and conflicted situation of practices”.

**Figure 3.5.** Reflection types including critical reflection (Reproduced from Schon 1987; Bawden 1995b)

Bawden (1990; 1995b) has referred to the role of reflection based on the work of Schon (1983; 1987). He develops the reflection concepts with complex problems in the agricultural domain. He suggests that to deal with complex problems and to be effective as experiential learners we need to address (reflect on) our style (see Figure 3.5). This type of reflection makes a significant contribution to higher level learning because it is a reflection on the role of the self in the situation.

From this standpoint, in this study therefore we seek to build a situation for the farmer as well as for ourselves in which we will be encouraged to reflect on our
experiences. To do this, strategies are used such as asking questions, encouraging self-assessment, analysis and critique of ideas and practice.

3.5.3. Dialogue and learning

Dialogue is an essential factor for experiential learning according to Mezirow (1990), Revans (1985) and Schon (1988). Through dialogue, people can develop a shared understanding and common consciousness (Bohm 1993), and also be involved in learning, how to recognize the pattern of interaction in teams that underpins learning (Senge 1994). Dialogue is a persuasive communications practice that can transform those who engage in it. This is because dialogue between people who share meaning that is built up over time, is the source of collective action. There are four basic structures of dialogue according to Malinen (2000, p.104): sharing, testing, justifying, and believing.

The initial step in conducting a dialogue is sharing. This means to open up the individual’s world for the other. This is because the individual learner’s “private conceptions” constitute the raw material which is employed in dialogue (Malinen 2000). Therefore, these private conceptions should first be expressed to others. However, these private conceptions are difficult to share due to the uniqueness and variation of each individual’s experiences (Ellinor & Gerand 1998). Telling and listening are essential processes for expressing our private conception to others, they create the ties between participants in a dialogue (Revan 1982, p.626).

The second step is testing. Testing means to challenge the private conceptions that are gained from sharing by questioning, answering and criticising. In other words, this is testing and individuals a “private conception against others” conceptions. In this context (a) participants are supposed to be ready to accept others’ conceptions, and need to “suspend judgment”; (b) participants need to make efforts to understand the meaning of particular ideas they share with others; (c) participants can suggest a new idea that can be put forward for investigation (Malinen 2000, p.107). Thus, the result of this process is a collective construction which comes from fuzzy views through a tolerance of different views. As Senge (1994, p 352), notes “people do not have to hide their disagreements, but rather to develop their capacity in using them to make the collective understanding richer.”

The next step is justifying. Dialogue seeks knowledge and therefore truth. In this connection, participants together define whether their collective construction can be
justified as truth. The result of this, is that the participants, with their individual capacities and potentialities, can develop an understanding and knowledge which is both objective and shared with others (Malinen 2000, p.110).

The final step means to engage in the “new truth”. Here the participants decide whether they will decide to engage in this new truth or not. In this particular situation they take one of three attitudes to hold: accept and believe it, reject or disbelieve it, or withhold it. Withholding means that he/she takes no judgment but does not change anything.

The relevance of dialogue to this study is that it is a central element of participative learning. Dialogue among and between farmers, extension agents and researchers are crucial to the process of group awareness raising and empowerment.

By engaging in this research the participants became involved in variety of ways of dialogue, which were directly and indirectly linked (see Figure 3.2)

3.5.4. The second and the third order experience of learning

Adults have some kind of inner compulsion or need to learn and develop themselves due to the need to be able to cope more satisfactorily with real life tasks or problems. However, the personal experiential knowing (self knowledge) that they had as a bridge to go to further learning is intertwined. A first order experience therefore is powerful and fundamental, and so it can easily become a boundary for learning. However, the relationship between first order experience and second order experience in fact creates a need to learn.

The role of second order experience is crucial in the learning process, as confronting a second order experience itself generates a need for better understanding. This sudden experience tells the adult that his elementary understanding is no longer sufficient, and that therefore he/she needs to understand better (Malinen 2000). The result of this situation is that an adult commits to learn more. Second order experience happens in the real life context. It often involves disorientation (Mezirow 1990), surprise (Schon 1983), or recognition of ignorance (Revans 1985), elements which all challenge the first order experience and lead to reconsideration and modification of that experience or knowledge (Percy 2002).

The third order experience of learning refers to how we learn about the nature of our paradigm. It is concerned with values and beliefs. This can be achieved if we are to question our prevailing “window on the world” and the metaphors we hold with such
dogged persistence, such as how do I know what I know? (Bawden & Zuber-skerritt 1991; Bawden 1995b; Packham 1997). This follows the social constructivist philosophy which maintains that our personal and shared theories of knowing determine what we see, and thus how we act, in the world around us (Brown & Packham 1999). This refers to a change situation where change of values and worldviews occurs through development of insights into the nature of knowledge. It is through engagement at the epistemic level that ontological, epistemological and human nature assumptions are surfaced and reflected upon. This is associated to the “third level of learning”. It’s over involved interpretation or reinterpretation of experience with the focus on forming new set of expectations, and within the new meaning themes (Kitchener 1983; Mezirow 1991; Bawden 1995b).

3.5.5. Action learning

Action learning is a continuous process of learning and reflection, supported by a group, with an intention of getting things done. It represents a difference from experiential learning in that it stresses the two essential components of understanding and action. It aims to provide an effective means of gaining real solutions to problems in real life situations. Through action learning, individuals learn with and from each other by working on real problems and reflecting on their experiences (Kember 2000; McGill & Beaty, 2001). Here a group of people work together in their “doing and learning”, requiring regular meeting of the group to allow space and time for questioning, understanding and reflecting (Weinstein 1999). Comparing this description with the definition of action research (section 3.3), the distinction is interpreted as that between learning and research in general. Both action learning and action research presume that learning results from active experience. Learning and improvement to an existing situation comes about through iterative or cyclic process. McGill & Beaty (1995, p. 32) believe that “both action research and action learning share the same learning cycle and have many values in common”. Thus, both action research and action learning are the basis for the learning process (Pretty et al 1995). A key difference is that the AR has to be open to public critique and wide dissemination and looking for transferability (O’leary 2004) such as publication, while AL only concerns those involved in the learning process.

The basic theoretical assumption behind action learning that is related to experiential learning is that knowledge can be created on the basis of concrete
experience. Here, the participants formulate abstract concepts and generalisations, and test their concepts in the new situation (Zuber-Skerritt 1995). Moreover, Kolb (1984), Mezirow, (1991) and Revans (1985) are agreed that perception is the basis for knowing or knowledge. In this context knowledge is gained through sensation as a result of being affected by an object. Habermas (1971) suggested three domains of knowledge that could be seen as means of classifying theories of learning: (1) technical knowledge, which includes information about cause and effect relationships in the environment (the positivistic paradigm), (2) practical knowledge, which is concerned with understanding what others mean including understanding social norms, values, and political concepts, as well as making ourselves understood (a component of constructivist paradigm), and (3) emancipatory knowledge, gained through critical self-reflection (and can be seen as a component of the constructivist paradigm).

Reg Revan (1982) the “founding father” of action learning, describes learning (L) as consisting of two elements: programmed or taught learning (P), coupled with asking questions (Q), that is, L = P + Q. Program or taught learning is similar to input knowledge described by Rogers (in King 2000) and questioning insight is the process of action learning. This insight seems particularly essential to this thesis, as it means that learning is a function of knowledge generation which is specific to the individual. In this process, participants can learn through reflection on their progress and they also learn about themselves as well as about the project they are carrying out. Participants also can learn through other group members by listening and discussing their project (dialogue).

3.5.6. Adult learning and critical thinking

Adult learning

The concept of adult learning is grounded in the work of Freire (1972), in which liberation in education is concerned with the relationship between “teacher and student”. He criticises this relationship as the “banking” concept of education. Freire conceives of education as a tool for changing society structurally. He believed that an elite had sought to protect its interest, and had traditionally monopolized knowledge, which he equated with power. The learner was considered as a passive recipient of knowledge. His view that liberating education:

“Consists in acts of cognition, not transferrals of information. It is a learning situation in which the cognisable object (far from being the end of the cognitive
act) intermediates the cognitive actors-teacher on the one hand and students on the other” (Freire 1972, p.53).

This concept was developed by many scientists in various domains, including in the social field (Fals Borda 1985), in education (Knowles 1984; Mezirow 1990) and agriculture (Van den Ban & Hawkins 1988).

According to Van den Ban and Hawkins (1988, p.22), an important task of the extension agent is to support and facilitate farmers. This is called self-directed learning. This statement is one example of the similarity of the modern view of adult learning and agriculture extension. They further note that there are ways to educate farmers; firstly, they may be taught how to solve specific problems; and secondly, they can be taught the process of problem solving. Adults are self-directed to learn what is relevant to them, their needs or their work situation.

In terms of the adult learning process, Knowles (1984, p.9) in his “andragogy” concept claims that adult learners are self-directing and would not learn as well if feeling unduly imposed upon by the facilitator. The learner enters the educational activity with substantial experience, which is a valuable resource for themselves and other learners. Adults become ready to learn when they experience a desire to know or do something in order to perform more effectively in some aspect of their lives. Adults enter an educational activity with a problem-centred orientation to learning, and the more potent motivator for learning comes from within the learners, for example self-esteem. Table 3.4 presents the differences between pedagogy and andragogy in the four basic concepts classified by Knowles (1984).
Table 3.4. The differences of adult learning (Knowles 1984)

<table>
<thead>
<tr>
<th>Process</th>
<th>Pedagogy</th>
<th>Andragogy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-concept</td>
<td>Dependent learner</td>
<td>Autonomous learner</td>
</tr>
<tr>
<td>Experience</td>
<td>A directing relationship</td>
<td>A helping relationship</td>
</tr>
<tr>
<td></td>
<td>Experience of the teacher valued as the</td>
<td>Experience of all valued as sources for</td>
</tr>
<tr>
<td></td>
<td>primary resource for learning (one-way</td>
<td>learning</td>
</tr>
<tr>
<td></td>
<td>communication)</td>
<td>(two-way communication)</td>
</tr>
<tr>
<td>Readiness to learn</td>
<td>Learners are grouped by grade and class</td>
<td>Learners group themselves according to</td>
</tr>
<tr>
<td></td>
<td>Teacher makes curriculum decision for the</td>
<td>interest</td>
</tr>
<tr>
<td></td>
<td>learners</td>
<td>Facilitator helps learners to diagnose</td>
</tr>
<tr>
<td>Orientation to learn</td>
<td>Preparing for the future</td>
<td>learning needs</td>
</tr>
<tr>
<td></td>
<td>Subject centered orientation</td>
<td>Doing in the present</td>
</tr>
<tr>
<td></td>
<td>(grouping and classifying information</td>
<td>Problem centred orientation</td>
</tr>
<tr>
<td></td>
<td>into subjects to be studied now for use</td>
<td>(learning by working on today’s problem)</td>
</tr>
<tr>
<td></td>
<td>someday)</td>
<td></td>
</tr>
<tr>
<td>Motivation</td>
<td>External</td>
<td>Internal (problem feeling, self-esteem,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>work–satisfaction and quality of</td>
</tr>
<tr>
<td></td>
<td></td>
<td>individual to enact goal directed</td>
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<tr>
<td></td>
<td></td>
<td>behaviour)</td>
</tr>
</tbody>
</table>

Cratton (1994) describes the nature of adult learning by linking it with the work of Habermas’s domain of knowledge and Mezirow’s domain of learning, namely: (1) subject-oriented learning relates to Habermas’s technical domain of knowledge and Mezirow’s instrumental domain of learning. In this context the learner is either a passive recipient of information or can be active, (2) consumer-oriented learning can be described as Knowles’s self-directed learning concept. Here the learner makes decisions about learning based on his or her perception or construction needs, and the facilitator responds to those needs. This learning is related to Habermas’s domain of practical knowledge and Mezirow’s domain of communicative learning, and (3) emancipatory learning, that is, the learner engages in critical self-reflection. It is usually expected to produce visible change in the behaviour of the learner. This is also called emancipatory knowledge by Mezirow (1991)

The relation of adult learning concepts to this thesis associated with my role in facilitating farmers to generate knowledge through participative learning. It is important for a facilitator to know concepts, so he/she can understand and apply these ideas to optimize “social learning”. Beside this, in order to gain a better understanding of the context being studied and with consideration of boundary judgment, I encouraged participants to think critically in making their choices and decisions for themselves. Therefore, critical thinking is also a significant area for discussion in this thesis.
Critical thinking

The theory beyond adult learning that seems to me essential to support adult learning is critical thinking. This is because learning to think critically is associated with adult life. The concept of critical thinking that I adapted to support this study is largely from the work of Brookfield (1987). He describes critical thinking as people developing awareness of the assumptions under which they think and act. Here people learn to give attention to the contexts in which their actions and ideas are generated. Although the concept of critical thinking is mostly developed in the higher education field, it seems to be relevant to agriculture extension, more specifically to the process of transferring technology to the farmers. Both development workers and farmers must be capable of thinking critically before technology can be delivered to the farmers, and farmers need to reevaluate the technology which has been delivered to them. Hence, it is important to develop some specific questions and their associated purposes in dialogue with farmers. The questions needing to be addressed for development workers are:

1. Do farmers need this technology?
2. Why is this particular technology needed?
3. How does it work in this area? Is it suitable for the local circumstances?

The questions for farmers are:
1. Why do we need this technology?
2. What does it mean for us?
3. How does it work?

These types of questions particularly help an intervener (development workers) to identify appropriate knowledge resources from their previous experience, and also knowledge gaps which might need to be filled as part of the intervention (Midgley 2000).

3.6. Systems thinking

A system can be described as a set of elements that are in relationship with one another to form a whole. Smith (1997, p.104) described systems thinking:

as…the conceptual glue, which binds these different elements together, and which provide the tools that enables isolated actions to be seen as an integrated pattern.

The concepts of systems thinking emerged in response to the understanding that reductionist approaches (breaking things into their component parts) did not account for
the relationships between these parts, and the resultant emergent properties of the whole (Capra 1996). However, Bawden (1995b) sees systems thinking as more than holistic thinking, in that it yields new insights and tools for dealing with the problems holistically.

In addition, conventional approaches to problem solving in agriculture are not holistic. Reduced parts are examined according to the predisposition of the investigator, often in isolation from the whole (Sriskandarajah et al 1991;1992). For example, a livestock specialist examining a production problem often looks for linear, cause-effect relationship in his/her effort to find technological solutions followed by transmission and adoption by farmers. This cause and effect relationship fails to see all aspects of the operation of wider systems. However, Ison et al (1997) assert that systems scholarship is more diverse than often realised and systems approaches in agriculture and rural development arise from a number of different traditions which may not inform each other. From this perspective, Bawden (1985; 1991a; 1995b) argues that in the process of inquiry, the researcher should look at the situation being studied as a holistic system; that is to see “farming” as sets of activities undertaken by people. In systems approach, the question under investigation is “what are the issues that the people perceive are problematic”? How can we improve the whole situation?

Checkland (1981) distinguished systems thinking into hard systems thinking and soft systems thinking. Hard systems thinking is established by an observer standing outside the systems boundary, where the system is viewed as a real-world entity, whereas soft systems thinking is seen as problematic in itself, being established within the systems boundary by an actor (rather than an observer) and, therefore, being subject to change (Brown & Packham 1999, p.6). This indicates a movement to an interpretivist position, seeing systems as socially constructed rather than objectively real. As mentioned earlier, human life and practices need to be understood dialectically. This means that the way of thinking about the world is seeing them as constructs, rather than them seeing them as objective reality. Here systemic ways of thinking about problematic issues are apparently associated with the “object out there”. This means systems are primarily based on issues and ways of viewing such issues and not on things per se (Sriskandarajah 1991).

Bawden (1995b) introduces systemic development for dealing with the complexity of a situation in which its focus of learning is an organisation. Systemic development is a set of ideas that promotes thinking and acting that will ensure continued development
of an organisation through participative learning (Packham 2002a). Bawden (1995b) emphasises that systems themselves, or the systemic notion, consist of three systemic level: organisation as a system in focus, its subsystem (especially the learning subsystems, that is, sub-system for persistence, subsystem for productivity, sub-system for participation and sub-system for production as “a set of learning relationships”), and the supra system, or immediate system environment.

The above explanation of systems thinking means undertaking comprehensive analysis in which defining its feature through reflection on what is to be included and excluded from analysis (Churchman 1971). In addition, Midgley (2000, p.36) asserts that “where exactly the boundary is constructed and what the values are that guide the construction will determine how issues are seen and what action to be taken”. Therefore it is necessary to explore different possible boundary judgments in order to optimise the inclusion of information in analysis.

In order to understand the systems and to understand the impact of changes, there is a need to apply systems analysis to identify the key actors or stakeholders that are part of the system and assess their part an interest in the system. Stakeholder analysis can capture this because it seeks to reveal the different, conflicting perspectives of stakeholders and to show that the many different ways of viewing the situation can be equally rational (Grimble & Wellard 1997; Ison et al 1997)

The latter concept is pertinent to this thesis in that it involves the actor in the process of shared problems appreciation, learning about the problems and taking collective action to improve it (Chekland 1981).

3.7. Credibility and reliability

Action research is usually considered to lie within the post-positivist paradigm, in which understanding is the focus of the investigation. The reasons for trusting the study are different from those of empirical inquiry, which is generally grounded in positivism and in which testing a hypothesis is the objective of the study (Smith 1997). Many researchers have questioned the trustworthiness of action research findings because the methods and findings of any one study are not replicable to another situation (Badger 2000). However, Greenwood (1994) counters this argument, suggesting that although the situation may be individual, unique and specific, it is “of a kind”, and that through

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2 Stakeholder in this context means any group of people, organised or unorganised, who share a common interest in a particular issue or system.
construction of theory, some finding may be generalised to other situations. He then asserts that as a simple approach, action research relies on face validity alone, that is the subjective judgment in which finding appears to fit reality. This implies the ability of individuals involved in AR to act with free choice and integrity within life situations (Champion & Stowell, 2002).

According to McNiff (1994) validity in action research is not about methodology, but is concerned with personal and interpersonal issues. This view is supported by Waterman (1998), believing that the validity of action research needs to be put in its context of linguistic and interpretive practices that consider its characteristics and goals. He further describes validity in term of dialectical, critical and reflective validity.

Dialectical validity refers to regular analysis and reports of movement between theory and research and practice in examining the tension, contradiction and complexities of a situation. In this context, understanding is the product of accumulating different perspectives and different interests of a given reality. This process is achieved through the cycles of action research.

The second, critical validity, involves analysing changes. In this sense, the measure of validity is not the degree of changes effected, but rather the analysis of intention and action, their ethical implications and consequences. It means that the validity of action research needs to be examined by its moral responsibilities to improve people’s lives through involving them in the research process as co-researchers (Carr & Kemmis 1986).

Finally, reflective validity is the researcher’s recognition and exploration of biases, demonstrating validity through considering the process of interpretation. It means that action research can be judged by how the reflection is represented in the study.

Lincoln (1990) cited in Pretty (1994) has developed some questions to examine the validity of action research:

1. Have people been changed?
2. Do they have a heightened sense of their own constructed realities?
3. Do they have an increased awareness and appreciation of the constructions of other stakeholders?
4. To what extent did the investigation prompt action?

The following questions are drawn from Pretty’s framework of 12 criteria for establishing trustworthiness:
1. Prolonged and/or intense engagement between various actors. This is primarily to build trust and rapport, to learn the particulars of the context, and to keep the investigator(s) open to multiple influence.

2. Persistent and parallel observation. This is for understanding both phenomenon and its context.

3. Triangulation by multiple sources, methods and investigators. This is to cross-check information and increased the range of different peoples’ realities encountered.

4. Analysis and expression of differences. This is ensure that a wide range of different actors are involved in the analysis, and that their perspectives and realities are accurately represented.

5. Negative case analysis. This is the process of sequential revision of hypotheses as insight grows, with the objectives of revision until one hypothesis accounts for all known cases without exception.

6. Peer checking. Peer or colleague checking involves periodical meetings with peer not directly involved in the inquiry process.

7. Participants checking. This is to test the data, interpretations and conclusion with people with whom the original information was constructed.

8. Reports with working hypotheses, contextual descriptions and visualizations.

9. Parallel investigations and team communications. These are essential for dependability as they demonstrate replication.

10. Reflexive journal. These are diaries individuals keep on a daily basis to record a variety of information about themselves.

11. Inquiry audit. The inquiry team should be able to provide sufficient information for disinterested person to examine the processes and product in such a way as confirm that the findings are not a figment of their imaginations.

12. Impact on stakeholders’ capacity to know and act. It is important to be able to demonstrate that the investigation or study has had an impact (Pretty 1994, p. 43).

Similarly, Checkland and Stowell (1998) stated that validity in action research requires a recoverable research process based upon a prior declaration of the epistemology, in terms of which findings will count and which knowledge will be expressed.
It is clear from the work of the authors reviewed that validity in action research is examined considering the characteristics and goals of the research. Discussion on this can be described as a process of (a) how the researcher and researched collaborate in the research process, (b) how the participants respond and interpret to the data that is provided for introspection and reflection, (c) how the participants focus on the relevant problems and opportunities in the context of the study.

### 3.8. Research Methods

Participatory rural appraisal was an overall method that was employed in this study to collect the information about the everyday experience of participants. This method was not only used to gather information but also allowed researchers and the people under study to understand the situation under investigation as well as to analyse their knowledge of life and conditions. (Chambers 1994a;1994b; Theis & Grady 1991)

The term PRA is used to describe a growing family of approaches and methods to enable local people to share, enhance and analyse their knowledge of life and condition, to plan and to act” (Chambers, 1994c, p. 1437).

Participatory action research provides a flexible way for researchers to enter and explore the research location. McTaggart (1999) suggested that a good way to start a PAR project is to collect some initial data in the area of general interest, then to reflect and then to make a plan for action. In that study, I had to be creative in using action research methods to achieve the purposes of action research itself.

From the large basket of the Participatory Rural Appraisal (PRA) (Theis and Grady 1991) techniques and tools, I had to choose the most suitable one based on the reality that I faced.

Research strategies were needed in order to get close to the community being studied. PRA technique were used, namely, semi-structured interview, direct observation, transect walk were employed for gathering information from different sources and perspectives. Triangulation involves use of different sources of information on the same topic, refers to use of known reference points (or known information) to determine the nature of unknown points (or unknown information) (Pretty 1995b). Dick (1993) provides some examples of multiple information sources, namely: (a) “different informant, (b) different research settings; (c) the same informant responding to different questions, which address the same topic; (d) information collected at different times; (e) different researchers and (f) different methods” (Dick 1993, p. 12).
3.9. Framing participatory action research to the inquiry process

Figure 3.6 illustrates the framework of participatory action research in this study. The focus was on collaboration and dialogue between farmers, development workers and researchers in mutual understanding of the reality that produced local theories as a basis for action. In this sense, farmers reflect on the reality of their knowledge about their farming practices, whereas development workers and researchers reflect on farmers’ perception on reality.

**Figure 3.6.** The framework of PAR to this study

Figure 3.6 depicts the process of the cycle, which consists of four basic phases: Reflective observation (rapid appraisal), planning, action and evaluation. The cycles of planning, monitoring and evaluating were organised in six month periods. A formal meeting to evaluate and plan the overall progress was undertaken at the beginning of the cycle. In addition, there was ongoing detailed monitoring and evaluation throughout the
implementation. The action was embedded in on-going reflection and evaluation as a dynamic process. The important thing, in the spiral process of action research, is that at “each step”, the information so far available should be used to determine the next step.

Reflective observation (Rapid appraisal)

Stage one was reflective observation. This reflective observation aims to explore the reality of the situation being studied. The important question to be asked in this circumstance is “what it is”? This question proved effective in encouraging the farmers to express their experiences and knowledge about particular practices, and as an entry question for the “how and the why” questions.

Several techniques such as direct observation, transect walks, informal and formal meetings, interviews and workshop were employed in this stage in order to understand farmers’ perception of reality, and decisions they have made (more detail of the implementation of these techniques is discussed in section 4.1). The outcome of this phase was to understand the situation being studied. This includes the problems perceived by farmers, and farmers’ expectation. During this stage the researcher also had an opportunity to develop rapport with the villagers as well as build trust with them.

Planning

Stage two was planning. This included presentation of the findings and proposed solution to the community. In this planning stage, the AR team and learning group collaborated in designing or constructing ideas, in order to integrate ideas into logical theories. The new ideas were explored and discussed among the participants. Different sources of information were accessed. For example, information was collected from former research or from other farmer groups. Any technology introduced to the farmers had the potential to be modified. Furthermore, the proposed solution needs to be assessed in the local circumstances. For example, the proposed solution needs to be reviewed in terms of natural resources, social capital (networks, access to wider institutions of society) physical capital (basic infrastructure) and financial capital (cash, savings).

Community group discussion was the principal method used to facilitate the negotiation and decision-making. During this process the roles of participants were negotiated and agreed upon as shared objectives, activities were undertaken together
and there were division of tasks and responsibility. For example, the tasks of research team and development workers were to facilitate the learning process.

**Participatory action**

The generalisations of local theories and hypotheses were then tested in the new situation through action. The form of test could be an informal trial to test the theories behind a particular practice or it could be an “entry point” of activity. The objective of this phase was to become familiar with the technology being tested and adapted to the specific condition. During this phase, farmers shared their experiences with others through group meetings and field visits. The role of the AR team and development workers was to provide information required and to facilitate farmers in conducting their activities such as facilitating farmers to conduct a demonstration plot. During this stage, participants can generate new knowledge and in depth understanding about a particular situation, for example, the AR team and development workers learned about farmers’ strategies to manage their forage fields.

**Evaluation.**

The information generated during implementation action was documented, systematised, and analysed by the participants. Group meetings were held in order to evaluate the activities and share the experiences, and to decide the next activities (new cycle) based on the previous experiences (previous cycle).

**3.10. Conclusion**

In this case participatory action research was used as a form of collaborative inquiry that involved empowering local people to help themselves in their struggle for improved livelihood and food security. The focus was on the improvement of livestock production and the associated extension approach through a reflective learning process. PAR provided a framework for the villagers to participate in the research process that incorporated cycles of planning, acting, observing and reflection.

The action research was a development process that accommodated technical, practical and emancipatory transformation along a social change continuum. Rather than these being different research types, they represent potential opportunities that modify the facilitator’s roles in the research process.
The methods and techniques were used to help in understanding people’s experiences in their farming practices and taking action to improve them. Participatory action researchers need to be critically aware of the way in which the social situation and traditional pressures shape the inquiry process. The methods employed in each stage of the PAR process were: interviews, group meetings, transect mapping, focus group discussion and workshop.

In the following chapters, I discuss this action research experience and draw out the strategies and methods that developed during the research process. The focus of activity in this study area was on developing forage technology with farmers in a collaborative way, which was found through the PAR to be a problematic issue for farmers. Several participative learning activities were carried out, namely: farmers workshop, developing forage model, plot demonstration, field visit and small training on forage management. This participative learning on developing forage technology is discussed in Chapter 6.
CHAPTER 4

SETTING UP AND COMMENCING THE PAR

4.1 Introduction

This chapter describes the initial fieldwork that was carried out from June to September 1999. It focuses on exploring the meaning of the everyday lives and practices of farmers and development workers. During this period Participatory Rural Appraisal methods (PRA) (Theis & Grady 1991; Chambers 1994a) were employed in gathering the information and analysing some of this information. The way method used were:

1. Observation and transect walk
2. Interviews
3. Informal and formal meetings
4. Focus group discussion, and
5. A formal workshop.

These methods were also employed to encourage stakeholders to describe and give meaning to their worlds. In this context, stakeholders described their life experiences and made interpretations of these experiences, as a way to attend to new experiences.

The livestock production systems under study were complex and included human activity systems. Therefore, it was impossible to understand them independently (Bawden & Macadam 1989; Sriskandarajah et al 1992). Theories of phenomenology and hermeneutics seem relevant to this context. These theories provide an opportunity for researchers to understand the situation being studied by collecting and interpreting data from participants’ everyday experiences, particularly experiences related to phenomena being studied. As Amezah (1998) points out, it is appropriate to start an action research project from a phenomenological and hermeneutic standpoint; that is, by encouraging participants to attach meaning to their own worlds instead of trying to find out meanings separately from the participants who experience them. In relation to this, shared interest and understanding about the reality of the situation needs to be achieved in attempting to initiate interventions for situational improvement.

The important point obtained from this exploratory stage was that participants had an opportunity to draw the “rich picture” (Checkland 1981) of their own situation, as well as the researcher learning about the social realities of the study area in
collaboration with stakeholders (Pretty 1995b). Furthermore, the results gained from this exploration were helping participants to design future action.

### 4.2 Action research organisation

When starting to work participatively with a community, it is important to have an interdisciplinary team membership, including local people. This contributes to the authenticity of the findings, as it encourages the expression of diverse views and the ongoing questioning of individual assumptions via critical dialogue. As Pretty et al (1995) assert, working in a group produces better ideas and is more likely to identify errors of judgment before action is taken, compared to individuals working separately. This AR organisation also helped me in gathering the information, in the analysis of this information and planning and implementing action. Therefore, the fieldwork started by establishing rapport with the stakeholders. Figure 4.1 illustrates the interaction and general outcomes of this approach in this study area.

![Figure 4.1](image-url)  
**Figure 4.1.** The working partnerships and outcomes in Tombolo village

The key principles applied to develop a learning partnership were:

1. involving local people as subjects
2. appraising for local knowledge and skill
3. sharing ideas and information
4. applying dialogue and negotiating strategies
5. assuring that participants had influence over development decisions, and
6. maintaining a concern for facilitating the learning process as much as outcomes.
Furthermore, the vision that was held while maintaining this relationship was:

Everyone has weaknesses and strengths. To obtain the most favorable result we need to complement each other, because no one is better than the other. We need collaboration. Hence, we need to shift our paradigm on problem solving. Through this project we can actualise our potencies, share knowledge and skills, and learn from each other.

These interactions would represent an arena of learning for all (AR team, farmers and development workers). This means that for everyone involved in the process it would be a learning process and it was expected that everyone would learn something that could be applied to improve his or her practices.

4.2.1. The action research team

The AR team consisted of four people, including myself, all from different backgrounds: one was an agriculturist, one an economist, and one a village leader. The members of the research group were willing to participate in this research because all were interested in working with people and all of them would like to improve their skills and knowledge to work for the community. For example, Mr Syarifuddin had experience working with a community in another District in this region as a volunteer in a transmigration area. He was a farmer and was also the village leader who was appointed by the Tombolo villagers in 1997. The two other members of the research group were Ms Rita Pasha and Mr Lukman. Mr Lukman was willing to participate in this research because he was interested to learn about the participatory approach that was employed in this study. Mr Lukman used to work in a Non Government Organization (NGO) in the field of sanitation and water management programs. He hoped that by involving himself in this research he would improve his understanding of participation and the practical skills of community development. Ms Pasha is a livestock services officer; she also held the position of extension officer since 1990. She was interested to join this project because she wanted to improve her ways of dealing with farmer problems. She had been trained in the theory of the participatory approach, but she had not applied it to her working life because she did not know how to start. She said:

High adoption technology requires the full participation of farmers but they decline to participate. This is the difficulty that I am facing in working with farmers, how to gain their participation. I think their low participation results
from their low education. I think we need to find out why and how to gain farmers participation (MRT#2)

Ms Pasha aimed to increase her knowledge and skill in gathering farmer participation. Prior to her involvement in the project her interests had been focused solely on the technical aspects of livestock production.

My motivation to this study has been described in section 1.1. What I would like to emphasise here as my vision to this study, particularly to this AR team, is:

No one has the right to subordinate others, either within AR team, between AR team and farmers as well as with others who are involved in this study. Therefore, we need to break the boundaries of being superior through having equal rights and responsibilities, holding solidarity and flexibility.

Every member of the AR team had experience working with a community. However, it was essential for us to be compatible in attitudes to community development. Accordingly, the first task of the AR team was to establish a common view and attitude to community development. The question addressed was: what does community development mean? The research team came to an agreed position that it was a process that enables people to:

1. realise their potential
2. develop self-confidence, and
3. develop better knowledge and skills.

From these perspectives, the question that then arose was: how was this going to be achieved? The AR team decided that their focus would be on helping farmers within their own situation, where contextual problems could be recognised and appropriate solutions sought from any available source that was relevant to the local conditions. This became a basic concept for undertaking any activities that occurred in this study.

The second task for this team was to understand the approach and philosophy that was employed for this study, its methodology and its goal. This was achieved by holding a series of discussion and meetings. Throughout this process I emphasised the “open agenda” of the research and the need for working collaboratively with others.

Furthermore, although most of the members of AR team had knowledge about participatory approaches, I thought it was necessary for them to better understand the principles of PAR. I facilitated their understanding of the concepts and principles of Action Research by writing a paper (see Appendix 1) on Participatory Action Research (PAR) based on discussion of PAR by Zuber-skerritt (1995); Stringer (1996),
Greenwood and Levin (1998); Kemmis and McTaggart (2000). This discussion compared conventional research and PAR, approach because the conventional research was more commonly used in this study area specifically and in Indonesia generally. Box 4.1 summarises the differences between the two approaches.

**Conventional Research**

A researcher forms an objective/a problem and formulates a hypothesis. This is followed by collecting data, analysing the data and drawing a conclusion. In this type of research, the researched is an object and is not involved in the research process from data collection to implementation of action. Therefore, the significant stage between the researcher and researched is how to provide valid and reliable data. The relationship between researcher and researched is limited to taking and giving information in the context of the research. Research conducted within this approach may or may not lead to action for changes.

**Participatory Action Research**

The issues being investigated is stated by the researcher and researched through involving some of the people in the study area in the research process to work collaboratively with the researcher to identify problems and to implement action. The process takes a spiral of cycles of planning, acting, observing and evaluating. The relationship between researcher and the people under study is beyond taking and giving information; it is much broader and deeper as the emphasis is on how to improve the situation or to bring about changes to the study area. This change could be in attitudes, skill, knowledge, material conditions. In the context of this study a high degree of collaboration and participation among AR team members and later between AR team and farmers (learning group) in the village is required. The most important is learning by all participants through the process.

**Box 4.1** The differences between Participatory Action Research (PAR) and Conventional Research discussed by the AR team (Zuber-Skerritt. (1995); Stringer (1996); Greenwood and Levin (1998); Kemis and McTaggart (2000))

**4.2.2. The Learning group of farmers**

Conducting a research process labeled PAR within the community in focus was complex, due to the diverse needs and expectations of participants. Thus it was important to consider how this Participatory Action Research could be made available to the local community and particularly the Tombolo village community, because all of the community could not actively participate in the action research process itself.
I therefore set up a learning group that was representative of the community and had committed to this research process. I called this a learning group because this group not only acted as co-learners but could also act as a forum for the whole community, reflecting community thinking to the research team as well as discussing appropriate issues with the wider community. This group actively participated in the research process, from the data collection through to implementing action. This relates to other studies that in which PAR is:

A process in which some of the people in the organization or community under study participate actively with the professional researcher throughout the research process from the initial design to the final presentation of the results and discussion of their action implication (Whyte 1991, p. 20).

In order to define the learning group, the AR team discussed general issues based on the field experiences. By sharing these experiences the AR team outlined several alternatives in terms of participation. The alternatives were:

1. Working with more than one group of farmers, including women, who were appointed by the AR team, to represent the village community,

2. Working with a group of farmers and women that was selected by the community itself.

These alternatives were discussed to choose which alternative would have the most effective impact for the villagers. The discussion was guided by looking at each alternative in relation to weaknesses and strengths, and the cultural tradition of the local community, the following points were considered:

1. The first alternative had the advantage of covering a wide community but it did not guarantee that the project would bring many outcomes. Meetings involving large numbers of people would be difficult to organise because of the lack of time availability of people, particularly in the early stages of the research, which required more attention.

2. The second alternative would cover a smaller number of community representatives, would create an exclusive group of people, but would possibly ensure the consistency of community involvement since it could be managed properly.

The AR team decided to commence the project by focusing on the second alternative with a small group of people, with the expectation that it would be expanded gradually to a wider community through the PAR cycle. Formation of this group was
based on the willingness of the people who wanted to participate in this study, to give and receive feedback. Selection of the members of the group then became a topic to discuss by both the AR team and the community. The question was, should we involve women in the learning group? Informal and formal meetings with male farmers and women farmers and within the AR team itself, were held in order to find out community opinion on whether to involve women in the learning group. The AR team thought it was important to consider having balanced gender perspectives in the research study.

There were differing opinions on this, as male farmers preferred to work only with males in the group for the following reasons:

1. women have their own tasks in the household
2. the male is the head of the household, and
3. men were responsible for the maintenance of their livelihood, particularly for their farming activities that were the main source of their income.

Reason given by women:

1. women had no interest in working with men in the learning group because it was not related to their tasks
2. women did not feel comfortable working with men
3. women were willing to be involved in the project if the purpose of the project itself related to their practical needs such as improving their income, health, knowledge and skills. These practical needs related to their interests such as sewing, embroidery, growing vegetables and raising chickens.

Based on these opinions the AR team decided the membership of the learning group should be all male but that it would involve women in every activity that emerged during the course of the study. Furthermore, women’s perspectives were also included in the analysis process. According to Patricia et al (1997) gender bias needs to be considered in any research and extension in agricultural and rural development. He further asserts that sensitivity to local circumstances such as kinship and tradition is essential for a better understanding of the dynamics of the social relations on which the research is based.

The learning group therefore consisted of seven male farmers. Most of the members of the learning group were recognised as leaders amongst farmers and all agreed to allocate time to meet regularly. The role of the learning group was to inform the wider community about the action research process and negotiate the process with them.
The first task of this learning group was to establish ways of working together as a group, building up self-reliance, trust and confidence. The AR team facilitated the learning group in understanding more about their situation, based on their experiences, taking action, and reflecting on the action. We expected them to critique the information gathered from our inquiry and our judgements and to impart their own views. Here, the participants who were involved in PAR would create their own environment in which they give and get valid information, make free and informed choices (including the choice of practices), and generate internal commitment to the results of the inquiry (Argyris & Schon 1991).

The principles used by this group were to share information, to respect each other, and to be communicative so as to enhance mutual learning. It was important to overcome the usual perspective of these farmers, that others would do everything for them. In this context I, as the research facilitator, played an important role in encouraging participants to achieve a deeper awareness of themselves, creating a dialogue throughout the evolving partnership that addressed such questions as: Who are we? Why are we here? What is our purpose? What do we believe? How can we work together? As Freire (1972) pointed out, emancipation (gaining freedom) means rejecting damaging images of one’s own culture, replacing these with pride and acquiring abilities for self-reliance in order to function autonomously.

The methods used by the learning group were: diaries for self-collecting data, diagrams, field visits, informal conversation, informal interviews, mapping.

4.2.3 Community discussion group

Besides forming a learning group, the AR team formed a community discussion group. The function of this group was to further test ideas and to generate knowledge from a wider community of stakeholders before action was implemented. This community group was bigger than the learning group, and comprised men and women farmers, a livestock extension officer and local government staff who were willing to participate in this group. Following the input of ideas from the AR team, which had already been discussed with the learning group were discussed in this group. This broader group generated possible and probable interventions that could be implemented to help improve the situation. The focus was on the identification of needed changes, and the direction that such changes might take. Participants were encouraged to impart
their ideas and concerns about topics introduced to the meetings. Participants were also asked to respect all views shared by others.

4.3. Selection of the study area

The selection of the study area was done in consultation with the head of livestock services at provincial and district level. Bantaeng district was selected as the site of the study area for several reasons. Firstly, it was chosen because it was an area of focus for livestock development programs as it was a source of meat supply for the capital city of South Sulawesi (Makassar) and its neighbouring district. Secondly, it was chosen because I had worked for a livestock development program in this area since 1996. Finally, in terms of its agricultural ecology, Bantaeng district is classified as an agricultural area with mixed farming practices where livestock play an important role in the farming system, so it was related to my knowledge and interest area.

In selecting the study area, I visited several villages: Baruga, Bontoloe, Malilinggi, Parangloe and Tombolo (in the same commune) in order to make a comparison in terms of ecology, topography, farming management and wealth. Previously, I had planned to carry out the fieldwork in three villages. However, considering the limitation of project resources I decided to focus on only one village. The limitations included those of research time and the nature of PAR itself: the aim of PAR to bring the people together in order to share their views and concerns. As Kemmis and Mc Taggart have argued:

Action research starts with small groups of collaborators at the start, but widens the community of participating action researchers so that it gradually includes more and more of those involved and affected by practices in questions (Kemmis & Mc Taggart 1988, p. 25).

To actualise these ideals we needed more time, patience and tolerance to involve people in the study. Working and focusing in a small group compared to a big group enables people to become more expressive. In addition, PAR is about people and their needs. As stated by Arratia and dela Maza (1997, p. 36):

PAR is about people and their needs. You have to begin from where people are at and move along with them. You cannot impose a particular process on them and expect them to stay with it.

These two representations bring PAR into effect representing a scholarly, people-oriented approach. Considering the limited time and resources of the study it was
decided to undertake it in one village, rather than in the three villages. Tombolo village was chosen to be the research site based on the fact that it was:

(a) Representative of important growing livestock program in the study area. (Tombolo was one of eight villages with a growing livestock development program in Bantaeng district)

(b) Representative of a dry land area (dry land area mainly for maize, 25% of Bantaeng district)

(c) Typical proportions of landowners and landless families, i.e. the average for Bantaeng district was 55% landless

(d) High density of cattle in this region (the ruminant species of greatest importance in South Sulawesi). Previously, cattle rearing had been identified by the agricultural department as having potential for on-farm income generation.

4.4. Data collection and analysis

The data collection and analysis took place between June and September 1999. Data were collected using several methods from PRA and were divided into three stages, namely: understanding stage, interactive stage and development and analysis of issues stage.

The understanding stage included observation and transect walk; the interactive stage consisted of interviews, informal and formal meetings, focus group discussions, and workshop; the development and analysis of issues stage consisted of community group discussion. All interviews were audio taped for cross checking purposes. Some data was also collected from other secondary sources such as agricultural project reports and statistical reports.

4.4.1 Understanding Stage

Observation

The first visit to Tombolo village involved direct observation in the village. We did the village observation over two weeks. Key informants were spoken to during this period. The purpose of this observation was to become familiar with the study area and to elucidate information concerning the socio-cultural and biophysical condition of the study village. These observations provided valuable information on site characteristics, opportunities and constraints. During this period, we (AR team) also developed our
relationship to the villagers by involving ourselves in any social activities that happened in the villages, such as participating in the religious ceremonies and harvesting events.

**Village Transects**

The AR team walked through the village to map the various agro-ecology zones. This was carried out over one week. During this time we also had conversations with the people that we met in the fields. This transect provided an opportunity to characterise the village in terms of farming systems, land use patterns, resources utilisation and crop-livestock interaction (see Figure 4.2 and Figure 4.3 p, 83 & 84 for the village transect mapping and village map).

Secondary data was also collected during this stage. The secondary data included local population figures for the last year; local statistics from education and health, data on the local agricultural services including crops and livestock services, and meteorological reports. These were assessed, and discussed with relevant government officers.
**Figure 4.2. Transect Mapping**

<table>
<thead>
<tr>
<th>Agricultural System</th>
<th>Darussalam (Medium Land)</th>
<th>Palanjong (Medium Land)</th>
<th>Botongajeng (Medium Land)</th>
<th>Berau (Medium Land)</th>
<th>Bungasa (Low Land)</th>
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<tr>
<td>Maize Based System</td>
<td>Maize Based System</td>
<td>Maize Based System</td>
<td>Maize Based System</td>
<td>Rice Based System</td>
<td>Rice Based System</td>
</tr>
<tr>
<td>Crop Pattern</td>
<td>Mixed Cropping, Inter Cropping, Rotation Cropping</td>
<td>Mixed Cropping, Inter Cropping, Rotation Cropping</td>
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<td>Mixed Cropping, Inter Cropping, Rotation Cropping</td>
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</tbody>
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| Average Plot Size (Ha) | 0.5 - 1 | 0.5 - 1 | 0.5 - 1 | 0.5 - 1 | 0.5 - 1 |

| Average Livestock Holding per Farm | 2 Horses | 1 Cattle | 1 Goat | 2 Chickens | 2 Ducks | 1 Horse | 1 Cattle | 1 Goat | 2 Chickens | 2 Ducks |

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Note: The image contains a table with columns for agricultural systems, crop patterns, average plot sizes, average livestock holding per farm, soil types, and problems encountered in each area.
Figure 4.3. Mapp of Tombolo Village
4.4.2. Interaction stage

In depth interviews, informal and formal meeting, focus group discussions and workshops have a high potential as participatory methods for understanding the problems and needs as perceived by farmers (Atta-Krah 1984). A formal workshop was carried out in order to build the “rich picture” of the study area. Formal and informal meetings were also conducted to discuss the problems in a group of men and women in terms of gender differences.

Interviews

The main method employed during this stage was in-depth interviews. The AR team carried out these interviews over two weeks. Before undertaking the interviews, we discussed the question list and the strategies as a guide to be used in gaining the information. During the interview process, the interviewers aimed not to impart their views and thinking to the farmers.

We interviewed the farmers in groups with a maximum of 5 people, in order to avoid any one person dominating the conversation. Open-ended questions were used. An example of such a question was: “Please tell me what you think about your livestock production?” “Please tell me, what are your thoughts about the extension program?” According to Spardley (1979) open-ended questions are preferable to specific questions, as they allow the respondent greater freedom to express their thoughts and beliefs about topics under discussion. The interviews therefore followed the narration of themes that were important to the respondent. The interviewers also made use of “minimum prompts” such as “yes”, “and then” and “go on” etc, and repeated the last few words used by respondents to encourage them to develop their story (Heron 1989). The interview finished with an acknowledgment of farmers’ responses by saying “thank you” to them.

The interviews were divided into sections - in the morning and in the evening. In the morning we interviewed the women and in the evening we the men. The interviews were conducted separately to coincide with the available time of the farmers, and in order to cross check the answers of husband and wife, particularly about the division of labour in farming and in the household as well as in decision making. The farmers who participated in the interviews were selected by the AR team, depending on their wealth ranking, as identified by the villagers based on house characteristics, land holdings and ownership of livestock. The purpose of these interviews was to obtain any information
on farming practices, livelihoods, to learn about and understand any issues that the farmers perceived as important and to glean any topics about the farming system, particularly the topics about animal husbandry considered important by the farmers. The interview process stopped when we found that the answers we collected were similar. Interviews were recorded with the permission of the respondents and we also took notes.

The recorded tapes were transcribed at the end of each day’s interview, and the AR team discussed and crosschecked the notes that were collected during the interview. This enabled us to note new themes and different views expressed by respondents. The information that was collected was then presented to the community at a workshop, as we recognised that some of the information needed to be discussed in a wider forum. We needed to engage the stakeholders who had direct influence on livestock production, in order to build up a richer picture of the situation in the study area. Involving the stakeholders in the workshop actualised this.

A Formal workshop

Workshops are one way of inviting stakeholders to “sit at the table” to discuss their problems (Salomon and Engel, 1997). The workshop was held over two days on 15 to 16 of September 1999 at the Bantaeng district headquarters with 60 participants, including two representatives from local government, nine extension workers, five representatives from local livestock services, 34 male farmers and two women farmers group, three youth farmers, one from the NGO, and the AR team. I worked with two members of the AR team in facilitating this workshop. The purposes of this workshop were:

1. to build up a “rich picture” of the situation in the study area
2. to share and analyse experiences that concerned the participants
3. to create knowledge and understanding about the situation and current practices of participants through undertaking collective reflection on their experience
4. to introduce to the participants, the research, its findings so far, and the approach that was adopted for this study.

The workshop began with an introductory session with the aim of allowing participants to become familiar with each other. The participants were asked to introduce themselves, and explain why they came to the workshop and what they expected from the workshop. The session then continued to introduce this research to
the community. I ran this session by introducing the research team, and the purpose of this study. The message that I described to the participants was:

We are here to learn from you. We are interested in understanding what you perceive as a problem and resources needed for living in this area. We are interested in hearing from you particularly if you have any questions that you perceive as important. We would be glad to support you in addressing them through research, planning and action.

Recognition of the nature of the study should eliminate distrustful feelings of participants about this study. I also informed participants that there was not any financial support to back up this study. We ended with the agreement with participants that:

In order to achieve our goal, we need to work as a collaboration between farmers and the AR team and any institution that is related to the research activities. Our collaboration is not just in terms of doing action together but also in terms of sharing resources that every one can provide to support the research activities.

In this working agreement, special attention could be given to the attitudes of the stakeholders who participated in this study, which should be conducive to a genuine participatory approach.

In the next session of the workshop, the activity was to discuss the issues faced by farmers in practising their farming in order to build up the rich picture of their situation. “Mind mapping” was one tool that we utilised at this stage to represent information. Participants were divided into small groups to build a “rich picture” of the situation. A picture allowed the presentation of a lot of information in an economical way, and indicated the connectivity that existed more so than words. It was rich because there was an opportunity to incorporate everything they knew about the situation in the picture.

To do this, participants worked in small groups of 5-6 to draw their current situation and to discuss the problems in depth. Working in small groups enabled participants to have a chance to speak and express their thoughts, feeling and views more than in a big group. In this sense, participants were encouraged to share their experiences with others, explore their ideas, feelings and thoughts, and articulate their views. Here, everyone had to appreciate other views. No contribution was regarded as the best or worst, but only as different. Furthermore, participants were also asked to paraphrase their problems and to classify the problems based on priorities of need, and then putting this into the matrix.
by ranking them. Each group produced a rich picture and problem rank based on their knowledge of the situation that they experienced. Each group presented their findings to the whole group. And then, in the big group participants had an opportunity to synthesise their respective pictures through discussion into a composite picture (see Figure 4.4. p. 89, the rich picture of the study area). This activity enabled participants (a) to learn to appreciate the differences and similarities of ideas that have been discussed with others; (b) to link topics and ideas held by others on the issues discussed.
Figure 4.4. Rich picture of problem situation in the study area (developed from formal workshop in Tombolo village)

On second day of the workshop, session was held to introduce the farmers to the practice of farming systems management. Successful farmers and an extension officer ran this session. The extension officer and a livestock officer presented their activities and program. A successful farmer shared his experience in running his farm. These presentations were used to initiate exchanges of ideas and to review the activities and performance of development workers. In addition, at the end of the session I asked the participants to evaluate the workshop activities. Had the workshop been useful to them?
or not? Furthermore, this evaluation would enable participants to assess the effectiveness of the workshop in relation to their context and experience as a method for problem solving.

Evaluations showed that 54 (90%) participants found the workshop useful, 6 (10%) of them found it useful but it required more time in discussion. Box 4.1 illustrates some participant responses regarding the relevance and effectiveness of the workshop for them.

“The workshop was good because we can sit at one table with development workers to discuss the problem and find possible solution. Although at first I was a little bit shy to speak, I spoke because the people in my group encouraged me to speak”.

“I found this workshop is not bad, although I found difficult it to follow particularly when we focused to discuss the problem… drawing it and writing it and make connection among them on the paper. We need little bit effort to do it”.

Box. 4.2. Some of the response of the workshop by participants

Facilitation of the workshop

The workshop was arranged to create a collaborative atmosphere in which participants could learn from each other. It engaged the participants to discuss the issues in depth and look for possible solutions, while at the same time participants could share their views without fear of intimidation.

The AR team facilitated the workshop as well as being involved in all activities as participants. During the small group discussion the AR team acted as members of different groups while at the same time observing and listening to people in every part of the session. Some discussions were tape recorded, as well as being paraphrased through note taking.

I facilitated the plenary session and it provided me with an opportunity to introduce the approach adopted in this study. The major challenge of this was using familiar language that was acceptable to all participants. For example, instead of using “mind mapping” or “brainstorming” we used “pengelompokan gagasan” which translated direct to English means “grouping the ideas”.
The outcomes of the workshop

The outcomes of the workshop are also presented as narrative in the outcomes section 5 (see p.94) together with the results gained from interview and other methods adopted in this study. In addition, the main outcomes of this workshop included (a) better understanding of a problematic situation in relation to other contexts, (b) the identification of possible solutions, (c) the creation of strategies for the improvement of practices. The workshop provided space for participants to learn from each other through discussion in small groups. This process enabled participants to develop mutual trust and appreciate other views.

4.4.3. Development and analysis of the issues stage

The issues perceived by farmers were discussed through several group meetings with the learning group. The purpose of these meetings was (a) to collect pertinent data related to this issue and (b) to look for possible solutions to solve the problems. Related information from other studies that had been carried out in some other parts of Indonesia as also collected by the AR team through consultation with the Livestock Services Department.

In this study area, a scarcity of fodder for animal feeding was an important issue that arose. The AR team then focused on this problem to look for possible solutions to solve such problem. Several meetings with the learning group were conducted to collect pertinent data that related to this issue such as to identify the availability of fodder species in the neighbouring villages, and other factors such as rainfall pattern, soil and socio-economic factors. This process is described in Chapter 5.
4.4.4 Data analysis

Undertaking an interpretive approach, we were able to interact with the different perceptions of reality of stakeholders. Data gathered from interviews were analysed through content analysis to identify the patterns and relationships in the experiences of respondents. The process was conducted by using a sorting technique to organise the data into topics or themes (Patton 1990; 2002). It was an attempt at grouping the topics and categories according to the meanings attached to experience by respondents. The frequency counts that emerged from this data process should not be seen as an attempt to test a hypothesis, but rather used as an indication of how widespread particular topics were among the respondents at the time of the study.

The person who carried out the interview coded the data into a classification scheme and then the results of the coding were compared and discussed with others. This technique was found to be useful in terms of giving insight into the meaning of the data, as different people looked at the same set of data in different ways. This was referred to in Patton (2002) who asserted that analyst triangulation can be used to compare the findings of the same data, and that such analysis can help reduce the potential bias that comes from one single person doing all the data collection and analysis. The Nvivo software (Bazeley & Richards 1999) was also used to analyse the data.

4.5. Conclusion

This chapter describes the initial process of conducting PAR in Bantaeng District South Sulawesi, Indonesia. It started with several group formations, several methods of data collection and ended with a workshop. The PRA methods were used to investigate the situation under study. Through the PRA the researchers not only gained the information about the situation under study but enabled researchers as well as farmers and development workers to interact with each other, sharing experience and learning from each other, thus giving them better understanding of multiple views of the reality that participants hold and getting insight about the situation in the study area. The information gathered from this process therefore was owned by the participants and then used by the participants to inform action in order to improve their own situation. Through this process the key problematic issues were identified and then, together with participants, were sought possible solutions to solve the problem.
Through this process of data gathering, I also found that combining multiple methods of inquiry helped us in formulating questions. As Whyte (1984, p. 96) points out:

Observation guides us to some of the important questions we want to ask the respondent, and the interviewing helps us to interpret the significance of what we are observing.

Several methods were combined as a means of gathering information from stakeholders in order to gain accurate information. These were through:

1. cross checking the information that we found from the understanding stage and interactive stages such as interviewing, informal and formal meetings
2. generating the information in the workshop and then
3. feeding back the information to the stakeholders (developing and analysis issues stage).

The interaction occurring in this study or learning partnership can also be said to break down the boundaries of power relations in the social system to accommodate collegial relationships among participants.

The outcomes of this process and the usage of information to inform action are described in the next chapter in detail, including the general information about the study area.
CHAPTER 5

THE OUTCOMES OF THE INITIAL EXPLORATION OF THE PAR

5.1. Introduction

This chapter describes the information gathered from the initial fieldwork (exploratory stage) that was aimed to: (a) understand the situation being studied, (b) identify the problematic issues and needs as perceived by farmers and (c) identify possible solutions to meet these needs.

The outcomes of the exploratory stage are recorded as a description of the economic, social, cultural and organisational lives of smallholder livestock farmers and development workers as they support each other for the purpose of livestock production in the study area. The problems perceived by farmers and development workers are also presented.

5.2. Background of Tombolo village

Tombolo village is located 14 kilometres from the capital city of Bantaeng district, approximately 135 kilometres from the provincial capital of Makassar. Administratively the village is divided into 6 sub-villages (dusun), Tanah Beru, Bungaya, Borongganjeng, Palanjong, Darussalam, and Turungasa, which border in the north with Gantarangkeke administrative village (Kelurahan Gantarangkeke); in the South with Nipa-Nipa village; in the west with the Tanaloe administrative village (Kelurahan Tanaloe) and in the east with the Kaloling village. Formerly, this village was part of the Gatarangkeke administrative village but about two years ago it become independent. Four of the sub villages are located along the main road or along a side dirt road, while the other two can be reached only by walking a kilometre or two across paddy or maize fields. According to the village leader, the population in 1999 was 2,304 people consisting of 1132 males (49.13%) and 1,172 females (50.87%), and containing about 540 households with an average of five to six people per household. The village is spread over an area of 6.11 kilometres squared of upland topography (Kantor desa Tombolo 1999). The average density of population was approximately 377 people per kilometer squared. The village inhabitants are Makassarne, an ethnic group with strong Islamic beliefs. Most of the people live in traditional houses, which are constructed of wood with roofing of zinc or palm leaves. The houses are built close to
each other in a group. Each house consists of three big rooms: a detached kitchen, separate sleeping area and separate eating, and living area (*baruga*). *Baruga* in the local language means “meeting room”. According to the village leader, this type of house makes up approximately 96% of the total houses in this village.

5.3. Village (*desa*) systems

Like other parts of Indonesia, before 1979 the *desa* (the smallest unit with some autonomy) system followed similar patterns set during colonial days (before 1942). The older village (*desa*) structure showed dominant kinship affinities. The new *desa* Act of 1979 requires each *desa* to have a head, so the *desa* has an election for its head, not a government official (except in urban areas). All these types of *desa* are under the direct control of the local *Camat* (representing the local Bupati/District Head).

The Indonesian government classifies *desa* systems into a three-tiered system based on their state of development namely: *Desa Swadaya, Desa Swakarya and Desa Swasembada*. *Desa Swadaya* is a village which perpetuates the traditional ways of life and continues to exist in an *adat* (custom or tradition) sphere. *Desa Swakarya* is a village which has been influenced from outside and is able to manage its own village affairs, and *Desa Swasembada* is a village in which the people are dynamic enough to generate further development on their own. Tombolo village is classified as *Desa Swakarya*. This means that the village has been influenced by outsiders. The village needs guidance and assistance from either the government or a private organisation in order to improve local economic and social conditions (Kantor Desa Tombolo 1999).

The *desa* law has also made provision for a *desa* council for “*musyawarah*” (LMD) a place for deliberation to decide on matters of community concern. Based on Presidential Decree a *desa*-head also chairs another *desa* institution, called Village Agency for Community Resilience (LKMD) to enact popular participation, work out annual *desa* plans/works and decide on costs, with funding from *desa* members, supplemented with grants of funds from the President’s office. At the moment the grant per village is about Rp.10 million. This grant started 30 years ago, starting then at the level Rp.100,000 per village, a part of which is earmarked for *Program Kesejahteraan Keluarga* (PKK), “family welfare program” (PKK as a section of LKMD) administrated by the wife of the village head. The LKMD function is like a Non Government Organization (NGO), being a local device to harness community participation, but with
rules stipulated by Presidential decree, an indication of the co-operative relationship between state and desa/village.

5.4. Education

The majority of the farmers who were interviewed had attended primary school. However, 15 people did not finish it, seven did not finish junior high school and five did not finish high school. Moreover, most people in the village had attended primary school (see Table 5.1 for the educational level at Tombolo village).

Table 5.1 The level of education of people in Tombolo village
(Kantor Desa Tombolo 1999)

<table>
<thead>
<tr>
<th>Highest Educational level</th>
<th>Number of people</th>
</tr>
</thead>
<tbody>
<tr>
<td>TK (Kindergarten)</td>
<td>57</td>
</tr>
<tr>
<td>SD (Primary School)</td>
<td>295</td>
</tr>
<tr>
<td>SLTP (Junior high school)</td>
<td>133</td>
</tr>
<tr>
<td>SLTA (High School)</td>
<td>165</td>
</tr>
<tr>
<td>Akademi (Diploma)</td>
<td>9</td>
</tr>
</tbody>
</table>

There were 4 primary schools and one Madrasah (the Islamic school equal to junior high school) in the village. To attend high school a student had to travel three to eight km outside the village. According to respondents, fees for high school were expensive. As revealed from informal meetings with farmers, giving a better education to their children was still a priority for them. However, due to the uncertainty of market prices of their crops and the high cost of farming they suffered a cut in their income. This phenomenon of course affected the availability of money to spend on educating their children.

5.5. Household structure

The term “household”, as used in this study, refers to a group of people who, at the time of this study, stayed in the same house and “ate from the same pot” and who cooperated together in the production and consumption of farm produce. There were 56 households interviewed from six sub-villages. The average number of people per household was five to six people. Members of most of the households consisted of husbands, wives, and biological children; some of them included adult brother and sister. The households were, therefore, extended beyond the conjugal home through blood relationships. Most of the households were headed by men, and about 2% (11) of them were headed by females, widows caused by death of the husband.
5.6 Socio-economic activities

The economy of Tombolo village was mixed, agricultural based, and integrated with the nearby market in Banyorang (6 Kilometres) and the district capital, 14 kilometre away. According to the villagers, farming was the major source of their income. Therefore, in order to maintain their income they seek diversity rather than specialisation. They sustain diverse plants and animals, to fulfill their various household needs and to ensure against production risk. Such a situation is similar to many smallholder farmers identified by Bayer and Bayer (1992), Chambers (1993), and Netting (1993) as smallholders who are practicing intensive agriculture, producing relatively high annual or multi crop yields from permanent fields that are rarely or never rested, with fertility refurbished and sustained by practices such as tillage, crop diversification and rotation, animal husbandry, fertilization, irrigation, drainage and terracing.

Of the 56 respondents, all owned livestock in various amounts, such as chickens, cattle, goats, horses and buffaloes. Seven households only owned rice land and grow a few cocoa trees, bananas and cassava on the land near their homestead. The remaining households (49) owned maize fields and 37 of the 49 integrated it with cotton or other crops such as cassava. Most of the farmers grew bananas, mangos, cashew, cocoa, and mangos, in the land near their homestead.

The main source of farm income was from maize, rice and cotton. There was also a small amount of cash from livestock production such as chicken (eggs and meat). Cattle and goats were kept as a form of savings and sold if the farmer needed extra money such as for education. However, the agricultural department had identified that cattle rearing had potential for on-farm income generating activities, and cattle were being introduced to farmers. This encouraged farmers to focus not just on crops for their main sources of income.

Economic activity varied considerably with gender and age, though, it was discovered, not by class. Men have exclusive access to raising cattle, goats and horses as well as cotton, from planting to harvesting. Women have income earning activities which vary with the season from chickens to fruit gardens, banana and mangoes (either for home consumption or for the market). Depending on the cycle of rice planting and harvesting, women were involved in labour for these activities. Occupations of the people in Tombolo village are illustrated in Table 5.2.
**Table. 5.2.** Occupation of people in Tombolo Village in 1999

*Kantor Desa Tombolo 1999*

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Number of household</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farmer</td>
<td>1062</td>
</tr>
<tr>
<td>Trader</td>
<td>7</td>
</tr>
<tr>
<td>Services</td>
<td>20</td>
</tr>
<tr>
<td>Civil Servant</td>
<td>8</td>
</tr>
<tr>
<td>Police (ABRI)</td>
<td>-</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1097</strong></td>
</tr>
</tbody>
</table>

Another economic activity in the village was the several small grocery shops, which sold food for daily life together with one of the village cooperatives (*Koperasi Unit Desa, KUD*). The *KUD* was mainly used to support rice and maize production. Mostly the *KUD* did this by providing loans, and assistance with fertiliser, seed and pesticide supply.

Markets were not held at the neighbouring village or in the capital city of district; some traders/retailers came to the villages and also traded door to door. The public transportation that connects the village with other economic activities outside the village was the *pete-pete* (mini-bus) and the *bendi* (the traditional transportation, carriage drawn by horses).

In addition, social activities within the village were mainly organised by the village leader, and included *karang taruna* (the youth organisation) and *remaja Masjid* (an organisation for Muslim youth). *Pengajian* (the Qur’an learning) was carried out once a week in the mosque. There was also a regular meeting of the women in the village that was organized by the PKK.

**Decision making**

Most men and women said that they made decisions jointly as husband and wife. Men led decision-making in term of investments such as buying a cow or land and marriage. When there was a difference of opinion, the husband had the decisive vote. The wife normally controls the household income, particularly for daily expenditure. When the husband works as a farmhand, the husband hands over his salary to his wife. Thus, in Tombolo village, both husband and wife shared responsibility for the well-being of their family.
Also in this village women never attended any activities run by the agricultural department except for those activities that related to their domestic role, such as health promotions run by the local health services and some activities that were run by PKK.

5.7 The Climate

In general there are two seasons in Bantaeng district, musim gaduh and musim rendengan. Musim gaduh (West season) means that the rain occurs on the West side of the district, and usually lasts from October to March. Musim rendengan, (East season) means that the rain occurs on the East side of the district, normally lasting from April to September. This pattern is locally modified by two big mountain ranges, Lompobattang and Latimojong which cut across vertically in South Sulawesi.

According to farmers, over the last 10 years the rainy seasons have changed in pattern. The dry season each year is longer than the rainy seasons. They noticed that a long dry season is normally repeated every 5 years. The average rainfall a year is about 1070 millimetres.

![The average rainfall during 10 years (90 - 99)](image)

**Figure 5.1.** The average annual rainfall during 10 years (1990 - 1999)
(Dinas PU Pengairan Kab. Bantaeng)

Consulting Figure 5.1, rainfall is extremely variable in volume and spatial and temporal distribution, although the average monthly rainfall is above 100mm. Some months, namely August, September, October and November experienced rainfall of less than 100 mm.
5.8. Topography, land and landscape

In the village, there are two streams; one is a tributary of the Nipa-nipa river, which is the second longest river in Bantaeng district. This river is a source of everyday domestic water, which is used for home consumption and for irrigating some rice fields. The other small stream, Turungasu, is also used for watering rice fields, but is dry during the dry season.

Geographically Tombolo village is located about 350 metres above the sea level with red-brown Mediteran soil. Compared to other villages in the commune, the land in Tombolo village is very stony due to the volcanic eruption of a hundred years ago. Effectively, the land for farming is divided into two types - the land for rice fields and the land for maize and cotton fields. Most of the land for rice fields depends on the rainfall. Additional lands used for growing kapuk trees have not been used for crop cultivation because of dry and stony land.

Land use and agrarian matters

The average landholding of farmers is less than one hectare. A farming family may own the land or rent it from other farmers. Some of the farmers who are landless are employed by rich farmers (this type of farmer is called ‘tesang’ farmer). In this type of farming, they practise a sharing of production systems. For example, in rice farming, the rice yield is divided into 50% for “tesang” farmers and 50% for the land owners; the situation differs with maize yield where the ‘tesang’ farmers gain 75% of production and the owners gain 25% of production. According to the farmers, these systems have been applied for many years. The landowner mostly inherits from their father; usually the farmer gives the land to their son after the son gets married. Large farmers are those who have land between 1.0 and 2.0 hectares.

In Indonesia generally and in this village specifically, primarily the land belongs to the government. In rural areas the farmers are free to use the land for growing crops as long as the land does not belong to somebody else. The farmers need to inform and be registered by the village head, and the village head will issue the permit and authority letter to the owner of the land. In rural areas, the farmer just has the “rinci” (the picture) of their land in their hand, not the certificate of ownership. This type of land cannot be sold.
5.9. Crops and cropping pattern

Agricultural production in this study area is based on food crops such as maize, paddy-rice, cassava, sweet potato, banana, and mango. A small amount of tree crops like cocoa and cashew, and a small amount of vegetables such as *kacang panjang* (snake bean) and sweet potato are found in back yards near the homestead and near the small forests that are located near the river. The *Pohon kapuk* (*Kapuk* tree) is found all around the village and small numbers of *pohon jati* (hardwood or teak tree) are found in the small forests. Farmers also grow cotton: some farmers integrate this with maize. According to the farmers they have grown cotton for many years and this crop provides quite a good income for them.

Cotton is usually integrated with maize while rice is planted as a pure-stand crop. It is also common for farmers to plant a small amount of cassava and vegetables among the main crops like maize. These are normally harvested by women for daily home consumption. It is also common for farmers in this study area to plant maize in the bund between the rice fields. Farmers who have no land, or landless farmers normally do this.

Maize is normally the first crop planted in the field and is later intercropped with cotton or cassava. After harvesting the maize, the field then becomes a pure stand for another crop such as cotton or maize. Table 5.3 shows the cropping pattern applied by farmers in the 1999 cropping season.

**Table 5.3.** Crops mixture cultivated by farmers interviewed

<table>
<thead>
<tr>
<th>Types of crops cultivated</th>
<th>Number of farmers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maize</td>
<td>7</td>
</tr>
<tr>
<td>Maize, cotton</td>
<td>29</td>
</tr>
<tr>
<td>Maize, cotton, cassava,</td>
<td>5</td>
</tr>
<tr>
<td>Rice</td>
<td>8</td>
</tr>
<tr>
<td>Rice, Maize, sweet potato, vegetable, snake bean</td>
<td>12</td>
</tr>
</tbody>
</table>

Note: the number of farmers is more than respondent number because some farmers had different fields, for example a rice field and maize a field)

Consulting Table 5.3, most farmers planted from two or three different crops. However, maize and rice were the dominant food crops, and cotton was the main cash crop. These practices helped farmers to produce more of their food requirements. They also helped farmers to insure against total crop failure. This observation is similar to studies by Devendra and Thomas (2002a) among smallholder farmers in Asia.

Agricultural activities in the study area followed the local rainfall pattern. The first cultivating season was from the beginning of March to July, the period of greatest
rainfall. During this time the farmers did most of their farming activities for the year because this time was supposed to be the long period of rain. The minor season of rain normally occurs in late January to late February. However, in practice in Tombolo, farmers traditionally organised the planting seasons depending on the types of stars that appeared in the sky. The type of star that appeared was considered to indicate the rainfall and the characteristics of the wind. They classified the stars into three types. Firstly, if the stars appeared in a cluster, it was called “Purung-purungnga”. These stars appeared in the east side, and indicated a dry season in a year. The second was “Pajekokang” (the star shaped to form a plough). If these stars appeared in the sky, this indicated the rainy season. Usually the farmer begins to plant the crops after this “Pajekokang” star appears in the sky. The third type of star was “Bosinajangang” (chicken rainy). This star indicates the wind characteristics. The Tombolo farmer believes that if all of the star types appear together, it means that a year will only have one rainy season. However, if the stars appear separately then this means more than one rainy season. In order to share opinions about the “stars sign”, the farmers confer with other farmers from neighbouring villages to decide the planting time. This is called “mabulosibatang” (the farmers sit together to discuss the planting time). According to farmers the rainfall has become unpredictable and the amount of rain has decreased both in the major season and in the minor season. These changes in rainfall intensity and periodicity have become the major threat to farming activities of the villagers.

**Figure 5.2.** illustrates the annual cropping pattern in the village.

<table>
<thead>
<tr>
<th>Feb</th>
<th>March</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sept</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
<th>Jan</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Maize</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Paddy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Maize</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Cotton</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Figure 5.2** The annual cropping pattern of three major crops in Tombolo village

5.10. Agricultural activities

The major livelihood activity of the people in Tombolo village was farming. The farmers plant their crops - maize, rice and cotton- mainly on a small scale, and they also raise a few livestock. Rice is planted mainly for home consumption whereas maize and cotton are mostly sold at market. Cattle and horses are the major livestock found in this area. Cattle rearing are mainly for cash and labour and horses are used only for labour.
The households raise chickens and ducks in small numbers, usually less than ten chickens, for eggs and meat.

Most farmers interviewed have been engaged intensively in farming since finishing school. Many of the farmers interviewed had up 20 years’ experience in farming. Initially, young men start by helping the father then continue on their own, especially after getting married.

5.10.1. Family participation in farming activities

Farming is basically the responsibility of men (father and son) in the family. This is related to the belief of the community that the father should do the cultivation, for the first planting of the “paddy”. It is because the father is the head of the household and has the responsibility to feed all of the members of the household.

As shown in Table 5.4 family labour was found to be the most important source of labour for this village, although some farmers shared labour with others or hired it.

Table 5.4. The main sources of labour for the farmers interviewed

<table>
<thead>
<tr>
<th>Source of labour</th>
<th>Number of household</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family labour only</td>
<td>18</td>
</tr>
<tr>
<td>Family + hired labour</td>
<td>15</td>
</tr>
<tr>
<td>Family + shared labour</td>
<td>23</td>
</tr>
<tr>
<td>Total</td>
<td>56</td>
</tr>
</tbody>
</table>

Family labour included the husband, wife, children and extended family. Farmers usually shared labour with their neighbours or relatives. This close knit community had a long established pattern of mutual support and assistance (*gotong royong*). This was a tradition of the Indonesian people. Hired labour or farmhands were normally people from outside the village.

In practice, although both men and women harvest crops, the spiritual belief of the community meant that mothers took part in the first part of the harvesting season (they harvest a few of the rice crops and take it home with them) and then the other members of the family or the farmhand will complete the harvest. During the harvesting of the crops the wife is not allowed to speak and on the way home (she takes some rice with her), she is not allowed to speak as well. She will speak after she gets home. It is believed that women (mothers) are responsible for all of the household activities, particularly the preparation of food for their family; thus she should do the first harvest
for their family. They do not speak because they believe that it could reduce the blessing of their rice yield. This belief indicates how this community regards women as having a high position in the household, particularly related to their domestic role.

Besides doing harvesting, women also undertake drying and marketing of rice (if rice production is more than enough for home consumption) and women share with their husband in decision making about the marketing of their crops. In addition, usually farmers are faced with labour problems between June and July. This is because they have to divide their efforts between the storage of the major seasonal products and land preparation for the next cultivation.

Livestock rearing is mainly the responsibility of men, except for chicken, men share with females. Chickens are raised traditionally without cages, fed from food scraps and are used for sources of egg and meat. The role of women and men in productive activities within the household and community is illustrated in table 5.5.

Table 5.5. Productive activity of the people by gender in Tombolo village

<table>
<thead>
<tr>
<th>Productive Activities</th>
<th>Rice</th>
<th>Maize</th>
<th>Cotton</th>
<th>Cattle</th>
<th>Buffalo</th>
<th>Goats</th>
<th>Horses</th>
<th>Chicken</th>
<th>Duck</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plowing</td>
<td>MA</td>
<td>MA</td>
<td>MA</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Hoeing</td>
<td>MA</td>
<td>MA</td>
<td>MA</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Clearing</td>
<td>MA</td>
<td>MA</td>
<td>MA</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Seeding</td>
<td>MA,FA</td>
<td>MA</td>
<td>MA</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Planting</td>
<td>MA,FA</td>
<td>MA,FA</td>
<td>MA</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Spraying</td>
<td>MA</td>
<td>MA</td>
<td>MA</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Harvesting</td>
<td>MA,FA,</td>
<td>MA,FA,</td>
<td>MA</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Drying</td>
<td>FA,MA</td>
<td>MA,FA</td>
<td>MA</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Storing</td>
<td>MA,FA</td>
<td>MA,FA</td>
<td>MA</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Marketing</td>
<td>MA,FA</td>
<td>MA,FA</td>
<td>MA</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Feeding/drinking</td>
<td>-</td>
<td>MA,MC</td>
<td>MA</td>
<td>MA,M</td>
<td>FA,M</td>
<td>FA,MA</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Breeding</td>
<td>-</td>
<td>natural</td>
<td>natural</td>
<td>natural</td>
<td>natural</td>
<td>natural</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Shedding</td>
<td>MA,MC</td>
<td>MA,MC</td>
<td>MA</td>
<td>MA,M</td>
<td>FA,MA</td>
<td>MA,FA</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Hatching</td>
<td>-</td>
<td>MA</td>
<td>MA</td>
<td>MA,M</td>
<td>FA,MA</td>
<td>MA,FA</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Marketing</td>
<td>-</td>
<td>MA</td>
<td>MA</td>
<td>MA,F</td>
<td>MA,F</td>
<td>MA,F</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

MA= Male Adult; FA= Female Adult; MC= Male Children; FC= Female Children

* AI artificial insemination

Domestic activities including childcare, cooking, washing, cleaning, and collecting water are mainly the responsibility of women. Sometimes the older children also help to mind their sister or brother as soon as they are old enough. Table 5.6 demonstrates the role of women in domestic activities.
Table 5.6. The role of women in domestic activities in Tombolo village

<table>
<thead>
<tr>
<th>Activities</th>
<th>Gender</th>
<th>Time</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cleaning</td>
<td>FA, FC</td>
<td>Daily</td>
<td>Home</td>
</tr>
<tr>
<td>Cooking</td>
<td>FA, FC</td>
<td>Daily</td>
<td>Home</td>
</tr>
<tr>
<td>Washing</td>
<td>FC, MC</td>
<td>Regularly</td>
<td>Home</td>
</tr>
<tr>
<td>Water collecting</td>
<td>FC, MC</td>
<td>Regularly</td>
<td>Garden</td>
</tr>
<tr>
<td>Fuel collecting</td>
<td>FC, MC</td>
<td>Daily</td>
<td>Home</td>
</tr>
<tr>
<td>Looking after the children</td>
<td>MA, FA</td>
<td>Periodically</td>
<td>Market</td>
</tr>
<tr>
<td>Shopping</td>
<td>MA, FC</td>
<td>Periodically</td>
<td>Home</td>
</tr>
<tr>
<td>Home repair</td>
<td>MA</td>
<td>Periodically</td>
<td>Home</td>
</tr>
</tbody>
</table>

MA = Male Adult; FA = Female adult; FC = Female Children; MC = Male Children.

5.10. 2. Farm management and financial matters

According to farmers, they manage their farm using low capital input implements such as an axe, hoe, spade, crowbar, short machete and sickles to accomplish their farm chores. Most of the farmers interviewed relied on their own resources to finance their farm operation, while some farmers relied on KUD (cooperative) and moneylenders to operate their farm. As observed by Netting (1993), smallholder farmers sell only the surplus of their produce. It was however observed from this exploratory stage that farmers sell their produce, including livestock produce such as eggs and chickens, to meet family needs. Very little of their money were returned as an investment to their farm except to buy seed, fertiliser and pesticide for the next planting season.

Most farmers interviewed had access to informal credit sources, although others studies found that informal lenders are strongly criticised for cheating their clients (de Haan 1992). Farmers have no choice but to borrow either from informal lenders, friends or relatives in order to continue the existence of their farm. This external funding was utilised by the respondent of this study area mainly when the maize yield failed or there was an unstable market price. It was revealed from interviews and in the formal workshop that the lack of finance was one of the most important problems mentioned by farmers (Table 5.10, p.114). To cope with financial problems, farmers normally go to a money lender. This money lender charged 5% monthly interest. The majority of such loans have to be repaid by farmers after selling their farm production. Although this system incurred high interest, there was no official bureaucracy behind this system thus making it a faster and a more efficient financial service.

The lack of capability of farmers to reinvest money in their farm operation is a serious threat to agricultural development in Indonesia, as well as in this study area.
Many attempts have been made by the government to help smallholder farmers. For example, during the beginning of the 1970s when the new varieties of high yield rice were introduced to the farmers, the government launched *kredit usaha tani* (KUT) through the *Bimas* program (mass media). Credit was to come from a government bank (Bank Rakyat Indonesia), partly in cash but mostly in the form of vouchers for such inputs as fertiliser and pesticides, redeemable either at the village unit branch or farm input shop in the village. However, this credit schemes failed due to the incapability of farmers to repay the credit on schedule. Furthermore, learning from this experience, many sorts of credit schemes were developed by the government through the agricultural department and cooperative department to establish a formal credit scheme to provide effective financial support. Such credits are organised by Bank Rakyat Indonesia (BRI) to distribute soft loans to the smallholder farmers. There is also some soft loan financial support established by local government for livestock production, which is organised by the local livestock services in each district. In this system the local government provides up to one and a half million rupiah for buying cattle, to be redeemed after 1 year. There is no interest in this system, but farmers have to pay a certain amount of money as an administration fee. This system started in 1998. After one year the livestock services already distributed the money to more than 10 groups of farmers, each group consisting of 25 members. In the study village, the number of farmers getting this soft loan was about 50 farmers.

There was little interest among farmers to borrow money from the bank because of bureaucracy in the banking institution. This loan is most often given late too them, sometimes after the planting season is over, or when livestock investment is not appropriate. In this case the loan becomes useless as a “production loan” and becomes misapplied to other expenditures in the household, and consequently, farmers cannot afford to repay such a loan.

5.10.3. Rice farming

A farmer grows rice once a year for home consumption, usually in late January or in the beginning of February, depending on the rainfall. This rain-fed rice land is usually left idle during the dry season. The rice varieties planted are based on recommendations from the agricultural services, and include high yield varieties such as “a variety 42”, “a variety ciliung” and “a variety Bromo”. According to the farmers, in order to gain high production, they need to use chemical fertilisers such as Urea, Kcl, Za, (Zwavelzur
Amonia), and SP36 (Super Phosphate fertiliser). To grow one hectare of rice field requires 150 kg Urea, 25 kg SP36, 50 kg Za and 25 kg Kcl. The farmers say that the increased availability and application of fertilizer has raised rice yields to almost 5 tons of milled rice per hectare. Through discussion with farmers, it became clear that they defined an agricultural system as meaning food production. Therefore, generally the smallholder farmer is identical with mixed farming systems that depend also on livestock such as cattle for increased food production (Devendra 2000; Devendra & Thomas 2002a; Netting 1993).

5.10.4 Maize farming

Beside rice, maize is the main crop planted in this area. There are approximately 500 hectares of maize field; however, the average field owner has only one hectare or less. In contrast to rice, the farmers grow maize mainly for cash. Considering the farming practices and the farming systems, I asked the farmers what was their maize yield per hectare; according to farmers, they gained between two or three tonness maize per hectare. Some farmers only gained less than 2 tonnes per hectare. I tried to gain their opinion on their forecast for the maize yield for the next year. Most of the farmers predicted that the maize yield would be the same next year as the previous year; the maximum maize yield is about 3 tonnes per hectare. In this village the farmers grew maize twice a year. Usually the first planting began in the second week of March and finished in the second week of June; the second planting began in the first week of July and finished in the first week of October (see Figure 5.2).

5.10.5 Cotton farming

Farmers plant cotton mainly for cash. Cotton is normally planted after the first main crops, from July to January. Farmers planted cotton either as an inter-cropped with maize, or planted as an individual crop. The maximum cotton yield was two tones per hectare.

At the end of 1997 the government introduced a crash program for cotton production to the villager. This included a “technology packet”. The implementation of this program was through the agribusiness approach, that is, using the “nucleus plasma scheme” of mutual cooperation between a private company (nucleus) and farmers (plasma) in the form of a cooperative. In this process the “nucleus” provides farm supplies, processing and marketing and the farmers conduct farming activities on their
own land. In addition, this system is called *bapak angkat*. However, this system has failed due to the inability of the nucleus to “determine the market price”.

5.10.6. Livestock keeping and production

Livestock play an important role for the smallholder farmer (Devendra 1997; Ehui *et al* 1998; Udo & Cornelissen 1998; Devendra 2000; Devendra & Thomas 2002b) as well as for the people in this study area. The interviewed farmers keep livestock not only for drought power but also for cash. They obtain cash by renting them put for work (cultivation), and transportation, and also through sales for meat, eggs, skin, manure and savings. One study observed that poor farmers own and raise livestock such as cattle or goats with several objectives in mind: namely, to meet their material, cultural and recreational needs (Devendra 1999). In this village farmers emphasised they had a mixed farming system, where crops and animals were integrated on the same farm. The benefits of crop-livestock interactions are many. This crop-livestock interaction is well described in Devendra (2000); Devendra and Thomas (2002a; 2002b); and Thorne and Tanner (2002).

Most of the farmers in this study area kept livestock such as cattle, buffalo, horses, goats, chickens, and ducks under their house. In the morning they take the animals to the field while the farmer they do work. They feed the animals with grass, which is available near the field. The farmer keeps small numbers of animals, mostly one or two cattle or goats per household, and less than ten chickens or ducks.

According to information gained from interviews with the farmers, animal raising was expected to be a source of additional income (Figure 5.3 shows the percentage of purpose of raising animal).

![Figure 5.3](image)

**Figure 5.3.** The purpose for raising animal

Some farmers interviewed who raised cattle or goats were not the owners but a *tessang* (as a raiser only, not the owner), meaning that they raised the cattle or goat with the
progeny being divided between themselves and the owner. The *tessang* farmer is responsible for feeding the livestock, but is not responsible if the cattle or goat dies or is lost. Under this system, people who have money buy the livestock and give it to other people to raise. According to farmers, most of the owners of the cattle or goats are their relatives from outside the village.

Livestock holding varies according to farm size (Kristanto, 1982) in this study, of farmers with holdings less than 0.5 hectares, about 14% own cattle; on farms of 0.5 - 1 hectares the animal ownership is about 40 %; and on farms of between one to two hectares, about 46 %.

![Animal Holding](image)

**Figure 5.4.** The relationship of animal holding to farm size in Tombolo Village

Few of the farmers house their cattle. They feed the animals twice a day. In the morning they take the cattle with them to the field, so the cattle feed themselves from the weeds near the existing crops in the field. In the evening they feed the cattle with weeds that they collect from the field and roadside verges. Sometimes the farmers feed them with crop residues such as maize stems and rice straw.

Some of the farmers use cattle for labour; however, some of them have substituted horses for cattle. According to one farmer, he substituted his cattle with horses because his cattle were overworked, and he found that using horses as draft animals was better than using cattle.

We observed that both chickens and cattle were the most common animals kept by households in the study village. However, the numbers of chicken were less than ten per household. Thirty-five households out of a sample of 56 households were found to be keeping chickens and cattle while three, ten and eight kept buffalo, goats and ducks respectively. We also observed that the most common species of cattle in Tombolo is the Bali species (local species); however, some of them were cross breeds such as Brangus. The number of cattle in this village has increased dramatically since 1998 (see
Table 5.7) when the government started the campaign that the livestock such as cattle had economic potential for on-farm income generation.

**Table 5.7.** The numbers of livestock in Tombolo village during 1995-1999

<table>
<thead>
<tr>
<th>Year</th>
<th>Cattle</th>
<th>Goats</th>
<th>Buffalo</th>
<th>Native chicken</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995</td>
<td>257</td>
<td>183</td>
<td>1</td>
<td>2782</td>
</tr>
<tr>
<td>1996</td>
<td>262</td>
<td>195</td>
<td>2</td>
<td>2785</td>
</tr>
<tr>
<td>1997</td>
<td>269</td>
<td>202</td>
<td>2</td>
<td>2513</td>
</tr>
<tr>
<td>1998</td>
<td>298</td>
<td>231</td>
<td>3</td>
<td>2542</td>
</tr>
<tr>
<td>1999</td>
<td>334</td>
<td>252</td>
<td>3</td>
<td>2552</td>
</tr>
</tbody>
</table>

Fathers and sons are more involved than women in the care of large and small livestock. Most of the men that we interviewed who owned both cattle and goats participated in herding, feeding and providing water. On the other hand, chicken and ducks were found to be cared for by women.

Farmers agreed that livestock such as cattle had an economic impact on the household (Table. 5.8). However, cattle production was low: The average daily growth rate was below 0.25 kilograms. Some attempts had been made by livestock services to improve livestock production, such as through improved breeding and health programs, but they assumed that animal feed was available and could provide enough nutrition (pers,comm., LS#4 00). In fact, as revealed from interviews, formal and informal meetings and workshops with farmers, farmers were struggling to feed their livestock. They had to spend three to four hours collecting fodder to feed their livestock.

**Marketing the livestock**

Generally in Indonesia, and in this village particularly, the sale of cattle occurs more often in “Idul Fitrih” and “Idul Adha.” Pricing of animals depends on age and sex, with males having a higher price than females. The buyer normally bases prices on the approximate live weight, simply judging this by eye and from experience. Generally buyers take advantage of farmers at this point: According to farmers, sometimes the price of cattle is different although they have similar age and weight. In this village most of the farmers sold their cattle directly to the buyer. Sometimes the farmer did not receive cash, with the buyer paying a week later.

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3 Idul Fitrih, the Islamic celebration day, feast the end of fasting month.
4 Idul Adha is the Islamic celebration day, feast of sacrifice. The day that commemorators the sacrifice of Ibrahim by Ismail. A holiday associated with pilgrimage to Mecca.
Animal disease

In this study area, farmers rarely vaccinated their livestock. However, they had never found their cattle attacked by harmful diseases such as anthrax and brucellosis. The common disease faced by farmers was parasitic worms for cattle and *gembung perut* (bloat) for goats. The majority of farmers used traditional methods to control worms, giving some particular leaf as a medicine, such as the use of “*tambarapai*” as medicine. This kind of leaf was also used to stimulate the appetite of cattle.

In contrast, with chickens, farmers found that disease was the main constraint for them against raising the chickens. The commonest disease attacking the chicken was white-feces (*berak kapur*), especially in the wet season. Furthermore, Newcastle Disease (ND) was also found, particularly between dry season and wet season. According to the farmers, in 1993 most lost their chicken to the “*gumboro*” disease.

Therefore, most of the farmers interviewed preferred to raise cattle or goats compared to big numbers of chickens, although to raise cattle required large amounts of money for investment. Table 5.8 shows perception of livestock rearing according to farmers.

**Table 5.8.** Farmers’ perception of livestock rearing

<table>
<thead>
<tr>
<th>No</th>
<th>Indicator provided</th>
<th>Cattle</th>
<th>Goat</th>
<th>Chicken</th>
<th>Buffalo</th>
<th>Horses</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Risk</td>
<td>Low</td>
<td>Medium</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>2</td>
<td>Raising cost</td>
<td>Medium</td>
<td>Low</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>3</td>
<td>Susceptibility to</td>
<td>Low</td>
<td>Medium</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td>diseases</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Capital needed</td>
<td>High</td>
<td>Medium</td>
<td>Low</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>5</td>
<td>Ease to sell</td>
<td>High</td>
<td>Medium</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>6</td>
<td>Sale value</td>
<td>High</td>
<td>Medium</td>
<td>medium</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>7</td>
<td>Used for power</td>
<td>High</td>
<td>-</td>
<td>-</td>
<td>High</td>
<td>High</td>
</tr>
</tbody>
</table>

From Table 5.8 it can be seen that even though raising chickens needed little capital, it was high risk due to susceptibility to diseases and the instability of market prices, while cattle rearing needs big capital but is low in risk due to good market prices and low risk of animal disease.

5.11. Livestock development and technology

It was revealed in this study that farmers depended more on interpersonal relationships (conversation with friends or relatives) for knowledge about livestock
technology. They rarely contacted the livestock services or extension agents for technical advice. They normally discussed their problems among themselves, and would interact with the development workers only if they had to attend a contact-farmers meeting. Farmers also mentioned that they hardly ever saw extension services come to their village: some of the farmers had not met with an extension officer, as only progressive farmers could access this service. There were 16 extensionists in Bantaeng, who were responsible for working with a population of 53,334 farmers (BPS 1998). The extension service provided field extension workers (PPL) at a village level. In this village, one extension agent might be responsible for up to 16 groups of 20-25 members, visiting farmers to transfer “knowledge” to them. I observed the lack of extension visits was not only caused by the scarce numbers of extension staff in this study area, but also because of the dual purpose task, as they were responsible for the administration matters. Extension workers in the study area would need to increase their workload or the number of extension officers, for better extension coverage to occur. Although a lack of extension visits to the village had been mentioned by farmers, farmers did not emerge as the problematic issue perceived by farmers. As revealed from interviews, only eleven farmers had mentioned that they required more interaction with development workers in the future (Table 5.9). In this village, farmers gained knowledge:

1. through personal experiences
2. from parents, friends (neighbours) and relatives
3. from livestock services staff and agricultural extension agents for guidance in their farming activities, including livestock practices.

The current practice of livestock development in Indonesia focuses on improving the welfare of smallholders, who form the majority of Indonesia’s livestock farmers and who are dominantly living in rural areas. One of the most important support functions of the government is to offer smallholders the technology to expand their productivity and income. Recently the focus of research and extension has shifted from a commodity-based approach to a farming systems approach which focuses more on a mixed farming (livestock/crops/legume) pattern based on the different agro-climatological regions in various parts of the country (see Chapter 2)

The technologies were designed in the Agency for Agricultural Research and Development (AARD) to develop and provide appropriate technology packages for farmers that were then used to support the livestock development program that was
carried out by livestock services at the district level. These technology packages were transmitted by extension agents to farmers who were expected to adopt them. Researchers were using Farming systems research and development (FSR&D) to involve farmers in generation of appropriate technologies, while the extension services used the training and visit (T&V) system to transmit these technologies to farmers.

It was revealed from the study area that livestock technologies introduced to farmers by development workers were often adopted from other regions without adequate assessment of such technology or adequate consideration of the local circumstances. This resulted in a lack of attendance of farmers at contact farmers meetings. The failure of this approach to attract farmers’ participation has brought to light the need to adopt an approach that is more acceptable to farmers and serves the need of farmers. Maclure and Bassey (1991), and Whyte (1991) have demonstrated that the appropriate way to achieve this is to actively engage the farmers in the development process.

5.12 Problems identified by farmers

As revealed from interviews with farmers, several issues emerged. The problems that were always mentioned by farmers included finance, lack of fodder for animal feeding, access to land, cost of fertiliser, and lack of extension visitors. They also talked about how they had been coping with their problems. As indicated in Table 5.9 finance appeared to be the major problem perceived by farmers. According to farmers, “they can not do without money”. They believe that if they had enough money, they could improve their stalls, they could buy vaccines, they could buy water pumps and they could expand their farms. The farmers expected that the government could make money available to them.

Table 5.9. Problems identified by farmers during interviews

<table>
<thead>
<tr>
<th>Problems</th>
<th>Number of farmers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Financial (capital)</td>
<td>37</td>
</tr>
<tr>
<td>Fodder</td>
<td>35</td>
</tr>
<tr>
<td>Disease (chicken)</td>
<td>23</td>
</tr>
<tr>
<td>Extension services</td>
<td>11</td>
</tr>
<tr>
<td>High cost input</td>
<td>7</td>
</tr>
<tr>
<td>Availability of technology</td>
<td>8</td>
</tr>
<tr>
<td>Drought</td>
<td>3</td>
</tr>
<tr>
<td>Access to land</td>
<td>5</td>
</tr>
</tbody>
</table>

Most farmers were hoping for government intervention to solve their problems. They believed that only government intervention could solve their problems. This practice was established between rural communities and government at the beginning of
the 1970s when the government campaigned to promote the use of the new high yielding rice varieties (HYVs) that is commonly known as the *Bimas* (mass media) program. Box 5.1 illustrates the factors affecting the dependence of farmers on government intervention.

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**Box 5.1. Example of factors affected the dependency of farmers to government Intervention.**

On the other hand, in terms of enhancing production and solving farmer problems, technology intervention was only mentioned by development workers, and was only adopted within the extension mainstream. The extensionists’ task was to introduce and train small groups of farmers in the uses of a new improved technology.

According to Table 5.10, most farmers perceived finance as the main problem for them. Moreover, most of the problems faced by the farmers as presented in Table 5.10 were identified as having to do with the relationship with the holistic context including factors such as ecological and socio economic factors (see Box 5.2. some factors that could affect the problems perceived by farmers).
Starting in 1997, Indonesia faced a deep economic crisis. The prices of *gabah* (unhulled paddy for seed) and fertiliser increased dramatically. The government reduced subsidies to farm inputs like fertiliser, but at the same time it tried to control the price of farm inputs at an economical level. Farmers had no cash to purchase fertiliser, since there was an imbalance between the high cost of inputs versus low price of crops products such as rice and maize (see Appendix 2 for the maize price during 1995-2000). Weather problems also pushed the nation into a series of food crises. The primary cause of food shortages and production drops was the long El-Nino drought, followed by La-Nina (Ohga 1997).

**Box.5.2.** Socio-economic factors that could affect the problems perceived by farmers

In the workshop we discussed these issues by linking them with other contexts that could cause problems. The farmers then realised that finance was the common problem faced by everyone. At the same time, we motivated the farmers by showing them about the potential that they already had, such as human resources, land and livestock, and we encouraged them to use these resources optimally to improve their condition. Accordingly, we then asked the farmers to prioritise their problems and possible solutions to cope with such problems. Table 5.10 shows how farmers ranked the problems and identified possible solutions to solve them.

Scarcity of fodder for animal feeding was found to be a major problem perceived by farmers. Farmers spent three to four hours a day looking for forage for their livestock: Sometimes they spent more than four hours, particularly in the dry season. This work was normally done by men and children. Generally, farmers could collect a maximum of 2 *karung gony* (gunny sacks) of forage each day to feed their cattle, horses and goats. As one farmer said, “I only could collect one gunny sack of forage each day for feeding my animals I have one cow, one horse and one goat. I knew it was not enough but I do not have time, I need to look after my crops as well” (MLG#5)
Table 5.10 Ranking of problems and possible solutions identified by farmers at the workshop.

<table>
<thead>
<tr>
<th>Problems</th>
<th>How farmers dealt with the problems in the past</th>
<th>Possible solution</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Financial</strong></td>
<td>Got loan either from the bank or informal lender such as money lender, friends and relatives</td>
<td>Review the existing credit scheme</td>
<td>Government intervention (recommendation to local government)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Looking for other sources of financial support such as bapak angkat (collaboration with private sector)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Strengthen the existing cooperative</td>
<td></td>
</tr>
<tr>
<td><strong>Lack of fodder for animal feeding particularly in dry season</strong></td>
<td>Give the animal weeds that found from their own or other fields. Get grass from roadside verges (Sometimes this creates dispute between farmers if the farmers took the weed/grass from other field. Caused animal death because sometimes farmers don’t know if the other crop fields had been sprayed by pesticide)</td>
<td>Planting forage (integrating forage into the farming systems)</td>
<td>Introducing forage technology Looking for forage management systems that were appropriate to local condition Considering forage varieties that were available in this area and appropriate to local condition.</td>
</tr>
<tr>
<td><strong>Lack of extension services and availability of technology</strong></td>
<td>Learn from parents and friends Get knowledge from parents and friends</td>
<td>Small training on livestock technology Increased face to face visiting by extension workers Establish cow fattening group</td>
<td>Possibility to set up community network through establishment of learning group</td>
</tr>
<tr>
<td><strong>Drought</strong></td>
<td>Make a well near the crops field Use plastic pipe to irrigate the maize field from the small river</td>
<td>Water pump Improved irrigation Need government intervention</td>
<td>No specific fund for buying water pump or building small irrigation.</td>
</tr>
<tr>
<td><strong>Access to land</strong></td>
<td>Some farmers grow maize on the bunds between rice fields</td>
<td>Optimal usage of adjacent land in existing crops.</td>
<td>Forage could be planted in unused land for growing crops, particularly the land under kapuk trees</td>
</tr>
<tr>
<td><strong>High cost input</strong></td>
<td>Get helps from KUD (KUD could not cover all farmers)</td>
<td>Substituted chemical fertiliser with organic fertiliser Government intervention</td>
<td>Planting forage tree (tree legume) as a fence around the field could improve soil fertility</td>
</tr>
<tr>
<td><strong>Diseases (chicken)</strong></td>
<td>Sell the chicken before wet season is coming</td>
<td>Regular vaccination required</td>
<td>Recommendation to government (Livestock services)</td>
</tr>
<tr>
<td><strong>Poor animal nutrition</strong></td>
<td>Fed the animal with forage that easy to find. (Lack of knowledge in animal feeding Farmers do not know how to feed the animal in proper way)</td>
<td>Learn livestock production technology particularly feeding management</td>
<td>Possibility to run small training on forage management which included animal feeding management.</td>
</tr>
<tr>
<td><strong>Thin animals</strong></td>
<td>Over work in the field; some farmer substitute with horses and buffalo Fed the animal with crops residue</td>
<td>Substitute with horses Sharing with other farmers (human power) Fed the animal with sufficient feed.</td>
<td>Possibility for planting forage can improve management practice of cattle rearing.</td>
</tr>
<tr>
<td><strong>Poor growth</strong></td>
<td>For supplement some farmers fed the animal with rice bran and dry cassava</td>
<td>Give the animal sufficient feed</td>
<td>Possibility to improve the nutrient balance of animal feeding.</td>
</tr>
<tr>
<td><strong>Overwork of cattle</strong></td>
<td>Substituted with horses or buffalo</td>
<td>Substituted with horses and buffalo Hire from other farmers</td>
<td>Strengthen mutual working among community through establishing Kelompok usaha bersama (Small group micro-enterprise)</td>
</tr>
</tbody>
</table>
According to women farmers, usually their children help the father to collect the forage. Normally, they collect fodder from the roadside verges or from the rice or maize fields, but this could create dispute between them. This is because some times the farmer does not know if the field has been sprayed with pesticides or if the owner of the field also needs fodder to feed their livestock. According to the village head this often happened in this village particularly during the dry season, because at that time it was difficult to find fodder for animal feeding.

In discussion with farmers in the workshop there emerged some possible solutions to cope with this problem, such as the distribution of Nappier grass (*Pennisetum purpureum*) and the utilisation of uncultivated land. Regarding the issues discussed above as to how to overcome the various problems that confront farmers in this study area, in my view there was a need to go beyond (1) access to capital, (2) delivery of technology, and (3) exploration of land. In this situation, the farmers needed to access new information to participate in deciding how to make the best use of new skills and information to improve their livelihood, or in other words, how to learn from their experiences to improve their situation. From these views there was a need to engage stakeholders (farmers and development workers) in participative learning in order to investigate what caused the problems, and then look for possible solutions that might be developed to bring about change.

### 5.13. Conclusion

In this chapter I have described the situation of some smallholder farmers in South Sulawesi Indonesia, who rely on farm activities for their livelihood and who depend on local knowledge and resources for their management purposes. Livestock play an important role for these smallholder farmers. Livestock such as cattle, buffalo and horses not only provide labour and manure for households but livestock such as cattle also have been identified by the local government agricultural services to have potential for on-farm income generating in this study area.

Scarcity of fodder was found to be the major problematic issue perceived by farmers as needing to be solved. This raised the question of how to involve farmers in the process of decision making for their own development, so that solutions could cover what farmers needed. Farmers had been put in the position of expecting help, and development workers put themselves in the role of telling farmers what and how to do.
In my opinion, a new framework for problem solving needed to be created in collaboration with farmers, sharing and disseminating and generating knowledge with them.

Collaboration to enhance mutual learning by the stakeholder is central for social change and development (Korten 1980; Fals Borda 1987). This participation and collaboration approach to agricultural development, including livestock development, has been developed recently to improve the situation of smallholder farmers (Jiggins 1993; Braün & Hocde 2000; Horne et al 2000). This means there is a need to engage stakeholders in participative learning by establishing a working relationship and practicing dialogue strategies to improve the situation based on their experience. Pushing technology alone might not be effective. I argue that farmers are part of the context in which they live and work. Thus, they should not be detached from their context; whatever they think, do and can do needs to be accounted for in the development context. Any attempt to improve the condition of smallholder farmers needs to focus on their views and on the interpretation of the various interrelationships that are relevant to their practice. The following stages of this study were therefore designed to employ and explore the appropriate and effective use of participative learning as an approach to enhance the livelihood of some smallholder livestock farmers in South Sulawesi through improving livestock production. The learning approach is also employed to improve the livestock development work in the study area.
PARTICIPATIVE LEARNING FOR FORAGE TECHNOLOGY

6.1. Introduction

As described in the chapter 5 (exploration stages) the main problem perceived by farmers was a scarcity of fodder for animal feeding. There was, however, division on what constituted specifics of this problem, and what could be done in the name of improvement. Farmers stated that direct agricultural government intervention, such as direct distribution of forage, plants and seeds could be a possible solution, whereas the development workers stated technological improvement to be the solution. As described before, this would be the conventional approach to agricultural development used to solve the farmers’ livestock problems. Development workers were always looking for a “good thing” to be delivered to the farmers and farmers were always seen to be waiting for “good things”; a dependency arrangement.

From my perspective it was necessary to go beyond this approach. Farmers needed access to new information to participate in deciding how to make the best use of new skills and information to improve their situation. Development workers served and provided the information that farmers required and they considered it their role to determine how this information could be modified to suit particular local circumstances. Therefore, there was a need to engage all stakeholders (farmers and development workers) to work collaboratively to solve the perceived problems through participative learning, in order to investigate what caused the problems and then look for possible solutions to bring about change. The working strategies established in this study (see Figure 4.1) helped to actualise this process. This working strategy eliminated the giver-receiver or teacher-learner model (Chambers 1993; Bawden 1995b; Pretty 1995b).

The present chapter describes this process through the AR cycles. This AR involved three months of planning, acting, monitoring and evaluation, from December 1999 to April 2001. Box 6.1 illustrates the process of the implementation of this action using the participative learning to describe the empowerment process.
6.2. Methodological and theoretical framework

The methodological and theoretical framework adopted in this research was discussed in Chapter 3. The approach adopted in this research was based on the ideas of action research (Kemmis & McTaggart 1988; 2000; Dick 1993; Zuber–Skerritt 1995; Stringer 1996), experiential learning by Kolb (1984), action learning (Revans 1982; McGill & Beaty 2001) and the concept of adult learning (Knowles 1985). These methodological and theoretical approaches support stakeholders in the generation and use of knowledge through their interpretation and critical beliefs, knowledge and action. Here, participants create knowledge for informed action. Critical reflection on action and knowledge that was generated is plays an important part in enabling participants to learn and to develop their mental framework. In this sense, learning is seen as an active process, which combines finding out about problems with taking action (Sriskandarajah et al 1992) and is therefore meant for transformation and empowerment of participants (Korten 1981; Mezirow 1991; Cranton 1994).
Step 1. Farmers small-workshop (6.6)
- to cover farmers’ knowledge gaps on forage
- to identify farmers’ resources, land, farming practice etc.
- to introduce varieties of grass and legumes to farmers
- to introduce Three Strata Forage Systems to the farmers

Step 2. Design forage model (6.7)
- to assist farmers in designing models on the basis of their land situation and circumstances and to test the model in the field
- to agree on model testing procedures and for monitoring field performance

Step 3. Plot demonstrations (6.8)
- to assist farmers to carry out plot demonstrations themselves

Step 4. Monitoring the forage plot demonstration (6.9)
- to help farmers to assess the performance of their technique and provide information needed in order to learn from experience

Step 5. Field visit to demonstration plots (6.10)
- to discuss outcomes with test farmers and exchange insights (action learning)
- to show other farmers what had been learned and changes they have undertaken
- to invite other farmers to start similar activities

Step 6. Small training (6.11)
- to organise small training on forage management in the village
- to include women who are interested in forage technology

The steps are interactive and iterative

Box 6.1. Participative learning at Tombolo village

6.3. Theoretical framework of ideas

Neither a focus on technology alone nor the use of a top-down approach, would improve the condition of farmers in Tombolo village. This perspective was supported by my experiences with initial exploration of the context of the study area and by the related literature in this area. Based on my literature search it seemed that the participative approach offered better scope in improve the farmers’ conditions. This is because the participatory approach could:

1. allow participants to discuss their problems, using dialogue for situation improvement
2. allow participants to share their experiences to enhance mutual learning
3. enable participants to create their own knowledge to improve their situation
4. formulate ideas for intervention that were appropriate to the farmers’ local context
5. encourage participants to learn from their experience through critical reflection on their experiences as sources of learning and knowledge
6. create empowerment of participants, and thus enable participants to initiate and implement their own learning and take responsibility for the outcomes of the learning.

These assumptions and theories formed the personal bias that I applied to the research process.

6.4. Framework of activities for the learning process

I proposed to undertake the project activities using a simple action research cycle, following Kemmis and McTaggart (1988); Zuber-Skerritt (1995); Stringer 1996. This idea was discussed and agreed upon by the research team, who thought that the cycle would bridge the differences in knowledge between the research team and the farmers (learning group), creating an opportunity for farmers to participate as much as possible in the process of improvement. The research team also discussed plans for the action period by considering and looking at the availability of farmers’ time. The research team and the learning group decided to implement the cycle of action over a series of 3 monthly periods. This period would allow sufficient time for farmers to participate in the meetings. As Heron (1996) states, the length of the action phase of the focus of inquiry needs to allow sufficient time to generate enough data for productive reflection. Thus, every three months after action was taken there were formal meetings, which aimed to evaluate current action and plan for subsequent action. The cycles of action are shown in Figure 6.1.

In addition, the process of developing appropriate forage technology was carried out through dialogue between farmers and development workers about the forage management practices that would be implemented. This was supplemented by several meetings with the learning group and also community group discussion in the study area. Information generated from this engagement formed the basis for decisions as to what could be done to improve the livelihood and livestock production in the study area.
Figure 6.1. Cycles of action for undertaking the activities

The AR team then shared this action cycle concept with the farmers by saying:

As you mentioned, you are committing yourself to this study, together we will try to solve your problem. In order to solve the problem that you face our work will be organised systematically over a period of three months. During that time we will have a plan, implement the plan, monitor (observe) and evaluate the action three months after the commencement. Both the AR team and you will evaluate the activities together. The result of this evaluation will become an input to further planning. The schedule of our activities relates to your time in your normal farm activities.
The learning group agreed with this statement and with the three months period of the action cycle. Critical reflection is an important component of this process (Boud et al. 1985; Kolb 1984; Mezirow 1991) because “reflection in action” leads to informed improvisation as well as ‘reflection on action’ locating participants in the learning context (Schon 1983; 1987). Furthermore, in the context of this study, the process of the AR cycle was applied to enhance “iterative action learning” and the “active decision making” of farmers in the process of technology development.

6.5. Formulation of the implementation action

In order to solve the problem of the scarcity of fodder and to meet the needs of the farmers, the AR team, the learning group and livestock services decided to work collaboratively so they could enhance mutual learning (see Figure 4.1, p. 73). The initial key questions that were considered are shown in Box 6.2 below.

| Do farmers think planting forage is important? |
| Are farmers willing to work together and commit their time to solve this problem? |
| Do we (AR team and livestock services) have possible solutions to cope with this problem? |
| Are farmers willing to provide support to cope with this problem? |
| Are livestock services and local government willing to provide support to solve this problem? |

Box 6.2. Key questions for possibilities to integrate forage into the farming systems (inspired from problems analysis of AR, Dick (1993)).

Several meetings between the AR team and the learning group were held in order to gather pertinent data related to such questions. The information gathered included identification of:

1. the availability of land
2. availability of forage varieties in this area
3. type of soil, and
4. the social cultural aspects (some forage trees hold a special place in the beliefs of the people, and cannot be eaten by humans and animals).

Furthermore, the AR team, in consultation with livestock services also collected other information such as forage management practices that had been developed and
introduced to other parts of Indonesia. This information was synthesised and analysed by the AR team and the learning group in order to find out possible solutions that were appropriate to the local circumstances. As Selener (1997) pointed out, it is essential to start problem solving with farmers by finding out how this particular problem is perceived by farmers, and can be solved. Participatory diagnosis and planning was employed to engage with farmers to find better ways for action. Figure 6.2 depicts the process of problem solving in relation to the scarcity of fodder.

![Diagram of Participatory Problem Solving](image)

**Figure 6.2.** Participatory Problem Solving to Develop Forage Technology with Farmers

The approach shown in Figure 6.2 provides space and opportunity for farmers to use their own capacity to solve their own livestock-feeding problem. The approach began with in-depth participatory problem diagnosis by gathering information from many perspectives, including both men and women. Opportunities and possibilities to solve this problem were then generated and discussed, and then a plan was made as to how to put the forage production model into practice in the field. The models were then monitored in order to see they worked in the local circumstances. The key principle of this process was active decision making by farmers in all stages of the process with the assistance of technical input and facilitation by development workers. Furthermore, this process also provided an opportunity for both farmers and development workers to learn from each other through (a) individual learning, by using these practices in their own
farm, and (b) communicative learning, by being active participants in the meetings and group discussions so they could exchange viewpoints and shared insights.

In addition, although the questions raised at the beginning of the action cycle (see Box 6.1) helped in the design of the action plan, the research team came to realise that the option of planting forage was a new concept for most farmers. For this reason, it was necessary to hold a group discussion in order to find out appropriate ways for intervention. The specific aim was to test the idea of integrating forage into the farming system and to gain public knowledge about forage technology before further action was taken.

In the first step of the group discussion, the research team focused on the farmers’ knowledge about livestock production, encouraging the exchanging of farmers’ experiences of animal feeding, and how farmers coped with this problem in the past. Table 6.1 illustrates farmers’ practices of livestock rearing. For the second step, the research team introduced ideas for interventions. Major attention was given to enriching the discussion by sharing participant viewpoints. For example, participants were asked to describe their farm resources by drawing them on paper. Through this process participants could think about the potential of the resources they had to support solving this problem. Furthermore, farmers were assisted in making a list of possible interventions which could help to solve their problem. The list of possible interventions identified by this process is shown in Table 6.2.
Table 6.1. Farmers’ practices of livestock rearing, their usage and feeding strategies, and expectations identified by farmers.

<table>
<thead>
<tr>
<th>Type of animal</th>
<th>Main usages</th>
<th>Management systems</th>
<th>Expectation (increased production)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Rainy period</td>
<td>Dry period</td>
</tr>
<tr>
<td>Cattle</td>
<td>Labour, meat, manure</td>
<td>Short hours of tethering the cattle near the crop field</td>
<td>Long hours of tethering the cattle near the crops fields, grazing on the road sides and grazing the cattle on the pure stand land (the period after the harvesting)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tethering the cattle under the houses or under the tree near the homestead and fed with cut carry grasses and wet</td>
<td>Feed with crop residues in the evening</td>
</tr>
<tr>
<td>Horses</td>
<td>Labour, transportation, manure, meat</td>
<td>The same as cattle</td>
<td>The same as cattle</td>
</tr>
<tr>
<td>Goats</td>
<td>Meat</td>
<td>Keep the goats under the houses and fed with cut carry grasses, banana stalk (normally the villagers used the room under their store houses for stalls, particularly for goats)</td>
<td>Grazing on fallow land, road sides</td>
</tr>
<tr>
<td>Buffalo</td>
<td>Labour, meat, manure</td>
<td>Grazing on fallow land</td>
<td>Long hours grazing on the pure stand land particularly on the rice field, grazing on the roadside, and fed with crop residue in the evening.</td>
</tr>
<tr>
<td>Poultry</td>
<td>Eggs, meat</td>
<td>Scavenging, grain corn, fed with food wasted from the homestead</td>
<td>Scavenging, rice bran, fed with food wasted from the homestead</td>
</tr>
</tbody>
</table>

Table 6.2 List of possible interventions identified by the group discussion

<table>
<thead>
<tr>
<th>Activities</th>
<th>Source of idea</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workshop</td>
<td>Research team</td>
</tr>
<tr>
<td>Forage model</td>
<td>Farmers and research team</td>
</tr>
<tr>
<td>Plot demonstration</td>
<td>Farmers and research team</td>
</tr>
<tr>
<td>Field visit</td>
<td>Farmers and research team</td>
</tr>
<tr>
<td>Small workshop on forage technology</td>
<td>Farmers</td>
</tr>
</tbody>
</table>
Furthermore, the outcomes of this discussion group provided information about the possibilities for integrating forage into their farming systems. The steps in the planning stage are shown in Box 6.3.

<table>
<thead>
<tr>
<th>Learning group meeting (group level)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• to discuss the problem in depth and looking for possible solutions that were appropriate to local conditions</td>
</tr>
<tr>
<td>• to assist farmers to do the recording and develop an action plan</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Action Plan (research team)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• to visualize a plan in the form of a matrix table, which lists the type of activities in detail</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Discussion group (community level)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• to review action plan</td>
</tr>
<tr>
<td>• to exchange participants viewpoints on how to cope with problem</td>
</tr>
<tr>
<td>• to facilitate farmers to allocate priority and decide on activities that they want to undertake</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Team meeting</th>
</tr>
</thead>
<tbody>
<tr>
<td>• to discuss the action plan in terms of who will be in charge of each activity as well as who will be involved</td>
</tr>
<tr>
<td>• to get support from local government and local livestock services.</td>
</tr>
</tbody>
</table>

**Box 6.3. Steps in the planning stage**

Reflecting on this group discussion, it was clear that farmers did not have previous experience in planting forage. Therefore, it was essential to provide broad information about forage varieties and management practices that suited this local condition. For this reason, the research team decided to run a workshop as the initial process of integrating forage into these farming systems, to enable farmers to have a better understanding of forage planting as well as to build on farmers’ capacity to try new technology appropriate to their local circumstances. As well, the AR team and development workers encouraged farmers to review the forage management practices that were introduced to them, and helped them to choose forage varieties appropriate for their land condition. Furthermore, the participants were encouraged to impart their views about this initiative. Why was this important to them? Who will benefit? What they are going to learn? How are they learning? These questions were asked to enable participants to
analyse and rethink their action plan. This also helped the participants to examine their initiative, and to understand the relationship between action and consequences. As McTaggart (1991) states, PAR involves participants in theorising about their practice.

In order to experience what to do and how to do it, it was decided by the discussion group to undertake plot demonstrations on the farmers’ land. These plot demonstrations provided an opportunity for both farmers and development workers to enhance mutual learning by exchanging information and experiences. Field visits to the plot demonstrations were also required in order for the learning group to exchange their experiences of planting forage, as well as to show other farmers and tell them about their experience so as to attract other farmers. The small workshop on forage management was significant to the commencement of this process of developing forage technology with farmers.

6.6. Farmers small workshop on developing forage technology

The workshop took place at the village with 26 participants. The purpose of the workshop was:

- To cover farmers’ knowledge gaps on forage
- To identify farmers’ resources, such as land
- To introduce new varieties of grass and legumes to farmers
- To introduce the “Three Strata Forage System” to the farmers

The workshop was arranged based on concepts of experiential learning (Kolb 1984) and adult learning (Knowles 1985) to encourage participants to be thinking creatively and to value their experiences as sources of knowledge. Here participants learn what is relevant to them or relevant to their situation.

Most farmers who participated in the workshop did not have experience in workshopping. Hence the workshop was organised to encourage farmers’ confidence to speak and to impart their ideas to others, and to encourage participants to appreciate other views. The workshop sessions were conducted by asking the participants to write about and draw on paper their problems, and then to discuss this with their group. At the end of the session each group presented their findings to the whole group. Details of the activities of the workshop are presented in Table 6.3.
The workshop began with an introduction to the participants about the purpose of the workshop, and asked participants to introduce themselves to others. I opened up the primary session by presenting my views and the purpose of the workshop. This is a translation (from Bahasa Indonesia) of what I said at the primary session at the workshop:

Thank you for coming to this workshop. As revealed from interviews with you and from the previous workshop, the scarcity of fodder is a problem recognised by most of you in this area. For this reason, the AR team and the learning group together have collected and analysed information related to this problem as well as looking for possible solutions to solve this problem. In the community group discussion, that I think most of you attended, all of you agreed that the scarcity of fodder is problematic for you and all of you agreed to grow forage on your farm. Therefore, the main purpose of this workshop is to find out a better way to grow forage on your farm. For this I need to ask you to assist in (a) finding out more information about your resources such as your land condition; (b) identify ways of using forage to solve the problem; (c) deciding what we can do together to integrate forage into your farming systems. Our (I mean AR team and development workers) mission here is therefore to learn with you, to identify what we can learn, and do together to improve the situation as farmers and agriculturists.
During this session I also introduced participants to the term “forage technology” and how we would develop forage technology with them. I gave a brief description of forage technology to farmers, as shown in Box 6.4.

**Box 6.4** Definition of forage technology introduced to farmers in Tombolo Village.

Forage species alone is not technology. It is how they fit into a farming system. A forage technology is the combination of forage species and how it can be grown within a farming system. For example, one forage technology is to use the tree legume, such as lamtoro (*Leucaena Leucocephala*) as fence lines to control animals and provide leaf for dry season feed supplement.

I gave a brief description of the participatory approach, by comparing it with the conventional approach of agricultural extension that has been applied to solve farmers’ problems. Those descriptions are presented in Box 6.5.

**The conventional approach to solving farmers’ problems**
Development workers identify the farmer’s production problem, and look for possible solutions from the technology developed by scientists in the research station and then transmit this technology to farmers to adopt it.

**Participatory problem solving**
Problem identified by farmers with assistance of development workers, farmers’ ideas and suggestions are included in the process of technology developed for solving farmers’ problem, the proposed solution offer to farmers is free to be modified by farmers based on their local circumstances.

**Box 6.5**. The descriptions of participatory problem solving introduced to the farmers in the workshop

I explained to participants that through this workshop we would like to develop forage technology with them, to find out what forage management practices and varieties they prefer, and that are appropriate to their conditions and circumstances. Therefore, I encouraged the farmers to be active participants in the group discussion during the workshop.
The second session concerned the identification of possibilities for planting forage within the farming systems. This included the identification of farmers’ resources to support them to grow forage. For this, participants were divided into small groups of 3-4 people, assisted by a member of the learning group or AR team to discuss the topic. Participants were asked to write and draw on the paper the nature of the problem and possible solutions. Each group presented and discussed their findings to the large group.

After the farmers had summarised their problems and expectations for developing forage technology, we continued to the next session, which introduced some species of forage available in the area and appropriate to the local condition. We also introduced to the participants the benefits of planting forage, and introduced the management practices of planting forage. As part of this, we addressed some questions to the participants such as:

- What types of vegetation, including grasses, grow in this area?
- What kinds of soil are indicated by these vegetations (clay, sand and loam)?
- Are some nutrients being recycled back to the soil?
- Is there land in this area which is uncultivated?
- What rainfall and other climate patterns may affect forage?

An important issue that came out from this discussion was that there was no nutrients being recycled back to the soil. Farmers’ opinion on the problem of soil fertility was mainly related to their inability to apply fertiliser. However, through our discussion, farmers made a link in the issues of soil fertility to the climate and ecological process, such as low rainfall and short fallow period. Farmers realised that the low fertility of soil could be caused by few nutrients being recycled back to the soil, because of their management practices. Participants became critically aware that planting legume forage had the potential to improve the soil fertility. *Gliricidia sepium* planted as hedgerow was crucial to improvement in the nutritional status of the soil. In this case, 50 percent of the leaf from the yield of hedgerow returned to the soil (Stür & Horne 1998). This information motivated farmers to grow forage on their farm.
### Table 6.4. Problems identified by farmers in relation to planting forage

<table>
<thead>
<tr>
<th>Problem</th>
<th>Cause of the problem</th>
<th>How farmer coped with this problem</th>
<th>Possibility for intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of fodder to feed the animal</td>
<td>No land specifically used for planting forage  Do not have knowledge about planting forage  Drought</td>
<td>Collected the grass from the roadside verges or collected it from the rice or maize field. Allow animal to feed themselves by tethering the animal near the field Giving crop residues to animals such as straw and stovers</td>
<td>Integrating forage to the farming system, so forage was available during the year to fulfil feed requirements and improve nutrition for animals</td>
</tr>
<tr>
<td>No land for planting forage</td>
<td>All of arable land used for planting crops  Never think to grow forage</td>
<td>Feed the animal with grass or weed available in the field or roadside vergers.</td>
<td>Optimal use of uncultivated land, particularly the land near the homestead and the land under kapuk tree</td>
</tr>
<tr>
<td>Do not have experience to grow forage</td>
<td>Development workers never introduced forage technology to the villagers</td>
<td>Normally get the technology information from friends or parents</td>
<td>Developing forage technology with farmers</td>
</tr>
<tr>
<td>Limitation of forages</td>
<td>Development workers never introduced forage technology to the villagers  The varieties of forage grown depend on the climate and agro-ecology of the area.</td>
<td>Insufficient knowledge on forage technology</td>
<td>Look for forage varieties that are suitable to the local circumstances and the needs of farmers.</td>
</tr>
<tr>
<td>Soil has become dependent on fertiliser</td>
<td>Soil became in fertile. The land is never rested.</td>
<td>In crop field, farmers applied inter-cropping with legume  Substituted chemical fertiliser with organic</td>
<td>Optimally use organic fertiliser. Learn to make compost</td>
</tr>
<tr>
<td>Drought</td>
<td>Unpredictable weather</td>
<td>For rice field only depend on the rainfall, the fields located far from the river. Some of the fields, particularly maize field, are located near the river, so some farmers use plastic pipe to irrigate the field.</td>
<td>Need government intervention to buy pump</td>
</tr>
</tbody>
</table>

The AR team ran this session collaboratively with one staff from the livestock services. This session included an introduction to an alternative technique of integrating forages into the farming systems, particularly the TSFS (Three Strata Forage Systems) (Nitis 1989a; 1989b) which was based on work carried out in Bali. The TSFS is a technology of planting and harvesting grass, ground legumes, shrub legumes and fodder trees, so that a sources of livestock feed is available all year around (Nitis 1989a; 1989b). The first stratum consists of grass and ground legumes, mainly for livestock...
feed during the wet season; the second stratum consists of shrub legumes mainly for livestock feed during the mid dry season; while the third stratum consists of fodder trees, used primarily for livestock feed during the late dry season. By incorporating legumes in the TSFS, soil fertility will be increased through nitrogen supply by the root nodules, and the nutritive value of the forage will be increased through increased crude protein supply from the legume foliage (see Appendix 3 for a description of TSFS).

It was planned to carry out TSFS as one of the forage management practices to be adopted by the farmers in this study area, based on the evidence that the TSFS technique had been successfully used in Bali, where it had been shown to be suitable to smallholder farmers due to the small amount of land needed (Nitis 1989a).

However, after we discussed with farmers the benefit of TSFS and the possibilities to integrate this model into their farming systems, the farmers rejected the adoption of TSFS as an alternative due to the unavailability of supplies of the necessary forage species in this area, as well as the lack of availability of land to meet the requirement of this TSFS. Most of the farmers were aware of the advantages of planting forage for animal feeding, but they could not accept the TSFS. Farmers said:

We are aware of the advantages of TSFS in the long-term period, but we could not apply it in our farm, as we do not have enough land to do that, we do not want to replace our crops. We think that we will still grow forage in our field based on our land condition.

This critical consideration of farmers encouraged the AR team and development workers to reflect on the needs of these farmers, and to continuously learn about and adapt farm practice to the application of forage technology.

In Tombolo village some forage seeds are not readily available. Example of the types of grass and legume that are found in the area of Bantaeng district are *Rumput gajah*, Napier grass (*Pennisetum purpureum*) and *dongi-dongi* (*Chloris gayana*); Examples of the types of legume are *lame-lame* (*Centrosema pubescens*) and *kacang-kacang* (*Calopogonium mucunoides*), and types of forages trees are *Gamal* (*Gliricidia sepium*), *Lamtoro* (*Leucaena leucocephala*).

Another important reason to adapt the TSFS model was that some forage species were not adapted to the soils and climate of this region. In this way, the TSFS and the possible use of some species of forage were subjected to (what we would call) critical analysis by the farmers. This raised the question of what alternatives were available. For example, *Gliricidia sepium* (*Gamal*) could be grow as fence lines; Napier grass
could be planted with adjacent crops in the field. These options were then discussed with farmers, considering advantages and disadvantages of each management practice (participatory planning). The participants were then asked to modify the models of planting forage so that they were appropriate to their particular land conditions and the availability of forage supplies in this area.

From this experience, development workers learned that the suitability of recommended technologies to farmers does not depend on the benefits of the product of the technology itself but depends also on other factors such as farm conditions and socio-economic conditions.

6.7. Design of farmers forage model

Using the process described above, and in order to satisfy the needs of the farmer, we suggested that the farmers develop their own model of planting forage based on the availability of land and the type of forage that they think would be easy for them to grow and be of benefit to them. This made the farmers think about what types of forage might be planted, and what would be good for their animals. They discussed this model in their groups. Here, development workers provided broad information about forage varieties that were appropriate to the local circumstances. The information about forage varieties found in this area is presented in Table 6.5.
Table 6.5. The varieties of forage introduced to farmers

<table>
<thead>
<tr>
<th>Species</th>
<th>climate</th>
<th>Soil</th>
<th>Ways of Growing Forage</th>
<th>Palatability</th>
<th>Forage Yield</th>
<th>Feature</th>
<th>Drought tolerance</th>
<th>Easy regrowth after cutting</th>
<th>Nutrition (digestibility ME, CP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rumput gajah (Napier grass)</td>
<td>Wet tropical with short dry season</td>
<td>Fertile &amp; moderately fertile (neutral to moderately acid soil)</td>
<td>Cut and carry; Plot or row</td>
<td>Moderate to high (high in young leaves)</td>
<td>High</td>
<td>Tall 2-2.5 m</td>
<td>yes</td>
<td>yes</td>
<td>Moderate</td>
</tr>
<tr>
<td>Rumput Benggala (Panicum maximum)</td>
<td>Wet tropical with short dry season</td>
<td>Fertile &amp; moderately fertile (neutral and moderately acid soil)</td>
<td>Cut &amp; carry plots or row</td>
<td>High</td>
<td>High</td>
<td>Tall 2-2.5m</td>
<td>yes</td>
<td>Yes</td>
<td>Moderate</td>
</tr>
<tr>
<td>Dongi-dongi (Chloris Gayana)</td>
<td>Wet tropical with short dry season</td>
<td>Fertile (neutral and moderately acid soil)</td>
<td>Grazed plot</td>
<td>high</td>
<td>Moderate</td>
<td>60 – 150 cm short</td>
<td>yes</td>
<td>yes</td>
<td>Moderate</td>
</tr>
<tr>
<td>Kacang kacang (Calopogonum mucunoides)</td>
<td>Wet tropical with short dry season</td>
<td>Fertile (neutral and moderately acid soil)</td>
<td>Cover crops in annual crops Cut &amp; carry</td>
<td>Moderate</td>
<td>Moderate</td>
<td>30-50 cm short</td>
<td>no</td>
<td>No</td>
<td>High</td>
</tr>
<tr>
<td>Gamal (Gliricidia sepium)</td>
<td>Wet tropical with long dry season</td>
<td>Moderately fertile/fertile (neutral and moderately acid soil)</td>
<td>Cut &amp; carry plots or row Living fence</td>
<td>moderate</td>
<td>High</td>
<td>5-10m very tall</td>
<td>yes</td>
<td>yes</td>
<td>High</td>
</tr>
<tr>
<td>Lamtoro (Leucaena leucocephala)</td>
<td>Wet tropical with long dry season</td>
<td>Fertile &amp; moderately fertile (neutral and moderately acid soil)</td>
<td>Cut &amp; carry plots or row Living fence</td>
<td>moderate</td>
<td>High</td>
<td>5-10m very tall</td>
<td>yes</td>
<td>yes</td>
<td>High</td>
</tr>
</tbody>
</table>

Based on the information described in Table 6.5, the development workers encouraged farmers to select the varieties of forage that they would like to grow. In this sense farmers selected the varieties of grass and legume using the criteria listed below:

- High yield
- Drought tolerance
- Easy to collect
- Easy regrowth after harvesting
- Animals like it
- Good growth through the year
- Not itchy when cutting
- Unpleasant smell
- Suitable with their land condition
- Not competing with adjacent crops
Some of these criteria were more important than others, for example unpleasant smell and not itchy when cutting were not considered high priority. This is similar to Stür et al (2002) who found that most development workers tend to focus on the yield and disease resistance when evaluating forage to grow. In this context, therefore, participatory planning and evaluation helped both farmers and development workers to better understand the constraints and opportunities for forage technology in this study area. Furthermore, through this process both farmers and development workers were able to share their knowledge to accelerate the learning process.

In this study area farmers tended to grow Napier grass (*Pennisetum purpureum*) as a main source of forage for their animal feeding, and *Gamal* (*Gliricidia sepium*) as a secondary source of nutritive value. *Lamtoro* (*Leucaena leucocephala*) was also grown as a fences around the field, but among farmers there was disagreement about planting this species due to the Gummosis diseases which can destroy it.

They selected Napier grass (*Pennisetum purpureum*) because it has a high yield; it has a soft stem that is easy to cut; it has deep roots, so is fairly drought-resistant and it is easy to re-grow after harvesting. This is similar to other studies in Kenya which found that smallholder farmers in densely populated areas showed great interest in growing Napier grass compared to other grass (Bayer 1990). *Gliricidia sepium* was selected not only for nutritive value but also because it has no apparent toxicity to animals compared to *Leucaena leucocephala*.

The outcome of this process was that the farmers created their own model in developing forage technology. They preferred to grow forage based on their particular land condition, such as planting *Gliricidia sepium* as a fences around the boundaries of homestead and field (tree legume in fence line); Napier grass was planted in waste ground adjacent to existing crops and in unused land within the homestead and under *kapuk* trees (grass and legumes in cut plots). The model of planting forage drawn up by the farmers can be seen in Figure 6.3.
6.7.1. Reflecting on workshop on developing forage technology with farmers

Reflecting on the workshop process, some farmers were “dynamic” while others were more passive during the workshop. This was because they had different capability in responding to the process. The process of developing forage technology to farmers in a participative way was time consuming, but was work at the grassroots level, especially working with those who have a low level of formal education. The entire process of the workshop was not only to achieve the aims of the workshop itself, but also to build up
participants’ confidence to speak, to learn from each other and to generate knowledge on their own for their own development. In particular I noticed in this workshop that:

1. there was a lot of interest and enthusiasm shown by the participants in designing their own model for planting forage
2. we had involved the stakeholders in the step of developing forage systems based on their experience and their local knowledge.

This presented me with insight into the methodology that was adopted in this research.

Another aspect to note was the process of facilitation itself. Facilitating group discussion required communication skills in terms of using simple words, terms and language which could be understood easily. Often the facilitators needed to repeat themselves or use an analogy to facilitate or to guide the participants (farmers) in understanding and making meaning of the topics under discussion.

6.8 The plot demonstration

The model developed by farmers was put into practice. This relates to other studies that show that forage development is more successful if the technique and the species demonstration are conducted under local conditions (Perkis *et al.* 1985; Stür & Horne 1998). The learning group and the AR team set up the agenda for undertaking the plot demonstrations.

The plot demonstration on forage technologies was carried out in three different fields. One was planted in unused land within adjacent crops; one was planted in uncultivated land under a *kapuk* tree and the other was planted in uncultivated land and as a fence line around the field. In this context, Napier grass (*Pennisetum purpureum*) and *Gliricidia sepium* were planted as tall grass and very tall legume.

The demonstration plots were commenced in March 2000, at the beginning of the rainy season, by the members of the learning group in their own land. Here the AR team and Livestock services assisted farmers to set out the plot demonstration by providing information that farmers needed and providing materials for undertaking plot demonstration.

The Napier grass was planted in row lines with intervals of 60 x 70 cm or 60 x 100 cm, planting cutting systems that came from the stem Napier grass that was found around the Bantaeng district. This stem material was planted angled to the ground at about 30 degrees, so two of the nodes were buried in the soil and one was above the ground, at 60 cm intervals along the line. Similar to grass the planting of cuttings also
applied to the *Gliricidia sepium* that was planted around the field at intervals of 75 cm. Farmers, AR team and development workers monitored the plot demonstration regularly and discussed the progress and the problems that farmers faced during forage establishment. The focus here was

1. to allow farmers to assess the performance of their techniques, and
2. to provide information needed in order to learn from their experience.

This process challenged them to reflect on their practice, why this particular practice was chosen instead of another, what and why they did what they did. So, through this process they understood about their own practice better. I found that during the early stages of forage development it was very important to encourage farmers to keep maintaining their forage, as well as providing technical information to them. From these activities farmers and development workers built a relationship based on mutual respect and trust.

### 6.9. Monitoring the forage plot demonstration

After three months of integrating forage into the farming system, we thought it was necessary to organise a formal meeting and focus group interview to evaluate the process. The focus was to rethink and review the forage management practices that had been integrated to the farming system. Farmers reviewed their actions through discussing and sharing their experiences, and then looking for new ways to improve their actions. The review was in terms of technical, sociological and economical aspects.

The research project had begun with four farmers involved in the plot demonstration. However, I observed some other farmers had started growing forage similar to the members of the learning group since introducing forage technology to them. As one farmer said: “I could not wait to grow forage on to my land because I do need grass to feed my cattle and horses. I knew how to plant forage because I always participate in your activities” (FR#2). Some farmers waited for a few weeks to start growing forage on their land in order to see how the forage on the demonstration plot was growing. This attitude is common when introducing new technology to farmers, as supported by a study of forage in some countries in South East Asia including Indonesia, reported by Horne *et al* (2001). This asserts that farmers asked to join in the project of developing forage technology after seeing their “neighbour’s plot”.
Technical aspects

Farmers found that under kapuk trees the grass grew well at intervals of 70 cm along the line. It was ready to be cut after 40 days. Farmers applied six to seven weeks cutting interval instead of the eight to ten weeks that had been recommended. They found that cattle preferred to eat the young leaves between six and seven weeks after cutting compared with over eight weeks after cutting. Farmers found that feeding young grass meant it had a high palatability; however, it was lower in carrying capacity because of lower yield. This is consistent with AAK (1985), pointing out the young leaves are palatable and nutritious.

In this study area farmers found that Napier grass responded to fertiliser. However, it is still at an economical level\(^4\). Farmers applied both chemical and organic fertiliser to their grass and legumes, particularly for the first two months, in order to achieve a good establishment of forage, and this was particular important for the first two weeks of planting. Farmers applied chemical fertiliser such as urea. Application of chemical fertiliser was 0.1t/ha and manure (fresh weight) 3 t/ha. Another study recommended that in the medium rainfall area the grass should be harvested after 7-8 weeks while high rainfall areas the grass should be harvested at 9-10 weeks (Muia et al 1999). According to Nitis (1989b) Napier grass itself was not rich in nutritive value; but if combined with a legume such as Centrocema pubescens, it can become an ideal grass-legume combination. He also found that sheep and goats fed on Napier grass (Pennisetum Purpureum) supplemented with 0.3 to 1.8 kg Gliricidia sepium per day gained 17 to 27 percent more weight than the sheep and goat not receiving supplement (Nitis 1989c). AAK (1985) stated that this grass particularly the young leaves provided good nutritive value.

Other studies have found that with the application of fertiliser, this grass could produce very high tonnage, approximately 250 tons per hectare (AAK 1985: Gill 1988) and it showed no decline in yield even after 30 years (Bayer 1990). Moreover Bayer (1990) also found that Napier grass could be grown without fertiliser, but the yield decreased substantially in the second year after planting, and became unproductive after 3-4 years (Bayer 1990).

According to farmers in this AR project, growing Napier grass in unused land within existing crops needed good management to control the grass from spreading over

\(^4\) economical level means the output is worth more than the input cost. In this study area farmers applied fertiliser such as *urea* (NPK) in the early stage of forage establishment as well as in dry seasons.
to crops. However, farmers found that under this forage management system, it was easier for them to control their forage because the forage was in the crop fields that they visit everyday. They also found that it was easy for them to collect the grass and carry it home. In addition, *Gliricidia sepium* was planted as a fence around the field. This forage management practice fulfilled the needs of farmers to protect their crop fields from animal incursion. However, farmers found that this forage management practice needed more time to become established compared to grass. Therefore, the impact of this system might not affect farmers until after this tree was well established, normally after eight months.

**Production effects**

Planting forage had direct and indirect positive consequences for farmers. Farmers planted forage in unused land, thereby optimizing land use. Farmers found that planting forage improved their practices. For example, most farmers who grew forage changed their practice in raising cows, moving from a system of tethering animals in the fields to eat weeds, to a cut and carry stall-feeding system utilizing more nutritious forage sources. The cut and carry system increased the amount of manure collected for fertiliser, as it could easily be collected from the stalls.

**Social aspects**

Integrating forages into the farming systems affected the division of family labour. In this study area, collecting fodder for ruminants was the responsibility of the father and son. The focus group interview produced evidence that the young boys had the task of collecting the fodder before or after schooling. Through discussions in this reflection stage, the farmers found that planting forage could reduce the burden of their sons due to the availability of fodder near the house. Furthermore, planting forage near the homestead attracted women’s interest to look after the forage, particularly the forage tree.

In the discussion session, some farmers complained about the availability of forage material. They suggested there was a need to establish a forage nursery, to make it easier for them to get the forage material. One of the members of the learning group was willing to use his forage as a source of forage material, particularly Napier grass.

During this reflection stage, I observed that the participants who engaged in this research began to understand, and make sense of what they had done through the
evaluation of action, and used the information from this evaluation for further action. Building up of trust, was an important part of this stage. For example farmers developed confidence in their ability to understand and use technical and scientific knowledge, leading them to recommend farmers cut their Napier grass mostly between 6-7 weeks, even though it had been recommended to be between 8-10 weeks: Farmers had also found that this resulted in the grass being higher in palatability. Here, farmers valued scientific information for providing general concepts and they understood why certain practices were recommended. Learning the theory and principles of forage management enabled participants to find out how and why certain practices were recommended to them. As one farmer said:

We know that cattle like young leaves, but I’ve never known all the reasons why…, now I know that. (FR# 11)

6.10. Field visit to demonstration plots

In June 2000, the AR team and development workers ran a one-day field visit to the demonstration plots for other farmers from the village and local area. The purpose of this activity was:

1. to discuss outcomes with test farmers and exchange insights
2. to show other farmers what had been learned and changes had been undertaken
3. to invite or to develop awareness in other farmers to start similar activities.

Twenty six farmers who attended this activity. A community group discussion was held in the village office hall with participants, before visiting the plot fields. The members of the learning group who carried out the plot demonstrations shared their experiences with other farmers by explaining the advantages and the challenges that they had faced during the period of forage establishment. Through community group discussion participants could learn “what and how” of the particular practices that had been chosen and created, and that had worked in the real situation. Farmers came to have a theoretical perspective, which to their practices is consistent with the notion of action research as a process of linking theory to practice (McTaggart 1991; Dick 1993). Development workers also had an opportunity to listen to farmers’ experiences of their practice (in this case growing forage), so they came to appreciate farmers’ experience and knowledge, generated through the joint learning with them. Here, development workers came to realise that they were not only transferring technology to farmers, but farmer were communicating their knowledge and representing their views to them.
6.11. Small training on forage management

A one-day short training on forage management was held at the village hall. The training focused on the basic understanding of management practices of growing forage and the role of management in improving the establishment of forage. The training was open to anyone in the village who wanted to participate. There were twenty eights farmers who participated in the workshop including two women farmer. The AR team and one staff of livestock services and two field workers were also involved in facilitating the training.

The training began with the gathering of the participants’ views about their expectations of the training (see Box 6.6). Farmers generally hoped to obtain technical aspects about planting forage, and to link it with the bio-physical issues related to their farming system; whilst the development workers generally had an expectation of learning how the process of forage management training was conducted. Although farmers, women farmers and development workers had different expectations from attending the training, they all valued similar things with regards to the learning process.

<table>
<thead>
<tr>
<th>Farmers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Better knowledge of planting forage to make it grow well</td>
</tr>
<tr>
<td>Better ways of utilising forage for animal feeding</td>
</tr>
<tr>
<td>Better management of planting forage</td>
</tr>
<tr>
<td>General knowledge of animal feeding</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Women farmers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Better knowledge of forage</td>
</tr>
<tr>
<td>How to manage forage trees</td>
</tr>
<tr>
<td>How often should forage trees be cut</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Development workers</th>
</tr>
</thead>
<tbody>
<tr>
<td>To develop communicating skill with farmers</td>
</tr>
<tr>
<td>To have an idea how the training is conducted</td>
</tr>
<tr>
<td>To know how communicate with farmer; how can knowledge of forage management be helpful in decision making with farmers.</td>
</tr>
</tbody>
</table>

Box 6.6. Response of participants to the questions “what were the specific reasons for you attending this training.

One interesting thing that emerged from participants’ was that women preferred to gain specific knowledge related to their purpose for planting forage. In this study area, women found it interesting to look after forage trees that were planted as a fence line around the homestead, particularly watering regularly. Their expectation was to get the benefit of firewood from the trees.
Although the participants went through the same learning process it seems they learnt different things from the training (Box 6.7). The participants’ response to the training was that farmers learnt about the technical aspect and development workers learnt about the process of training; it was consistent with the participants’ expectations.

<table>
<thead>
<tr>
<th><strong>Farmers</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Better understanding of forage management.</td>
</tr>
<tr>
<td>Understanding of appropriate interval cutting systems could improve the forage yield</td>
</tr>
<tr>
<td>Understanding the composition of fertiliser applied to forage</td>
</tr>
<tr>
<td>Now, I have ability to grow more varieties of forage in my farm.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Women</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Having new knowledge about forage.</td>
</tr>
<tr>
<td>Enjoyed to learn new things although some of the forage varieties that were discussed with participants they were not familiar with</td>
</tr>
<tr>
<td>Understanding of forage management</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Development workers</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Improved methods to communicate with farmers</td>
</tr>
<tr>
<td>Learning from farmers experiences</td>
</tr>
</tbody>
</table>

**Box 6.7.** Knowledge gained by the various participants in the workshop.

This experience demonstrates that participants can learn different things although involved in the same learning process. What they learn tends to be related to their expectations.

### 6.12. Conclusion

I have described a facilitation process for participative learning in Tombolo village, designed to solve the problem of fodder security. The process presented created the space for stakeholders to become partners in the development process and to focus on in-depth analysis of their problem, with a view to its improvement. What was experienced and observed was then assimilated, made sense of and interpreted. This provided insight into the problems and that knowledge was transformed into a plan and action. Taking action was the result of this process. The farming systems of this situation have been described in a previous chapter, but for this stage, adequate understanding could only be achieved by considering the perceptions of the stakeholders. Through the process of participative learning, knowledge was generated not only from propositional learning (learning for knowing) and practical learning.
(learning for doing) but also from experiential learning (learning for critical reflection). The knowledge that was produced in this process was generated from the critical analysis of a real life problem, and the opportunities that arose to take action to solve the problems. It was also generated from discussions related to how different people saw the same problems and proposed alternative solutions from their different perspectives.

In these contexts, farmers became the resources persons. They were jointly responsible for the process and product. Development workers were reoriented towards this participatory process. The process of decision-making followed shared discussion, negotiation and agreement. Knowledge was transmitted to the farmers through the “process” of problem solving, rather than “advising” farmers on how to solve specific problems.

The concepts associated with action research were action learning, experiential learning and adult learning, purposefully supported by the facilitation of learning about the development of forage technology. The fundamental belief behind these concepts was that knowledge could be created from concrete experience through a process of active experimentation and reflective observation, following the Kolb (1984) learning cycle see section Five.

Chapter 7 now turns to the evaluation of this key intervention and its effects on the activities, livelihood and wellbeing of the farmers.
CHAPTER 7

EVALUATION AND OUTCOMES OF THE STUDY

7.1. Introduction

Evaluation in the field of agricultural programs can be distinguished into broad two categories, formative and summative evaluation. The differentiation between formative and summative evaluation is concerned with the basic use of the value judgment (Dart et al 1998).

Formative evaluation is conducted to provide program staff with judgments useful in ongoing improvement of the program. Summative evaluation is commonly conducted after completion of the program, for the purpose of the decision makers, whether the program should continue or not.

In this study both formative and summative evaluation were conducted. The formative evaluation was carried out during the implementation of action as a part of the PAR process. It was aimed at improving and developing existing activities and assessing whether those activities were reaching their goals. The summative evaluation was conducted toward the end of the research project life and it aimed to review what participants thought and valued about the process and outcomes of this research project, and to move towards a self-sustaining development process in the study area.

In addition, the participatory action research used in this study resulted in ongoing learning throughout its implementation, and therefore evaluation process was an integral part of the development of the study. Evaluation was built into all the stages of the research process and it determined the action orientation at each stage. This process has been described in Section 6. This chapter includes an outline of how reflection the PAR cycle was done by the AR team, the learning group and community group discussion.

The most common approach to evaluation used by Government Livestock Services in Indonesia is “measuring” things only (accountability), and the evaluation is carried out by external evaluators. The clients of the programs (farmers) were not generally involved in developing indicators for the evaluation.

In this study, by contrast, I undertook an evaluation based on a constructivist paradigm, which I thought was consistent with the principles of community participation. I carried out a community self-evaluation strategy built upon the inherent, critical reflective capacities of the participants who were involved in this study. The
researchers and stakeholders defined the topics to be examined in order to transfer relevant knowledge related to future actions.

Because this research project was about social change, in the evaluation of this study I was not searching for the desirable and undesirable things, but rather I wanted to hear the reflections of the participants about the lessons they learnt during the research process. The focus here was on reflecting:

1. on what happened with respect to the activities carried out by stakeholders
2. why participants thought these things happened, involving the uncovering of factors that contributed to both the success and the constraints of the research project
3. the strategies employed
4. what this research meant to stakeholders in terms of their work and lives
5. it also included reflections on my role as a researcher and facilitator of the learning process.

The summative evaluation is the focus of this chapter, that is the reflection of participants on the lessons they learnt during the course of the study (summative evaluation). Formative evaluation occurred during the course of the study as the information collected was used to improve the research project agenda. These insights gained might also be used to improve other programs in South Sulawesi province.

7.2. The evaluation process

Evaluation in PAR projects is an ongoing process. It occurs through the PAR cycle, in which the participants are encouraged to reflect on their action. The ongoing process of evaluation is shown in Figure 7.1.

![Figure 7.1. The evaluation process in PAR](image-url)
The evaluation consisted of a consistent process of

1. setting up clear purposes of activities
2. developing relevant questions related to the goal of the activity
3. collecting the evidence and then using this for the next action plan process.

The focus here was to create an atmosphere of inquiry into what could be done to improve the situation in a proactive and responsive manner to participants. The AR team therefore played the role of guiding the participants towards critical and self-reflective inquiry.

The evaluation was further conceptualised as an input into strengthening the learning culture. It was therefore regarded as another action research cycle in which participants learnt to improve upon the learning process. The results provided an indication of whether or not the PAR and associated other theoretical approaches to learning were effective and appropriate to improve farmers’ conditions, as well as to improve the livestock development work in the study area. This evaluation did not just focus on determining future action, but also focused on giving a voice to the farmers who were usually silent. This emphasised what the participants “value” in this research project, and valued knowing what people think and what they would prefer.

7.3. Evaluation: ongoing process of activities (formative evaluation)

The action-reflection cycle guided the participants and research team (see Figure 7.1). Actions were planned and constantly evaluated. What is working? What is not? Why is it not working? As observed in this study, was the “act” phase effective in responding to and challenging the information and interpretations from the previous cycle?

The formulation of action phases in this study into three monthly intervals was found to be appropriate by the participants in generating fruitful actions which provided information for the next step. Participants had a chance to collect the information from their experience, make meaning and learn from it. It led to the production of new knowledge that could be used as a basis for appropriate future action. The AR team observed that the only way to keep track of this process was to shift between thinking and doing. Actions were implemented based on the reality of available knowledge, and were conceived as trials to be validated through practice and accepted or rejected based on the experience of the outcomes of the practice. In this way the participants progressed and learnt at the same time, and learning was constantly applied to the
process. From this process the AR team observed that participants enhanced their critical thinking and problem solving skills either as individuals or at the group level (see Table 7.1, p. 153 and Table 7.2, p.154 for how participants developed their knowledge and skill through reflection and action)

Notes taken and subsequently commented upon by the participants (learning group of farmer, and AR team) emphasised the point that actions and reflection implemented to guide the activities were effective as a means to judge aspects of the new situation. However, it required the capability of participants to:

1. shift from doing to thinking,
2. use and critique the process, and
3. share the experience that they had from the process with others in order to reconstruct new experience.

In the framework of the PAR cycle of this study, participants entered the PAR cycle at “plan stage” (situation analysis and plan for action), and then continued to the next step, “act” (take action), “observe the results” (achieved through documentation and assessment of current practices), and “reflect on results”, (farmers suggest future action). However, it was observed that action could eventuate as the same time as observations, for example when farmers attended the workshop on developing forage technology; this aimed to answer farmers’ questions by an adviser, but then two actions eventuated, with farmers developing their own model of planting forage, and farmers developing an action plan to put the model into practice. This indicated that the PAR cycle could be entered at any stage.

The following sections discuss the ongoing formative evaluation during the first two fieldwork phases. It also includes the role of the AR team, the learning group and group community meeting in the process of undertaking the activities that were guided by the PAR cycle.

The sequential formative evaluation during the first fieldwork

As described in previous chapters (4 and 5), the first PAR cycle was entered in order to understand the situation being studied by collecting the information from many perspectives and to identify problems that were perceived by the farmers in the study area. The goal of evaluation was to:

1. develop an understanding of livestock farm practices and the work of livestock development in the study area
2. gain an overview of the important issues as perceived by the farmers and development workers who were involved in the management of this relevant farming system
3. determine which problems required further investigation
4. look for possible solutions based on local knowledge and circumstances.

The concept of triangulation was used in this process of collecting information. General information about the study area was collected through direct observation, key informants, and interviews. The group meetings, workshops and community group discussions were conducted to find out pertinent information related to the issues concerned and to discuss possible solutions to improve the situation. The chronological evaluation process at this stage is presented in Table 7.1 below

**Table 7.1.** The formative evaluation conducted during the first fieldwork

<table>
<thead>
<tr>
<th>Evaluation of the activities</th>
<th>Purposes</th>
<th>Evaluator and Method</th>
<th>Understanding</th>
<th>Further Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reflect on the data collection method from problem identification</td>
<td>To improve technique used</td>
<td>Group discussion by AR team and the learning group</td>
<td>AR team and the learning group agree that it was needed to build up the rich picture of the situation in the study area as well as analyses of experiences that concerned participants</td>
<td>Formal workshop</td>
</tr>
</tbody>
</table>

| Group reflection to conclude phase I | To legitimate the findings that had been discussed at the workshop and by AR team and the learning group | Community group discussion | Legitimate aims with participants (all the participants agree that scarcity of fodder was the problem) Led to reaction of believing change was needed to improve the situation Enable farmers to set up their own agenda | Group reflection to conclude phase I identified needed changes and the direction such changes might take through introducing forage technology to farmers. Cycle one of PAR was completed. This led to beginning of the next cycles. |

The sequence of formative evaluation during the second fieldwork

The aim of the second fieldwork was to implement action that was conducted from December 1999 to July 2000. During this period several activities were undertaken by the participants in order to improve the livestock production and the work of livestock development. From the previous cycle of PAR, scarcity of fodder had been found by farmers to be an important problem to be solved. Table 7.2 depicts the formative evaluation that was conducted during the second fieldwork
<table>
<thead>
<tr>
<th>Evaluation</th>
<th>Purposes</th>
<th>Evaluator &amp;Method</th>
<th>Understanding</th>
<th>Further plan (action)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Review the action plan</td>
<td>To agree upon the action that would be undertaken</td>
<td>Group meeting with the learning group</td>
<td>Farmers developed their problem-solving skills and understanding of the problem in relation to other contexts. Farmers learned to picture a plan in the form of table.</td>
<td>To agree to conduct the workshop on forage technology.</td>
</tr>
<tr>
<td>Review the forage model that was introduced to farmers in the workshop</td>
<td>To allow farmers to develop their own model for planting forage</td>
<td>Workshop Community group discussion</td>
<td>Build upon critical thinking skills and this led to building creativity of farmers. Farmers learned about various varieties of forage. Farmers understand the advantages of planting forage. Development workers understand farmers’ knowledge and local circumstances.</td>
<td>Put the model into practice.</td>
</tr>
<tr>
<td>Evaluate the forage model</td>
<td>To allow farmers and development workers to develop their understanding of the concept of learning by doing To examine the action that had been implemented</td>
<td>Group meeting with the learning group Interview Visiting forage fields Community group discussion</td>
<td>Enable participants to act on event and situation that occurred in order to improve the performance of their forage field. Farmers learned particular forage management practice. Development workers improved their understanding why such management practice was chosen by farmers. Some women interested in maintaining the forage fields. Farmers developed communicative learning through shared individual learning. Farmers want to improve their knowledge and skill on forage management.</td>
<td>Undertook field visit to demonstration plot in order to exchange knowledge and to show other farmers. Conducted small training on forage management.</td>
</tr>
<tr>
<td>Reflect on the success of planting forage</td>
<td>To allow farmers and development workers to interact to discuss and exchanges insight</td>
<td>Community group discussion</td>
<td>Improve knowledge and skill on forage. More farmers interested to grow forage. Development workers develop their skill and knowledge on the concepts on learning approach. Farmers would be able to transmit knowledge to others.</td>
<td>Conducted small training on forage management.</td>
</tr>
</tbody>
</table>
From the process above I identified three characteristics of PAR:

1. building creativity of farmers
2. knowledge construction, and
3. developing individual and communicative learning.

I will return to discuss these issues in the chapter 8.

In addition, as observed by the AR team in the ongoing evaluation process, learning specifically took place when planning and achievement were assessed, and farmers analysed some factors related to the aspect if there were differences between planning and achievement. For instance, different time of planting forage applied by farmers resulted in unlikely forage yield, particularly for legumes, that tended to establish more slowly, but performed well during the dry season. The development workers noted the importance of reflection in action to enhance their practices. They found that discussion and listening to others’ experience in the action process helped them in stepping back from the action and obtaining different perspectives. Development workers recognised that the process of evaluating/reflecting on the action was a better approach to the transfer of knowledge to farmers.

During the ongoing evaluation process, increasing attention was given to formalise group learning. At the same time the AR team tried to motivate farmers to take ownership of the program. Although the farmers were interested to learn from each other as a group, poor managerial skills and lack of clear purpose were found by the AR team as barriers to farmers meeting regularly as a group. However, with the assistance of the AR team and development workers in organising meetings and setting up an agenda, farmers became more and more confident and aware of the usefulness of colleagues as a source of knowledge. This can be seen from the increasing numbers of farmers that attended the community group discussion (16 to 32). Similarly, several meetings for the learning group were attended by farmers who had not been specifically invited. The ongoing evaluation process was found to be useful by the AR team and development workers, who were improving their understanding about the learning approach, as well as for their role as facilitators. Here, the AR team and the development workers experienced the trying out of new ways of working with farmers. As illustrated, below how the AR team and development workers felt about being able to apply the learning approach was:

They felt they were really undertaking their job and on the other hand they were concerned about the depth of problems they would uncover and whether they
had adequate skills to cope with the diverse needs of farmers (Pers.jrnlt, 12-2-00#).

Experience from the field tells us (AR team) that the facilitators played an important role as a source of knowledge and innovation during the first year of PAR. On the other hand the community group discussion also played its role in the process by creating public perceptions of a valid inquiry process. For instance, six community group discussions eventuated during the course of this study that were used to make sense of the emerging experience and to allow other farmers to scrutinise and make judgment about the ideas that had been discussed with the learning group.

In addition, after more than a year of engaging in the PAR process, during which forage had been introduced to the farmers to improve their production problem, farmers then further developed this idea, demonstrating capacity building. This was achieved through forming “cattle fattening groups”. This achievement is an example of how action, although it was technical intervention, could bring about change in the social aspect of the community through the PAR process itself.

Although the PAR itself includes an evaluation process, it was also necessary to carry out further evaluation after the project had stabilised (summative evaluation). I now briefly describe the summative evaluation in this study.

7.4. The evaluation of the research project (summative evaluation)

The evaluation was carried out 18 months after participants had been introduced to the concept of the learning approach (PAR). This level of evaluation aimed for encouraging a change of the extension approach used by livestock services and extension services staff, while also ending this research project by evaluating outcomes.

The evaluation in this context was a process of finding out and making sense of the experience of participants with the PAR (learning approach) in which they were engaged. The questions were: Has the situation improved? Did participants learn and gain knowledge through this study? The following sections discuss the process of summative evaluation and its outcomes. It also includes the theory behind the evaluation, how data was collected and the analysis of that data.
7.4.1. Theory behind the evaluation process

There has been a gradual shift from a notion of evaluation based on the “conventional approach” – involving measurement, judgment and description by “experts”, (accountable thinking) to a concept of a “participatory approach” in which both researchers and stakeholders participate in the creation of knowledge through a review of the project (Patton 1987; Guba & Lincoln 1989; Ernest 1993; Narayan 1995; Wadsworth 1997). Evaluation conducted in the conventional fashion has little impact on local communities and their autonomy as intelligent individuals: Here participants have little say in regard to what is evaluated, how it is done and how to make sense of the results. In addition, the evaluators in conventional evaluation are placing the participants in a passive relationship with the evaluators. In response to this dilemma, some evaluators have developed participative approaches in which the evaluator and the evaluants have created a closer relationship and opened up the possibilities of mutual learning. Guba and Lincoln (1989) in their “Fourth Generation Evaluation” introduce this approach to evaluation, as well as Patton (1986) “Utilization-Focused Evaluation”, and Brunner and Guzman (1989) “Participatory Evaluation: A Tool to assess Project and Empower People”. All of these authors stress the importance of involving participants in the evaluation process in order to reach the desired goal.

Although there are similarities among these approaches, the Guba and Lincoln (1989) approach was selected for this thesis because it offered detailed information about the concepts and procedures to use in the evaluation of this study (see Box 7.1 for the principles of constructivist evaluation).

Guba and Lincoln (1989) assert that evaluation is a process of construction and reconstruction of realities. This approach sees evaluation as a marriage of responsive focusing, using the claims, concerns and issues of stakeholders as the organising elements, and constructivism methodology aiming to develop judgment consensus among stakeholders who earlier held different, perhaps conflicting, emic (different view) constructions.
1. Evaluation is a process whereby evaluators and stakeholders jointly and collaboratively create (or move toward) a consensual valuing construction of some evaluate.

2. Evaluation is a process that subsumes data collection and data valuing into one inseparable and simultaneous whole.

3. Evaluation is a local process. Its outcomes depend on local contexts, local stakeholders, and local values and cannot be generalised to other settings.

4. Evaluation is a sociopolitical process. Social, cultural and political aspects, far from being merely distracting or distorting nuisances, are integral to the process, at least as important as are considerations of technical adequacy.

5. Evaluation is a teaching/learning process. Evaluators, clients, sponsors and all stakeholders both teach and learn from one another; indeed, such teaching/learning is an absolute prerequisite to the meaningful reconstruction of an emic view.

6. Evaluation is a continuous, recursive and divergent process, because it’s “findings” are created social constructions that are subject to constructions that are subject to reconstructions. Evaluations must be continuously recycled and updated.

7. Evaluation is an emergent process. It cannot be fully designed in advance for its focus depends on inputs from stakeholders and its activities are serially contingent.

8. Evaluation is a process for sharing accountability rather than assigning it.

9. Evaluation is a process that involves evaluators and stakeholders in hermeneutic dialectic relationship.

10. Evaluators play many conventional and unconventional roles in carrying out fourth generation evaluations.

11. Evaluators must possess not only technical expertise but also relevant interpersonal qualities such as patience, humility, openness, adaptability and sense of humour.

**Box. 7.1.** The principle of fourth generation evaluation (adapted from Guba & Lincoln 1989, p. 263)

Thus, in fourth generation evaluation the researchers engage with participants directly and then, together with them, make sense of the evaluation process and results. As Guba and Lincoln (1989, p.142 ) say,

The major task for the constructivist investigator is to tease out the constructions that various actors in the setting hold and, so far as possible, to bring them to the conjunction - a joining - with one another and with whatever other information can be brought to bear on the issues involved.

Similar to Guba and Lincoln (1989), Greenwood and Levin (1998) point out that in participatory evaluation the recipients of programs are actively involved in the process
of interpreting evaluation results. This means that the researchers collaborate with stakeholders in gathering the data as well as making sense of the findings.

The participatory evaluation recognises the central position of stakeholders as users of the results of the evaluation and advocates for their effective participation in the process. Participatory evaluation resides not in its ability to ensure social justice but in the utilisation of systematically collected and constructed social knowledge (Cousins & Earl 1995).

The approach used in this evaluation differed from the conventional approach used in Indonesia, and has the following characteristics:

1. it occurred in a collaborative way, where both evaluators and farmers contributed and participated in the process; thus, what is learned is of value to everyone
2. it searched for learning not only about “what happened” but also “Why” those things happened
3. the information collected was reported back to the participants.

In addition, the evaluation process of this research took the form of social discourses in which stakeholders were encouraged to construct and reflect on the experiences they had in this study. The process also acted as a chance for stakeholders to improve how they could learn from the evaluation for future action. Thus in this context the researcher and stakeholders were learning together to improve and understand:

1. the issues and the practices of the farming and livestock development work
2. the activities that had been carried out during the course of the study
3. the context of this study
4. knowledge generated based on problem solving, and
5. the learning approach employed in this study.

7.4.2. Method

There were four groups of interviewees. The first was the learning group of farmers (as co-researcher), group A; the second was farmers who were peripherally involved (group discussion), group B; the third was the development workers (livestock government official and extension officers), group C; and the fourth was the AR team, group D. The main questions asked at the evaluation are presented in Box 7.2; the questions could lead to other questions based on the answers of respondents. These
questions were guided by the work of Kemmis and McTaggart (1988; 1991) and the work of Grundy (1992).

<table>
<thead>
<tr>
<th>General questions to respondents (group A, B, C and D)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. What do you think about this research project?</td>
</tr>
<tr>
<td>2. What did you get and learn from being involved with this research project? What significant lessons did you gain?</td>
</tr>
<tr>
<td>3. Why did you join this research project? What significant change did you find?</td>
</tr>
<tr>
<td>4. What do you think about the approach that we applied in this project?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>In relation to forage management: (group A and B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. What do you think about your forage?</td>
</tr>
<tr>
<td>6. What is most important to you in managing forage?</td>
</tr>
<tr>
<td>7. What are the problems of forage? Why are there problems?</td>
</tr>
<tr>
<td>8. What do you think about planting forage?</td>
</tr>
<tr>
<td>9. Does planting forage affect your family labour? Why?</td>
</tr>
<tr>
<td>10. Do you have any problems with planting forage? How do you handle it now?</td>
</tr>
<tr>
<td>11. Is your wife interested to look after your forage? Why?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>In relation to the learning group (group A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participation:</td>
</tr>
<tr>
<td>12. Why did you join this group?</td>
</tr>
<tr>
<td>13. What interested you about being a part of the learning group?</td>
</tr>
<tr>
<td>14. What do you expect from participating in the learning group? etc</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Learning process in the group:</th>
</tr>
</thead>
<tbody>
<tr>
<td>15. What have you learned so far through the experience of being a part of the learning group?</td>
</tr>
<tr>
<td>16. What do you think about the way we have been learning as a group? For example the way we solve problems etc?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>In relation to extension workers and trainers (group C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>17. As a professional, what did you learn being involved in this research project? (group C)</td>
</tr>
<tr>
<td>18. What do you think about PAR that guided the process of research project activities? were you aware of that?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>In relation to AR team (group D)</th>
</tr>
</thead>
<tbody>
<tr>
<td>19. Has the process gone as we planned?</td>
</tr>
<tr>
<td>20. Has we achieved desired goals?</td>
</tr>
<tr>
<td>21. What are significant constrains of conducting PAR?</td>
</tr>
</tbody>
</table>

**Box. 7.2.** List of questions asked to participants at the evaluation stage

**Interviews**

The evaluation started with in depth interviews with the members of the learning group (group A), and interviews with farmers who could benefit from an increased understanding of this research project, and included both men and women (group B). The respondents from group B were selected randomly from six sub villages. These interviews were carried out by the AR team over a month from January to February 2001.

There were thirty four male farmers including seven members of the learning group, and five women farmers who were interviewed at this evaluation time. For the convenience of farmers, and in order to encourage them to express their opinion and feelings, we created conversations with them, starting with general topics and then asking them more specific questions such as: “Tell me a little bit about your forage field? Tell me a little bit about your cattle? Tell me what did you learn through this
project? Tell me what significant lesson you gained? What significant changes did you make during this research project? What do you think about this research project? What did you expected from this research project, and so on. We also observed the forage fields and had casual conversation with the owners as we did this. Therefore, each interview took an average of about one hour. The interview was recorded and notes taken as well during the time of interview.

**Group discussion**

A group discussion was held, which included four officers of livestock services of Bantaeng district (including the head of Bantaeng District Livestock Services), three extension agents, and all the members of the AR team. It was conducted on 15 of March 2001, and was held at the livestock services office. Its aim was to evaluate the appropriateness and challenges of using a learning approach in the livestock development work in the study area, as well as to find out views and learning experiences from being participants or associated with this research project. Note taking was done during the group discussion by the AR team.

The reasons for two categories of interviewing of farmers and livestock government staff was to compare the perceptions of benefits to farmers among those who had been closely involved (learning group of farmers), and those who had not been closely involved, and to separate farmers from livestock department staff to see the differences in the benefits and concerns of the two groups.

**7.4.3. Data analysis**

The information that was gathered from interviews and group discussion was analysed through content analysis (Patton 1989b). The process used a sorting technique to organise the data into topics or themes. The notes taken by the AR team during the interviews were discussed in order to compare them with other findings and to give insight to the meaning of the data. The questions raised by the AR team at this stage were:

1. what makes the information collected more than just documentation?
2. how can the information collected have benefit for decision-making, and planning processes, in terms of improving the work of livestock development in the future?
The information collected was then given back to the participants in another workshop, as information to be re-assessed by them.

The AR team believed that the PAR approach was difficult to evaluate, because it concerned a learning process in which activities and outputs could not always be planned before, and might changes over time in unexpected ways (Defoer et al 1998).

The results of the interviews and group discussions were first coded into very broad categories, (e.g. the impact of forage production, the extension approach) from these main themes, they were coded on more details. For example:

1. from forage production; capturing detail of what it was that farmers achieved from having a forage field? (technical, economic and social outcomes). What constrained them? How did they cope with their problems more recently?
2. from extension approach, capturing details of what were the lessons learned from that experience by participants? (relationship, learning, participation)

This type of organised coding allowed the AR team and the learning group to examine the context in which the code was used.

The results from the process of data analysis above are summarised by descriptions of the main themes that emerged from participants’ experiences (learning group of farmers, farmers who were not closely involved, and development workers) of this research project (see Figure 7.2).
7.5. The workshop

A small workshop was also held with participants in the village on 14 April 2001: The women farmers were also encouraged to participate in the workshop by specifically inviting them. The purpose of the workshop was to give back the data collected from the interviews, to generate knowledge about lessons learnt through the implementation of facilitated learning, and to reflect on the suitability and challenges of the learning approach for livestock development work in the study area.
The workshop began with a presentation of information collected from the individual interviews (see Table 7.3). The participants were then encouraged to comment on the information in small groups, and were asked to identify the indicators of impact on their forage production, commenting on both positive and negative aspects.

In this context, attention was placed on the knowledge shared, and the values and assumptions that were reflected in the individual interpretations, while the group was encouraged to reach shared conclusions. The results from this workshop and the knowledge generated were then used to suggest further actions and recommendations that could be used to improve participant activities in the future.

**Table 7.3** Indicator of impacts of developing forage technology identified by farmers and development workers during the individual interviews and group discussion

<table>
<thead>
<tr>
<th><strong>In relation to activities</strong></th>
<th><strong>In relation to approach</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Availability of livestock feeding</td>
<td>Create opportunity to learn from each other</td>
</tr>
<tr>
<td>Fatten livestock</td>
<td>Can get assistance from learning group</td>
</tr>
<tr>
<td>Animal not used to eating <em>Gliricidia</em> leaves</td>
<td>More confident to speak</td>
</tr>
<tr>
<td>Increased number of livestock</td>
<td>Improving network among farmers</td>
</tr>
<tr>
<td>Increased sale price</td>
<td>Self confident</td>
</tr>
<tr>
<td>Increased work capacity of animal</td>
<td>Farmers have capability to solve their problems</td>
</tr>
<tr>
<td>Increased amount of manure collected</td>
<td>Improved capability of farmers to understand their problems in relation to others’ context</td>
</tr>
<tr>
<td>Compost</td>
<td>Improving extension strategies</td>
</tr>
<tr>
<td>Improve soil fertility</td>
<td>Improving relations with development workers</td>
</tr>
<tr>
<td>Time saving</td>
<td>Benefit to every one because farmers free to attend the meeting</td>
</tr>
<tr>
<td>Additional off-farm income</td>
<td>Meet the need of farmers</td>
</tr>
<tr>
<td>Relax</td>
<td>Farmers being encourage to speak and impart their idea in the meeting</td>
</tr>
<tr>
<td>Planting forage material was available</td>
<td>Farmers are given choice of options</td>
</tr>
<tr>
<td>Less work for children</td>
<td>Development workers pay more attention by giving more of their time to visit the village</td>
</tr>
<tr>
<td>Increased attendance of children to school</td>
<td>Farmers are the drivers now</td>
</tr>
<tr>
<td>Less work for women</td>
<td>Farmers are being treated as a partners and equals. No differences between educated and uneducated as well as between poor and rich</td>
</tr>
<tr>
<td>Security for animals</td>
<td>Improving relation amongst farmers</td>
</tr>
<tr>
<td>No need to tether animal in the field</td>
<td>Need strong commitment among participants</td>
</tr>
<tr>
<td>Protect crops from animals</td>
<td>Need institutional support and commitment about the learning approach, both Local and national level</td>
</tr>
<tr>
<td>Increase income</td>
<td>If required more time</td>
</tr>
<tr>
<td>Possibility to sell green feed</td>
<td>It challenges a large number of farmers</td>
</tr>
<tr>
<td>Establish cattle fattening group</td>
<td>Need skilful facilitator</td>
</tr>
<tr>
<td>Have opportunity to gain grant from government</td>
<td>Appreciate local knowledge</td>
</tr>
<tr>
<td>Recognition of contextual relevance of farmer practice</td>
<td>Enhance capability of farmers to collaborate with other stakeholders</td>
</tr>
<tr>
<td>It encourages collaboration with other institutions</td>
<td></td>
</tr>
<tr>
<td>Appreciate other opinion</td>
<td></td>
</tr>
<tr>
<td>Apply dialogue rather than debate</td>
<td></td>
</tr>
<tr>
<td>Need patience and tolerance</td>
<td></td>
</tr>
<tr>
<td>Need listening skill</td>
<td></td>
</tr>
<tr>
<td>Learning and problem solving orientation</td>
<td></td>
</tr>
<tr>
<td>Improving behaviour of development workers</td>
<td></td>
</tr>
<tr>
<td>Need more training on participatory learning for development workers</td>
<td></td>
</tr>
<tr>
<td>Ensure farmers’ decision making for their own development</td>
<td></td>
</tr>
</tbody>
</table>
In the workshop, participants reclassified the information into their own themes. Some of these themes from the interviews were found to be repeated by the participants. In addition, participants identified each indicator impact of forage technology in relation to the household, and weighted each indicator in order of importance (see Figure 7.3).

There were two main categories of information classified by participants:
1. those activities completed during the course of the study, regarding the development of forage technology, and
2. the learning approach employed, regarding the methodology employed in this study for institutional improvement

The following sub sections are the outcomes of the evaluation study based on the results of the workshop, interviews and group discussion. The first relates to the assessment (learning experience) of the technical research intervention to this study. The outcomes of this intervention can be seen in Figure 7.2 and Figure 7.3. The second category refers to the assessment (learning experience) of the implications of technology transfer using the learning approach model. This includes the participants’ perceptions as to whether this research project met their aims. The information described is also supported by direct quotes from a cross-section of participants, as recorded in the transcripts of the material collected.

7.6. Research outcomes and implication

7.6.1. Reflection from the forage field

As part of the evaluation process participants were required to give a justification of their practice to others. This enabled them to show how the evidence they gathered and the critical reflection they did, helped to create a developed, tested and critically examined rationale for what they were doing. Accordingly, in the workshop, participants were asked to examine this process. In this context, participants drew on paper the relationship of the forage production to the household, and also identified the linkages between forage and other aspects of the farming systems (see Figure 7.3).
Figure 7.3 shows the impact of forage field on the household as drawn by farmers and women farmers. However, it was found that different genders had a different perception of the impact of forage. For example, women described that planting forage near the homestead benefited them because their children had more time to help them in doing housework, such as collecting water or firewood. Some farmers saw that time saved by having a forage field could be used for rest and productive activity. Both fathers and sons appreciated the saving in their time, which resulted from moving from grazing animals to a cut and carry system. One farmer said that:

Before I had forage, it was laborious to feed the animals, now it is not so laborious. (FR#.21)

Some indicators presented in Table 7.3 had some differences in ranking by the participants due to their particular circumstances. For instance, male farmers had different rankings to the women farmers. The male farmers focused more on the productive and technical aspects, such as fattening animals, or that animals were not used to eating Gamal leaves, whereas the women were more concerned with the social aspects, such as having more firewood, and labour reduction for children. The development workers gave more emphasis to the relation of forage production to the techno-science perspective, such as increasing the fertility of soil and preventing soil erosion.
There were several direct and indirect impacts that farmers found most important.

Direct impact:
- provide more feed to animals
- increased the live weight of livestock
- saved time
- provided compost
- improved soil fertility

Indirect impact:
- Increased number of livestock
- Crop yield improved
- Increased sale price
- The children have more time to help their mother.

Their indicators were classified as being very important, important or less important. Figure 7.4 shows the indicator impacts of planting forage identified by participants in relation to the farming system.
Figure 7.4. Indicators of impact of planting forage identified by the participants.

Several indicator impacts as highlighted by development workers were important in relation to animal health, the aesthetic environment and the prevention of soil erosion. These indicators were not mentioned by farmers. It is interesting to note that, although farmers were able to identify indicators, they had difficulty in differentiating whether
indicators had a direct impact or an indirect impact. For them all the indicators had the same value, that is, to improve their cattle production in order to enhance their income.

Growing forage was a new concept for most farmers in this village. However, the idea had expanded gradually among the farmers. We observed from this study that it was better to start with a small group of enthusiastic farmers so we could visit them regularly in order to gain insights about their experiences of planting forage, as well as to provide technical information about forage management practice.

Some farmers expanded their forage field as well as growing one or two additional varieties of forage. As described before, some farmers grew ground legumes in their maize field such as *Calopogonium* and *Centrosema*. This indicated that farmers learned from their experiences of planting forage, and gained insights to understand the advantages of forage for cattle production as well as for soil fertility. As observed from this study, farmers tended to grow more varieties of forage rather than only one variety; for example, 27 from 34 respondents grew more, than one variety of forage on their land. This is consistent with the smallholder farmers’ aims, that tended to seek diversity, or grow varieties of crops rather than specialise or grow one single crop. In this study we, the research team, collaborated with development workers to offer farmers broad varieties of forage to grow (see Table 6.5, p.137) but farmers had to decide what sort of forage they preferred to grow. Farmers chose the varieties of forage to grow based on their purposes and availability of land. From these experiences, development workers learned that offering farmers broad varieties of forage allowed them to select the variety that was appropriate to their local circumstances.

### 7.6.2. Reflection of the learning approach

**View of success**

It was found that most participants considered that this research project was useful. They also felt that their expectations had been met (Figure 7.5)
Figure 7.5 suggested that most respondents viewed this research project as having benefits for them in terms of learning something new, shared information, improved skills and meeting their needs.

Motivation to join the research project

As seen in Figure 7.6 most participants joined this research project because they wanted to learn. Amongst participant groups A and B, participating in this research project was because they wanted to improve the feed supply and farm production.
Motivation to joint the research project

![Motivation to joint the research project](image)

**Figure 7.6.** Motivation to join the project by few group of participants (A,B,C,D)

**Improved learning**

A large majority of farmers said that there had been improvements in the way they learned. All of the members of the learning group found this learning approach useful, although at the beginning they felt that was “too much theory and talking”. They also found that their learning behaviour changed to be more active and to contribute more to discussion (see Figure 7.7).
Developing a working relationship

Most of the respondents found that the relationships between them had been improved through collaboration: meeting regularly, meeting informally and meeting dependent on needs. The entire learning group found that the relationship between farmers and development workers had improved, although 40% from group B commented that the relationship needed to be improved in the future in terms of meeting informally (see Figure 7.8).
Understanding of learning approach by development workers and farmers

The interview revealed that participating in this project had influenced the development workers’ approach to farmers for the better. The way they worked with farmers had improved: They became more aware of the importance of farmers’ knowledge and circumstances, and they also saw themselves as becoming good listeners. Similarly, farmers had improved their practice and attitude to learning (see Figure 7.7). Forming the learning group had helped achieve this end. This learning group model for agricultural extension is still a new model to this study area, and there are several implications and issues that needed to be discussed before this model can be developed further. These implications and issues relate to:

1. facilitator skills
2. institutions that support and adopted this model, and
3. farmers’ commitment to work as a group and to commit their time to meet regularly.

These issues are discussed more fully in Chapter 8.

In addition, over 80% of respondents felt that the AR team and learning group of farmers was essential to the success of the project. All the members of the learning group found that having local people as a member of the AR team instead of only one researcher helped them in organising the activities while the main researcher was not available in the field. The AR team recognised that the availability of a capable and knowledgeable research team was an important factor contributing to the success of the research project in terms of facilitating the diverse needs of farmers.

PAR framework

Most of the respondents were also aware that this research project was guided by the PAR cycle. All the members of the learning group were aware of the PAR that guided this research project. This has been expressed by them as described in Box 7.3.

We met in a regular time frame
We are learning by doing
We collected the information and analysed and used them for the next activity.
We set up an action plan

Box 7.3. Farmers’ comments (learning group) on the guidance of PAR cycle in this study.
Among the farmers, the learning group of farmers was more aware of the PAR process compared to other farmers. From the farmers, 45% (group B) of farmers mentioned that they knew about the PAR process because they were invited to the group discussion, and all the time the researchers talked about it. Some of the farmers mentioned that they had been told about PAR from the beginning of this research project.

All of the development workers who were involved in this study mentioned that they knew about the PAR cycle, because they had been told about the time frame of the PAR process and they had been involved in the PAR process.

Virtually all the AR team, development workers and the learning group of farmers felt that the PAR framework was appropriate, even though the majority had no prior experience with a PAR project. The important point found by the participants was that PAR was an appropriate framework for enhancing the quality of developing appropriate technology with farmers.

7.6. 3. Wider outcomes of the project

In this study the research team, encouraged farmers to grow Napier grass in the unused land such as under Kapuk tree and near their homestead. Farmers found that the Napier grass could be grown well in the stony soil, which had previously never been used for planting any crops or forage. On account of its high yields, Napier grass was particularly well suited for smallholder beef production that in this study. Another study has found that the Napier grass could be used on terraces and dams as a means for erosion control and also to provide an additional source of fodder (Goldson 1997).

The obvious progress created by the learning group during this project increased the numbers of farmers planting forage. Planting the Napier grass became a topic of discussion amongst people in the village and neighbouring villages. Many farmers from neighbouring villages came to the learning group members asking for the seeds and stems of forages, and also asking them to teach the management of planting forage, particularly the Napier grass. As mentioned in the workshop, most farmers from the village were interested in the activities of the project and at some time attended the meetings that were organised by the learning group without being invited.

As a result of the success in planting forage, the village received more attention from the District Government and from the Agricultural Department and thus gained
more development resources. For example, the learning group was invited to help facilitate a workshop organised by the livestock development program at the district level; one of the members of the learning group was invited to be a representative from Bantaeng district at the livestock farmers conference at the provincial level, and to present his experience about the success of planting forage, as well as to tell other farmers about the existence of the learning group in supporting this end.

The incorporating of planting forage in the farming systems, particularly in uncultivated land, attracted the head of Bantaeng district (Bupati) and the chairman of the district council (Ketua DPRD) to visit the village. They were interested to know how farmers used their uncultivated land to be productive. Fortunately, when both of them visited the village I was there, as it coincided with the time when I had a meeting with the learning group. Thus, I had a chance to introduce the context of this study to them, the approach, methods, technique and tactics that I had applied to attract people’s participation. I also introduced them to the members of the learning group, who I encouraged to explain about the existence of the group in the community. The head of the district became really enthusiastic and he promised to provide funding to train the people in forage management, to support the cow-fattening group to build collective stalls, and to provide soft loans to expand the numbers in the cattle-fattening group.

The establishment of the cattle-fattening group was a by-product of this study, but it also provided powerful evidence of the farmers’ empowerment. By being involved in the fattening group, some farmers have developed leadership skills through their role as a chairperson of the group, thereby becoming empowered in terms of leadership. On the other hand, being in a group, the group members could improve their personal autonomy to work as a group to increase their livestock production.

Farmers have democratised the process of selecting a group chairperson whereas previously this role was selected by the village leader. This is a profound strategic transformation as nowadays they select their group chairperson by consensus according to:

1. commitment to the success of the group
2. ability in speaking, writing, and reading, and
3. ability in organising the other farmers.

During the course of this study there were three cattle fattening groups established, each group consisting of ten farmers. Cattle fattening groups were formed by the community after introducing forage technology to them. Previously, raising livestock
was only a part time activity, however, now the farmers developed the idea of raising cattle for meat production, in a semi-intensive system, and to pursue this idea they formed a group, to make easy for them to gain access to information, service and support from outsiders. Through this group, farmers also could develop their self reliance by sharing information and knowledge in relation to their cattle production. Farmers also expanded their group to other commodities such as cotton.

7.7. Personal reflection

In this subsection I would like to summary my profound journey while carrying out this study, and particularly my role as a change agent. As Mills (1994, p. 77) states “if there is nothing of yourself in your thesis it is incomplete”.

As a leader of the research team I realised that I was more knowledgeable in terms of the research approach employed in this study compared to other members of the research team. Although I had more knowledge and power as a leader, I tried to use this sensibly to ensure that the process went on participatively, and all the members had equal responsibility during the research project. I created a democratic climate and tried to balance the authority and responsibility of the members of the research team, while also developing collaboratively the relationships between the research team, the farmers, and the development workers. Therefore I took my role to be that of the “outsider within” (Kemmis & McTaggart 2000) and I worked side by side with others in order to enrich my understanding from the inside out, while I coordinated others from the outside in. By understanding this, I was able to manage the participants to improve their situation as well as to achieve their goals.

My ability to lead this study was supported by my experiences of working as a trainer and a supervisor in livestock development in South Sulawesi, as well as my experiences of learning the participatory approach in 1992 when I did my Masters degree at the University of Western Sydney-Hawkesbury. It was also supported by my status as a student who had studied abroad. However, this status also challenged me when applying this PAR, because others assumed that I knew everything.

7.8. Limitations of the study

The research was limited because it only focused on one village instead of a number of villages. It was also limited by the numbers of people who participated in this study. Because of the limitation of the numbers of people involved, it was possible that there
were many other experiences that could have been explored through this study. Research is always limited by time and resources. These were necessary constraint arising from the time frame of the research project.

The process of inquiry of a participatory action research project follows a cycle and it also involves the participants in all stages of the cycle. In this study we utilised what can be considered a triangulation method to eliminate bias by comparing different sources of documentation. I am aware of the fact that the results will still be limited by the interpretation process, that the results will still be authentic, because they reflect on the justification of the paradigm adopted in this study and the process of implementation of the facilitated learning model. I will return to these issues in the discussion chapter (Chapter 9).

7.9. Conclusion

The participatory evaluation employed in this study was an important contribution in terms of increasing the awareness of the participants about the benefits of the facilitated learning model, the development of the forage fields and the role of the learning group. I employed several strategies to ensure the trustworthiness of data gathered and I also made adequate demonstration of participant perspectives to further ensure the authenticity of this study.

Through this evaluation process participants observed that the learning approach that was employed in this study enabled them to improve their capability to work collaboratively to improve their situation. In this context, the working partnership between farmers and development workers that was developed through this study became a learning partnership, and was a necessary condition for improving livestock production in the study area.

It also enabled participants to improve their creativity and capacity to solve their own problems. Development workers also learnt that the transfer of technology model had its limitation in solving farmers’ production problems: Throughout this study, they found that PAR provided for facilitated learning and participative decision making to occur for situation improvement. The participants considered the PAR to be an appropriate way forward to improve livestock development in South Sulawesi.

The main lesson learnt by development workers through this study was that farmers would adopt particular practices or technology if such technology fits in to particular
farmers’ conditions. But if such technology does not fit with farmers’ conditions then they modify or reject it.
CHAPTER 8

GENERAL DISCUSSION I
The Research and Its Direct Outcomes

8.1. Introduction

This chapter describes my reflections on the practical use of participatory action research to improve livestock production and the work of livestock development in South Sulawesi Indonesia. The thesis has explored participatory action research as an alternative approach to the transfer of technology in Research & Extension in rural development in Indonesia. Through this study, participatory action research created the opportunity for learning to occur between farmers, development workers and researchers, resulting in the improvement of farmers’ practice and the work of livestock development. This collaboration took place in the context of developing forage technology with farmers, in which development workers acted as catalysts to improve the farmers’ situation as well as their professional work.

There were four interrelations theory which underpinned this study: action research, experiential learning, action learning and adult learning. The first concept, action research, was used in relation to the inquiry process, and to the reflection on action (Kemmis & McTaggart 1988; 2000; Dick 1993). The second concept, experiential learning, was used to give meaning to adaptive action in which experiences were transformed into knowledge as a basis for personal adaptation to a changed situation (Kolb 1984). The third concept, action learning, was used for knowledge construction through interaction between people within the learning context (Revans 1991; Anon 1995) and the final concept, adult learning, was used for individual and professional development in which participants were actively involved in the learning process rather than being passive recipients of knowledge (Knowles 1980; Brookfield 1986).

The methodology employed in this study provided framework for participants to create knowledge about their practice for situation improvement, while using their local resources and own experience as a major inputs. This research thus became an opportunity for participants to work collaboratively to learn from each other and to use their learning to make decisions, solve problems and meet new challenges for improving farming practices and livestock development work in the study area.
The outputs of this study stress the limitation of the concept of technology transfer for the improvement of livestock production in order to enhance the livelihood of smallholder livestock farmers in the study area. The outcomes were not only in situation improvement, but also to empower participants who were involved in this study. In agricultural settings such a learning approach has also been found useful to achieve changes with a range of other farmer groups (Chambers 1993; Ison & Russel 2000; Farrington et al 2002).

This study has shown improvements, in relation to four main areas: (a) the practices of the practitioners being improved, (b) the understanding of the practices by the practitioners was improved (c) the situation in which the practice was practiced was improved, and (d) the understanding by the practitioners of the situation in which the practices were practiced was improved (Bawden 1991, p.27). The following subsections discuss these four themes, before reflection on the role of the learning group of farmers, and the role of the AR team.

8.2. The practices of the practitioners is improved

8.2.1. The output

The approach adopted in this study enabled participants to share their experiences with each other in order to improve their practice through critical reflection. Here, participants were challenged to review their former perceptions about their knowledge and practices in order to reconstruct new knowledge and practices for improvement. For example, farmers shared ideas about how they could improve their livestock production through planting grass and legumes in their fields at the same time as livestock development workers assisted them with technical information to support the establishment of forage. This assistance was carried out in a participative way, where technical information was open to modification by farmers based on farmers’ circumstances. Here livestock development workers came to acknowledge that farmers have the right to be heard. I saw this process as one of self-determination and self-development by farmers who are supposed to benefit from the development effort. This is consistent with Freire’s (1972) view that people should have the opportunity and support to name their world, in order to change it. The implication of the learning approach in this study was an improvement in the practice of farmers, and in the practices of development workers, as now discussed in terms of output and the learning outcomes.
Improving management practices

The farmers moved from a system of tethering animals in the fields to eat weeds, to a cut and carry stall-feeding system, utilizing more nutritious fodder sources. Farmers found that this tethering system also enabled more manure to be collected for fertiliser use. Another study had found that the cut and carry systems may not be sustainable unless there are inputs into the system to reimburse nutrients removed from the cut area (Pezo et al 2000). However, in this study, application of organic fertiliser and the greater adoption of legumes in the forage systems covers this problem, because those two inputs enhanced the nutrient structure of soil. In this study this aspect was not researched further. However, according to Stür and Horne (1998) forage legume can increase the nitrogen component of soil: their results showed that returning 100 percent Gamal leaf from the hedgerows to the soil could substantially improve the yields of intervening crops. This was equivalent to adding 40 kg/ha nitrogen (Stür & Horne 1998).

Planting forage was a new technology for farmers in this study area, but this technology was introduced to them based on their needs and local circumstances. The number of farmers planting forage had increased after the one and half year period. As we observed from our study, most farmers who raised cattle, goats and horses now grew forage in their land (Appendix 4 records the numbers of farmers who planted forage as recorded by the evaluation process).

Farmers’ adaptation of technology

Most farmers used the new practices, assuming they were better than their current practices, either based on their observation of other farmers experience or because they were convinced by advocates of the practice. Most farmers learned from the experience and some used the information to modify their practice to their own conditions. For example, as revealed in an interview, one farmer said that:

Planting forage is a new concept for me, so I don’t want to take the risk to do it. I would rather wait to see the result from other farmers, if the result is good, I will then do the same thing, if the result is not good, I do not want to try it (FR#10).
On the other hand we observed that a minority of farmers applied the practice with the intent of trying it out, and eventually adapting it to their farming systems. For example, as one of the members of the learning group said:

After a year of growing forage in my field I knew the benefit of forage to my cattle as well as to me, I then started to grow more varieties of forage legume in my maize field. Before I planted my field, I tried to grow in a small plot near my homestead (MLG# 1).

It is clear from these statements that farmers intended to try new ideas or practices after they knew of the benefits they could get from it. This is because they did not want to take a risk.

It emerged from this study that the technology and practices that had proven successful in other regions in Indonesia, such as Three Strata Forage System (TSFS) (Nitis 1989) were rejected, but a modified system adopted by farmers in this study area. The TSFS technology required particular inputs that these farmers could not provide. This finding was similar to those reported by Rölling and Pretty, (1997) who noted that few farmers were able to adopt a whole “package” of technology without considerable adjustment. Farmers tend to make their own adaptations according to their own needs and circumstances.

**Improved practices by development workers**

It was observed that by consciously learning with farmers, the development workers found that the way they observed farmers’ problems had changed. Previously they thought that only technical solutions and government interventions could solve farmers’ problems, and they also assumed that farmers would fully accept the recommendation of practices that were given to them. However, by being involved in this research process they had questioned their views about this. This change of view was expressed by one of the livestock officers for the Bantaeng district:

I thought that every technical recommendation that we arranged for farmers through our office was the best for them. This outlook changed when I participated in several workshops with farmers in this research. The rejection of the recommendations of TSFS, made me understand that farmers have their own needs. This new way of interacting with farmers, that was based on a learning partnership, has changed my attitude as a livestock services officer (LS#2).
Similarly, extension workers found that the way they worked with farmers changed. Previously they had the view that only scientific knowledge could solve farmers’ production problems. This change was expressed by one of them.

For ten years I have worked with farmers, but I have never thought of the farmer as a knowledge creator. Formerly, I worked to transfer technology without reflecting on what these technologies might mean to the farmers. Now, I realise that farmers have their own local knowledge...and now I need to use my service to improve farmers’ understanding of the various choices open to them that are appropriate to their local conditions. Learning with farmers not only enables farmers to improve their own practice, it also improves the way I act with them (EX#1).

These statements illustrate how the PAR created the space for participants to interact to solve particular problems through the learning partnership process where development workers in this context acted as catalysts. Here development workers have to give up their expert role and welcome farmers to contribute with their experiences, knowledge and opinions for situation improvement. Location specific solutions for farmers’ problems are also necessary, however, participation of farmers is required to discover these solutions (Pretty 1995b).

8.2.2 Learning about:
Building creativity of farmers

In the context of this study the creative ideas of participants developed through dialogue during the process of the PAR cycle (see sub section 7.2.1). The participants came to the meetings to share experiences, problems, insights, beliefs, expectation, fears, hopes and stories of success and failure of their field experiences. I found that these situations were more than a discussion of ideas, as they included a process of adjustment or critique of the concepts or ideas that arose in the group meetings and workshops. This process also developed the “creative ideas” of people who engaged in the inquiry process through critical reflection and judgment of the situation and process. This creative idea was ideal for developing problem-solving skills (Ragsdell 1998) as well as in creating knowledge (Chekland & Holwell 1998).

In this study participants had the opportunity to build their “creative ideas” through reflection on (a) implementation action, and (b) the process of facilitation. For example, in the process of facilitation, this learning approach recognised farmers’ knowledge and
circumstances, therefore farmers had the opportunity to examine and then modify the technology that was delivered to them through a dialogue with development workers. In essence, farmers developed their “creative idea” by designing their own model of planting forage based on their needs and circumstances. Several authors such as Defoer (2002), and Loevinsohn et al. (2002) present examples of how farmers developed their creative idea through drawing on what they had learned during an intervention.

In relation to the implementation of action, farmers as co-researchers had the opportunity to establish the value of the inquiry process. For instance, farmers developed their creative idea by participating in monitoring the performance of their forage, and gave judgment as to why particular practices were required. Here, through dialogue, farmers determined if a new management practice could be designed (from what they had learned) that would be appropriate to their circumstances.

In addition, it was also a process of developing and refining creative learning through workshops, group discussions, plot demonstration and exchange visits to plot demonstration to encourage participants:

- To build an understanding of the development of the learning approach
- To build up their self-awareness of their own situation
- To develop their self-confidence in undertaking action to solve their particular problems for their own development
- To generate knowledge from the action taken to improve their situation (livestock production and the work of livestock development).

Through this process, farmers played the role of co-researchers and co-creators of knowledge.

In terms of development, the approach adopted in this study is consistent with Pretty’s (1995b) idea of participative learning, Bawden’s (1995b) idea of systemic development, and the idea of people empowerment (Young 1997). Both Pretty (1995b) and Bawden (1995b) assert that participants need to be involved in creating a network of critical conversations in which communities and organisations learn about themselves as learning systems. In addition, the approach also empowered participants, in that it enabled them to collectively take control of their own lives, to set their own agenda, to organise and to help each other, and to make demands upon the state for support and upon society itself for changes - these will be described further in the next subsections as a part of the outcomes of AR. It was therefore not possible in this study
to apply a ‘blue print’ (Korten 1981; Chambers 1992b) model to the problems and solutions, as is used in most development situations.

**Developing individual and communicative learning**

During the course of this study individual learning and communicative learning were developed. The individual learning took place in the process of putting the forage model into practice, where individual farmers learned at farm-level. Here, farmers as individuals grasped the information from their own forage field experience and then transformed this information by reflection to generate knowledge. The learning process occurred while farmers implemented action, gained insight and then transformed the new experience into meaning. Here, learning started from the physical and extended to the conceptual.

The communicative learning relied on the ability of participants to share their experience and ideas with others. In this study, communicative learning took place through the four phases of PAR. For example, during the diagnostic stage the communicative learning occurred when farmers analysed the existing situation through mind mapping, livelihood analysis, and problem ranking etc. In this sense the communicative learning occurred when farmers exchanged points of view and insights. During the planning stage, the communicative learning occurred when farmers discussed the action plan through community group discussion, where farmers reviewed the outcomes of the diagnostic stage and searched for alternative solutions to solve the problem. In this stage, the communicative learning also took place when farmers developed their own model for planting forage, and designed the action plan to put the model into practice. During the implementation phase, the communicative learning took place during the monitoring of forage fields by the learning group, and field visits to plot demonstrations by other farmers. During this stage, the learning group of farmers exchanged their experience of planting forage to other farmers, and showed others their forage performance and exchanged ideas about how they monitored their forage fields. In the evaluation stage the communicative learning happened during the evaluation workshop where participants examined their activities, including the performance of the forage field and the learning approach adopted in this study. Here, participants learned through exchanged perspectives and insights.

These two learning perspectives supported each other as a basis for knowledge construction. Individual learning focused on the reflection and usage of individual
information as a component of the learning cycle, whereas communicative learning emphasised the importance of activity and how this led to ongoing learning, with them guiding the process of reflection on these activities. Few other cases were found that describe these two learning perspectives such as King (2000), however Paine et al (2000) discussed them as individual and collective learning about dairy cow technology, and Defoer (2002) discussed these two perspectives of learning as learning about methodology development for integrated soil fertility management.

Construction of knowledge

The methodology used in this study can be seen as dealing with the social context of the research by encouraging participants to reflect continuously on their experiences. Figure 8.1 is a representation of the interconnection of cycles of experiential learning, to form an action research spiral. A conceptual relationship between experiential learning and action research is understandable as both provide tools for change. My understanding is that action research is the connecting of cycles of experiential learning, focusing on a particular situation. It is a marriage of thoughtful reflection on participants’ experiences corresponding with informed action. Thus the methodology employed in this study can be seen as a flux between “experience and action, a dialectical process.

![Action Research and Experiential Learning](image)

**Figure 8.1** Experiential learning (inner cycle) and action research (outer cycle)

Key: CE = Concrete Experience; AE = Active Experimentation; AC = Abstract Conceptualisation; RO = Reflective Observation (Kolb 1984; King 2000)

Through the process shown in Figure 8.1, learning occurs, which leads to the creation of new knowledge, which is then used to inform the actions of the participants.
in order to improve their practices. This is consistent with Churchman’s (1970) concept of improvement. The improvement of the situation in the study area was a relationship between the improved understanding of the stakeholders of the situation; improved knowledge creation; improved decision making ability; and improved action taken by the participants. The participants who actively involved themselves in the inquiry process obtained the knowledge needed to deal with the problems that motivated them to improve their situation. According to Pretty (2002, p. 67) this process is “a cognitive system that is a learning system that is information taken, process it and changes as a results”.

In addition, knowledge generated from this study goes beyond the technical solution of the particular problem; it has implications for the lives of participants and their social structure. This is consistent with Capra (1996), Habermas (1987), Park (1997) and Woodhill and Röling (1998) who point out that knowledge produced from a learning approach contains human aspiration and shared experiences of the people who engaged in the inquiry process. In addition, Pretty (2002, p.67) draws on the work of Maturana and Varela (1987) to conclude that knowledge is created through interactions between our “mind” and our “environment”.

In the context of this study, the knowledge and skill that farmers generated in the learning process was applied through making the best use of their limited land and capabilities to improve their situation. This is coherent with the concept of sustainable livelihood, which is people’s capacity to make a living by surviving vulnerable conditions and improving their material conditions without jeopardising the livelihood options of other people, either now or in the future (Chambers & Conway 1992; Carney 1998).

8.3. The understanding of the practice by the practitioner is improved

8.3.1. Output:

This study brought together farmers and development workers to work collaboratively as a learning partnership for the purpose of learning to learn how to improve livestock production in the study area. This working partnership gave the opportunity for the AR team and development workers to (a) improve their understanding of the learning approach whilst improving their practice as development workers, (b) to experience being a facilitator. In addition, farmers, particularly those in the learning group, also learnt the concept and practice of learning together as well as...
being co-researchers to develop their own practice. These two outcomes are now discussed.

To improve understanding of the learning approach and practices by AR team and development workers

Most of the members of the AR team and development workers who were involved in this study had been trained in the participatory approach; however, they had never undertaken an action research project before. The first three months of this study were used as a process to socialise this approach. Several meetings, community group discussions and workshops were conducted to allow participants to understand the concept and theory of the learning approach.

The learning group meetings, workshops and group discussions were used as a forum by participants to discuss what they thought about their problems and practices and how these could be improved. The process of developing forage technology with farmers was achieved in this participative way, where the power of decision-making was shared among all participants. Learning partnerships appropriate to this specific situation were the means used to achieve this. Various social interactions enabled participants to learn to develop their understanding of the concepts of learning partnership. The argument here is that efforts at improving livestock production should move from answering the question: “How can technology be adopted by farmers?” to “how can we encourage farmers to participate in a learning process in order to learn about the way they handle the problems that they face to improve their own situation?” To do this there is a need to shift the “linear” problem-solving model to an “iterative” model that promote thinking and acting.

From these experiences, development workers then realised that knowledge to solve farmers’ problems needs to come from the critical analysis of real life problem of farmers, and if scientific knowledge is to be useful, it has to follow a proper situation analysis, and the production of practical knowledge by learning about practitioners’ situations (Checkland 1984).

To experience being a facilitator

PAR as a methodology required the researcher to act as a facilitator to help farmers make the transformation from an expectation of being told what to do, to becoming co-
learners, and then becoming co-creators of knowledge and developers of their own situation.

The most significant step in this process was to ensure a balance between leading and facilitating, where the AR team had to reduce their power and perceived knowledge differential. Here, the AR team encourage participants to appreciate others opinions. Therefore, the “stick needed to be handed over” to the owners of the problems, who took the leading role at community meetings in planning activities. The role of the AR team changed to that of coordination of the learning activities (Chambers 1997).

8.3.2. Learning about:

Experiential learning as employed in this study is considered to be the process by which experiences are transformed into knowledge as a basis for personal adaptation to a change situation. This can be seen as the basis of PAR, in which the actors who engaged in PAR can learn from each stage of the process. This was illustrated by some of the interview responses of the evaluation of this research, demonstrating that learning does emerge from the PAR process. An example was this recorded in interview with a farmer:

If we try new things in our farm, it means we have learned. Moreover, learning has also happened if we discussed something...for example we are sharing information, and we are confronting the ideas (MLG#2).

An example of experiential learning in practice is discussed below:

(i) On the basis of participants’ concrete experience (divergent knowledge)

The participants collaborated in developing a rich picture of their situation, exploring the situation from many perspectives; the question asked was what is there? The participants began to identify with their own experiences and practices, and the situation enabled people to understand their own situation. The experience of the PAR team showed that people gained knowledge from sharing their different perspectives, including differences in feelings, attitudes, values, and of worldview. One of the participants stated:

I had the opportunity to impart my ideas, thinking, and feelings to the whole group and I felt that everybody appreciated other peoples’ opinions. I shared the information and discussed it with other participants (MLG#5).
(ii) Through observing and reflecting on that experience (assimilative knowledge)

In this context, knowledge was produced through a critical analysis of the situation. The question asked was *what does it mean?* The information from the concrete experience was analysed in order to make meaning from, and to value those experiences. By reliving and reflecting on their experiences, participants were able to articulate their problems. It was here that the scarcity of fodder emerged as a real issue for consideration. An example of the evidence from interviews about how farmers gained knowledge from this stage was this quote:

Now, I am able to distinguish what is the problem and what is not the problem? Why and how the problem is occurring? (MLG#1).

(iii) By forming abstract concepts and generalisations (convergent knowledge)

Here participants collaborated in designing creative and responsible strategies for change from their experience. This process requires a lot of critical thinking and a careful consideration of the concrete situation. The question was *what will we do?* Community meetings with the *discussion group* were held to open up the results to public criticism. These open discussions enabled participants, the PAR team and the learning group to validate their descriptions and analyses. Further, it enabled participants to identify different views and perceptions regarding these findings. Discussion soon narrowed to some specific livestock production issues, such as fodder management, fodder species, soil, rainfall, and socio-economic considerations. Farmers were also exposed to some theoretical and technical aspects of forage production and management, such as the positive effects of fodder trees and shrubs on soil nutrients, the contribution fodder trees can make to the provision of protein to cattle diets, and the adverse effects of land degradation on soil fertility. Farmers thus gained some theoretical perspectives about some of their farm practices. As one farmer was recorded as saying:

We want to learn something to be not too difficult to understand, just a simple things. So it will then be easy for us to understand. For example, what kind of fodder grass and tree is appropriate to our conditions…not only that, but we are also looking for something that will not cut our income (FR#2).
(iv) By testing the implications of these concepts in new situations (accommodative knowledge)

What has been decided and planned in order to improve the situation is then transformed to the real world through implementation of the changes proposed. The question now becomes *How will we do it?* This stage concluded the first round of the action research cycle. Participants were involved in discussion and debate about feasible methods of implementation, and this was followed by action to implement the agreed changes. Of course, the results of the implementation needed to be evaluated, forming a continuation into the next PAR cycle. Interviews revealed that participants gained knowledge from this stage. For example, an extension worker commented on her experience of being involved in this participative learning as follows:

> It had been my belief that our technology was better than the farmers’ own practice. However, after I became involved in this learning process, it became clear to me that farmers had their own interests and values, and that these are different between them…. and I think our technology cannot capture these variously (LS#2)

Three general kinds of knowledge recipients can be identified from the PAR/experiential learning processes:

- Knowledge developed by individual farmers: For example, recommendation of forage production and management, such as the optimum cutting time, ways of land preparation etc.
- Knowledge shared by the learning group: For example, the emerging fodder technology which was appropriate to the local conditions, and
- Knowledge developed by academics: For example, facilitating the stakeholders in participative learning process to be aware of their situation for changes (after McTaggart 1991).

The AR team experienced the integrated aspects of learning arising from the PAR process, these being knowing, thinking, feeling and acting; knowledge was being generated through a process of social praxis, where praxis was the dialectic between thinking and action (Selener 1997).
8.4. The situation in which the practice is practiced is improved

8.4.1. Output

Planting forage for animal feeding became the technical research intervention of this study. This intervention was enacted through a number of activities to support forage technology use by farmers, all using a facilitated learning approach, including strengthening the farmers networks in the village. This facilitated learning process encouraged farmers to implement certain practices to improve their situation. The main actions taken to improve the situation of farmers had technical, economic and social outcomes, which are now discussed.

Improving live-weight of cattle

Planting forage improve the availability of fodder for animal feeding in the study area. Planting grass such as Napier grass and shrub legume such as Gamal (Gliricidia sepium) and Lamtoro (Leucaena leucochepala) helped farmers provide better nutrition for their animals during the whole year, particularly in the dry season. Ground legumes like kacang-kacang (Calopogonium mucunoides) and lame-lame (Centrosema pubescens) were also planted by some farmers as ground cover in their maize field. These two varieties of forages were only planted after a year of introducing forage to the villagers, even though these two varieties of forage had already been introduced to farmers in the forage workshop. In this study, farmers were motivated to feed their cattle in a better way in order to obtain a higher body weight.

Napier grass and ground legumes were given to animals during the wet season while leaves of Gamal and Lamtoro were given to animals during the dry season. Some farmers also gave rice bran and cassava powder. Previously, (non-intensive cattle rearing) during the dry season, most of the farmers fed their animals with rice or maize straw (ordinary roughages). As observed from other studies in this area, this resulted in low daily live weight gain, at an estimated 0.2-0.25 kg/head/day. As experienced by farmers in this study, and from the related literature in this area, many attempts had been made to improve the nutritive value of crop residues by scientists, such as giving chemical treatment to cereal straw prior to supplementation. However, this was a high cost and so it was difficult for smallholder farmers. Therefore, the production of green forage was potentially important for ensuring adequate feed supplies for ruminants as well as for improving soil fertility. In this study we encouraged farmers to feed 60% grass + 30% legume + 10% concentrate + mineral + vitamin. Some farmers observed
that cattle fed with this mixture gained more live weight and reached market weight faster than when fed the traditional weed or native grass. Farmers observed that they obviously improved the performance of their cattle, as one farmer said:

I can sell my cattle faster than before, because my cattle have gained weight, previously it was difficult for me to find out the buyer, but now, not anymore, they come to my place, and the interesting thing is that I have a voice in determining the price. It has never happened before (MLG#1).

In this study, we encouraged farmers to estimate the weight of their cattle every two weeks over a 120 days period, using the formula presented in Box 8.1. However, many farmers did not measure their cattle as we encouraged (120 days required). They rather preferred selling if they found the buyer.

\[
\begin{align*}
\text{Live weight (kg) (♂)} &= 101.3 - 2.493 \times L + 2.02317 \times L^2 \\
\text{Live weight (kg) (♀)} &= 601.8 - 9.033 \times L + 0.04546 \times L^2
\end{align*}
\]

Box 8.1. The formula used to estimate cattle weight (adapted from Siregar 1990)

$L =$ thorax measurement in cow.

**Improving soil fertility**

Planting forage at edge of fields would not adversely affect the space available for crops, but would potentially provide organic matter for soil fertility. Leguminous forage trees and shrubs provided high quality fodder for livestock, while also contributing to soil fertility. Farmers commented that *Gamal* and *Napier* grass produced a lot of leaves and that they had the potential to improve the soil structure (used as compost), especially when supplied with manure.

Some farmers also planted ground legumes to help improve the fertility of their soil. Ground legumes such as *kacang-kacang* (*Calopogonium mucunoides*) were said by farmers to be highly palatable, particularly for cattle.

**Economic Aspect**

Farmers found that growing a forage as a source of nutritional feed for their cattle enabled them to increase the number of cattle they could raise. As one farmer said:
Having a forage field enables me to get better feed for my cattle. Now, I do not feel worried about raising more cattle. I have enough grass to feed my cattle. At the moment I am able to feed 2-3 cattle (FR#8).

This statement described how a farmer demonstrated his ability to raise more cattle. Interviews revealed that 50% of farmers who planted grass and forage legume increased their cattle raising by one or two more cattle.

In addition, having a forage field enabled farmers to engage in more productive activities, because the time that they normally spent collecting grass from the roadside verges or rice and maize fields (4-5 hours) could be used for productive activities. For example, as revealed from interviews, 6 from 34 of respondents can now work as farm hands to big farms in the neighbouring village.

Division of labour

Planting forage also affected the gender division of labour. Planting forage near the homestead attracted women’s interest to look after the forage tree, such as watering the tree. All of the women who were interviewed showed that they benefited in having firewood near the house and the children had more time to help them with the housework as well as going to school. As one women said:

My son does not need to wake up early in the morning to search for fodder for our cattle and horses or take the cattle out for grazing. He used to do this before going to school, now my son has more time at home to help me to do housework such as collecting water (WFR#2)

Diffusion of Napier grass stems

Introducing forage to the farmers in the study area, requires the diffusion of stem cuttings. In this study area two members of the learning group used their forage field as a source of stems. Farmers in this village were able to get stem cuttings from these forage fields. This initiative emerged during group discussion with farmers when the lack of planting material was found by farmers to be an important issue. The learning group members readily provided stem cuttings to farmers, with the consequence that other farmers shared in the maintenance of those forage fields.
Improving relationships within the village

Communication improved amongst farmers and between farmers and development workers. One farmer expressed his experiences in relation to extension workers:

This study has created space for me to meet with other farmers and extension workers as well as livestock services staff to discuss any issues related to our farming. It also improved my confidence to impart my opinion in meetings, particularly meeting with outsiders such as livestock services staff and extension workers. Formerly, I just tried to be a good listener to them and felt they knew everything...that created a gap between us. Through this study, we have become co learners...they also learned from us (MLG#7).

An extension worker similarly described his new experience of working with farmers:

I improved my ability to work with farmers, as this study brought us together to solve the problems, not to sell the technology to the farmers. For example, this participative approach does not put myself as extension officer, as having to do all the giving and the farmer at the receiving end; we learned as partners in finding solutions to farmers problems (EW#1).

These two are examples of how participants open themselves to others as well as emphasising the idea of equal partnership. This improvement resulted from the development of equality in our working strategies, that placed special emphasis on listening, respecting all views and sharing responsibility.

8.4.2 Learning about:

Empowerment of participants

The approach employed in this study not only improved the farming practice of farmers but also empowered farmers and livestock development workers. Empowerment of participants in this context can be seen as a mutual partnership between farmers, livestock development services and the AR research team (see Figure 4.1. p. 73). It is my observation that the learning process helped unite participants in a shared cognition of the experiences, and ideas, and the farmers gained more power to set up their own agenda of development such as being participative and having a voice in deciding the technology or knowledge that was being delivered. The livestock development workers enhanced their ability to form a common desire through mutual persuasion and deliberation with farmers.
Furthermore, the learning approach adopted in this study brings to mind for development workers changes in organisational relationships similar to the concepts of the learning organisation (Agryris & Schon (1978); Senge (1992)) in which researchers, development workers and farmers come to share the learning and take responsibility for action taken as outcomes of the learning process. In essence it means that the power to know and decide what has to be done is held by the participants. This was a by-product of the learning partnership.

Through the learning approach, the process of farmers’ empowerment in this study can be distinguished into two categories: “individual” and “collective”. Individual empowerment is a process to enhance farmers’ strength based on their “potencies” and capacities. In this process farmers are able to develop their own ability based on their own capacities and circumstances, and to make choice and take control of their own practice. The other is an inside-out process in changing farmers’ attitudes and behaviour. It is a process of developing the togetherness of farmers to achieve prime goals in the community. These two categories of empowerment were identified through this study and can be analysed using the framework of empowerment as described by Smith et al (1997) from the work of Starhawk (1987). Here the farmers have gained power as follows:

**Power over:** the notion of power over usually refers to relationships based on domination and authority:
- Personal autonomy of the farmer has increased
- Confidence of the farmer has increased
- Awareness and aspiration of the farmer toward their own development has increased.

**Power with:** is a form of social power, in this study meaning farmer relationships with each other. It is power that is shared among farmers who value each other as equals:
- Farmers gave their support to each other when dealing with problems in relation to their farming, particularly in relation to their cattle fattening enterprise
- The learning group gave their support to the other farmers who faced problems in relation to their forage field.

**Power from within or power to:** arises from connections and bonding with other people and environments and awakens a person’s deepest abilities and potential:
- Skill of the farmers has increased
• Control of the farmers over their own development has improved
• Access of the farmers to livestock production information has improved
• Access of the farmer to the market has increased
• Establishment of the fattening group enables farmers to have productive assets
• Establishment of the learning group strategy at the village led to transformation of the existing system.

Similarly, these achievements build on those elements of empowerment as described by Sofiarini (2001), that is participation, human development and economy. This is associated with:

• Participation of farmers in decision-making
• Human development, enhancing the skill and knowledge of farmers which is improved by access to the livestock information through the learning approach
• Economy, establishment of forage field enhanced the capacity of farmers to access the market and other farm productive activity.

In terms of organisation’s influence on the process of farmer empowerment in this study, it can be described by an old Indonesian proverb as “giving a fishing rod rather than giving a fish”. This saying illustrates that if we want to help the people, give them the fishing rod; with the fishing rod they may go fishing and catch fish whenever they want, while if only the fish is given, it will be eaten and will be asked for again. This saying refers to the perception by farmers that a lack of money for their farm operations was due to the inability of agricultural government department to give them money. The livestock development workers saw that to solve farmers’ production problems through intervention using technical solutions based on scientific knowledge, resulted in low adoption by farmers. Their perceptions changed. The change of perceptions occurred through the process of interpretive reasoning of the situation, social critique of the practices and open communication, which enabled participants to transform their point of view about issues and problems of livestock production in the study area. Farmers became more aware that their areas of concern were actually related to each other. For instance, the low rate of livestock production was not only caused by lack of capital.

Group learning and commodity groups, such as the cattle fattening groups, were found to be a good forum for both farmers and development workers to learn from each other.
Participation

Participation in this study was the process of allowing participants to commence exchanging information and learning from each other and thereby increasing the transparency of their decision-making. This was consistent with Rahman (1993, p. 150) who says that

Participation is the exercise of people power in thinking and acting and controlling their action in a collective framework.

Initially the participation of farmers in the group discussion was slow. A major reason for this was that most of the farmers assumed that the meeting that was held by the research team would be similar to ordinary meetings that were run by the development workers. Participation rarely occurs spontaneously in a community that has been isolated from the decision making process. Hence, participation does not mean simply attending the meetings for a once-only input into the project planning, but it is a continuing process of negotiation and decision-making.

The initial participation of farmers in this study area was facilitated intensively, and did not automatically happen. The research team encouraged the livestock development workers to place emphasis on fostering an environment of listening rather than telling. This fostered a new way of communicating between farmers, livestock development workers and researchers. Forming the learning group and conducting group discussions were processes used to democratise relationships between the research team, development workers and farmers. The concept use here was that livestock development workers had to be encouraged not to tell farmers what to do, and farmers had to reduce their expectation of being told what to do by the livestock development workers. Particular aspects supported this process, including:

- holding meetings at times to suit the farmers and
- joining in any social activities in the village, particularly related to religious activities.

All these aspects helped build trust with the farmers through strengthening rapport between the farmers, the research team, and the development workers. As a result farmers took a significant role in every step of the research process. Farmers voluntarily designed, implemented, observed and evaluated their activities. They also shared the decision-making and benefits of their efforts. Therefore, the development itself became owned by them. This is consistent with Pretty (1995b), Sriskandarajah et al (1996), Conway (2002), and Packham (2002b), who called this genuine participation. Although
there are a number of forms of meanings of participation classified by these authors, I identified three similar dimensions, that is:

1. people’s involvement in decision making
2. voluntary contribution to implementation of decisions, and
3. collective sharing of their benefits of their efforts.

I agree with Pretty’s (1997; 1998) view that participation is a fundamental right in which the main aim is to initiate mobilization for collective action, empowerment and institutional building.

8.5 The understanding by the practitioner of the situation in which the practices were practiced is improved

8.5.2. Output:

As we observed through this study, farmers’ knowledge about their practices was strongly connected with their experiences in the field. They applied particular practices or knowledge based on adjustments to their local conditions as well as to knowledge that they already had. It was clear that farmers learned particular practices through creative adjustment to the field conditions, rather than experimenting with a priori theories and set plans. Technology generation can, therefore, be considered as a process of interactive learning with their environment (Vanclay & Lawrence 1995) and interactive learning with changing time and conditions (Millar & Curtis 1999).

Furthermore, farmers’ practices can also be conceptualised as emerging from their reflection and action (learning from experience) about their practice in relation to their local condition. This process developed the capacity of participants to understand their situation and take informed decisions for action that they believed would improve their situation.

This study also observed that the technology transfer approach created the definition of “good farming practices” as adopting only scientific knowledge. Consequently, this formed barriers against the beliefs and values of local knowledge and local circumstances of farmers. However, in this research, participants were involved more with in-depth analysis of their problems for improvement. What was experienced and observed was then assimilated - made sense of and interpreted, to give understanding and insight to the problems, and then transformed into a plan of action. Here, farmers were intended to be the “resources” jointly responsible for both the process and the
product. Livestock development workers were being reoriented towards a participatory process. An example of this can be seen in Section 6.

In this study, farmers’ experiences with managing their forage were often described from an historical perspective, illustrating the changing dynamics of farming as a way of life associated with changes with the natural resources. Introducing forage to the farming systems was an ongoing learning process where farmers, researchers and development workers collaborated to learn from the experience of developing forage technology.

The participants at the evaluation process also justified the implications of this approach to livestock development in the study area. Participants legitimated the establishment and maintenance of the learning group and group discussion as a social network for ongoing discourse and development. These changes in development framework by the participants indicated that participants recognised the benefits of the learning partnership as a means of better understanding and improving action for situation improvement. The understanding by participants of the meaning, relevance and application of this approach during the course of this study means that it can be recommended that the approach be more widely used for livestock development in Indonesia.

8.5.2. Learning about:

Improving understanding of farmers

Farmers found that this study helped them to understand their problems in relation to other contexts. For example, they became aware that low animal production was not only caused by their inability to get a financial loan, but was related to many other factors, including animal feeding, rainfall and the relative price of farm inputs. This point was highlighted by one farmer as follows:

Now, I am able to see what the real problems are for me, I understand that my problems in relation to the other factors such as rainfall, government policy and input price (OF#3).

Appreciation of farmers’ knowledge and circumstances

Most development workers had assumed that farmers’ knowledge was primitive or unscientific. In fact, farmers’ local knowledge can be an important source of information and insight into local farming systems, environment, culture and beliefs. In this study, we stressed learning with farmers through partnerships where development...
workers came to appreciate the contextual relevance of farmers’ knowledge and action. The experience of working with farmers in this study enabled development workers:

1. to understand that farmers’ knowledge is valuable and relevant, for example, farmers are continuing to use vinegar to protect the stem from insect damage, and

2. to recognise that decisions made by farmers to adopt particular practices are mainly based on their local knowledge. For instance, farmers developed specific local knowledge through a process of their experiences of planting forage.

According to Chambers (1997), the strength of local knowledge lies in temporal and spatial observations, which can bring increased understanding of ecological processes and influences. Moreover, combining local knowledge with scientific knowledge will create both new local knowledge and new scientific understanding (Greenwood & Levin 1998).

Although the value of farmers’ knowledge and experiences were taken into account, the opportunity to share it was limited. This was because planting forage was a new concept for most farmers in this study area. However, there was a gradual transition from passive to active learning so the interaction between farmers and development workers became an important stimulus for the emergence of local knowledge.

8.6. Reflection on the role of the learning group of farmers

In this study we developed a working strategy with farmers that helped both farmers and development workers to work collaboratively to achieve their goal. We established collaborative learning settings that emphasised dialogue amongst farmers and between farmers and development workers, both of whom had different perspectives on forage management practices. We believed that rapid and sustained farmer learning was essential to meet the challenge of integrating forage into the farming systems. The learning group we created was key to the success of this project. The following section discusses the outcomes of the learning group evaluation

Strengthened network among farmers

Most of the members of the learning group stated that being a part of the learning group put them in the position of helping other farmers. For example, this group was being used as a “village knowledge center”; it was used as a source of information and inspiration, and as a forum of the community to discuss the problems and possible
solutions to those problems, through sharing knowledge and exchanging information among farmers. The group also searched for possible solutions from outsiders, such as from livestock services and other institutions related to those problems (representing the community in relating to other organisations). An example of this work was revealed from an interview with a farmer who was not a member of the learning group. As he explained his experience in using the learning group as a source of information:

I was not successful in planting Napier grass. I planted the grass in my spare land near my maize field. The grass did not grow well. I came to a member of the learning group and discussed my problem with them. At the time three of them agreed to visit my field to see what had happened. After they visited my field and saw the way I planted the grass, then they said to me that the seedling application was not good. They then explained to me how to cut good stems and how to plant the stem in the proper way. After that, I understood why my grass did not grow well and now, I am happy with my grass and having this group among us (OF#3)

Creating a learning environment in the village

Most of the members of the learning group said that it was a setting for information exchanges and creative innovation via discussion among people with different experiences of managing forage. They also stressed that such learning was essential for coping with problems they faced in relation to their forage. One member of the learning group expressed this view by saying:

This learning group is useful for me, as through this group I can discuss any problem that I face in my forage field as well as in relation to cattle fattening enterprises. I learnt how to share experiences and problems, and learnt from experiences (MLG#3).

Qualities of openness, open-mindedness and honesty were seen as critical to fruitful interchanges within the group members. This was expressed by another member of the learning group, in response to his experiences as a member of the learning group.

This is the first time I have been involved in any farmers’ group. Initially, I found this group was frustrating, because I felt ashamed to speak up to contribute my opinion and thinking to other. By the time I had attended several meetings, I felt more confident. This is because the officers and other members encouraged me to speak and the officers told me that they would like to learn from me, so they have the same position as me (MLG#5)
Another farmer argued that the free sharing of both success and failure in forage management increased the rate of learning. In his words:

This group was set up in terms of our interest. We have the same interest, that is, we would like to learn forage management in order to improve our cattle production. Something I experienced and I think other members do too, is building our self-confidence by sharing our success and failure in planting forage. I learned from this group that we are not badmouthing each other, but are learning from each other as well as helping each other (MLG#4)

Development workers valued that the farmers increased their effectiveness through the exchange of information among farmers, development workers and the research team. One of the members of the research team said that

Although planting forage is a new concept of farmers in this area, there is also disagreement between farmers. For example, one farmer suggested to plant lamtoro (Leucaena leucochepala) as a source of legume for animal feeding because it has been grown by farmers and is popular among farmers in other areas, whilst other suggested to grow gamal (Gliricidia sepium) because of its resistance to the defoliating psyllid (Heterophyla cubana). Through dialogue these differences could be solved” (MRT#2)

Another research team member reflected that:

Learning group is a long-term working group as opposed to individual encounters where officers like us are set up as an “expert”, I think all of us who were involved in this learning process are trying to get out of the role of being a set up as the “expert” (MRT3#)

From these statements it can be noted that:

1. farmers could learn from their mistakes to improve their practice
2. the skill and knowledge that farmers gain from adapting ideas to their local condition could form the basis for changes in farming practices, and
3. farmers were able to disseminate knowledge as well as to foster group autonomy and build relationships and learning opportunities among themselves and between development workers.

A number of learning challenges were experienced by the participants through the group learning process. These challenges were discussed with members of the learning group and development workers at this evaluation time. These challenges related to practical events, such as weather influencing the performance of forage. We observed
that the effect of the weather was crucial during the establishment of forage. Not enough water or too much water risked poor establishment of forage. Identification of the appropriate time to grow forage was important to this end. This was essential for development workers to know when to introduce forage to the farmers particularly if planting forage was a new concept for them.

In addition, the activities included understanding forage management practices, particularly the cutting period which was a challenge farmers had to anticipate each critical seasonal period. Particular time periods had been determined by development workers, but were modified by farmers depending on the seasonal conditions. Here, farmers learnt that learning was fundamental to the planning and evaluation of activities.

Although during the course of this study only one learning group was formed, the function of this group has been expanded. For example, eight months after starting the research project in the village, the members of the learning group were invited by a local agriculture government group to collaborate with them to facilitate forage workshops in other districts.

Here, I observed that although the farmers’ learning group model could produce creative options to solve farmers’ production problems, it by no means could answer all the problems. Some problems, particularly complex ones, required diverse resources that were outside the capacity of the group (financial, human etc). For example, the initiative of the establishment of a nursery in the village had been discussed in the learning group and group discussion but this initiative did not occur, due to the financial resources required.

This learning group model for agricultural extension is still a new model in this study area, and there are several implications and issues that need to be discussed before this model can be developed further. These implications and issues relate to:

1. the facilitators skill
2. institutions that supported and adopted this model, and
3. farmers’ commitment to work as a group and to commit their time to meet regularly.

These issues are now discussed.
The facilitators’ skill

The farmers’ learning group concept was used as a research strategy in this study to mediate and bridge the relations between farmer, researcher and livestock development worker. By using this learning group concept I observed that participants developed not only strong relationships but also developing openness, integrity, equality and responsibility. This is consistent with Scoones and Thomson’s (1994, p. 31) view that …With an interactive, dialogical approach the researcher acts as a catalyst, a facilitator and provider of occasions, with learning occurring continuously and reflectively. In this dynamic, power-laden process, there are no neutral parties; every one is engaged.

Building on this argument, it can be said that development workers needed to change their role as an expert to share knowledge with farmers and appreciate farmers’ knowledge and circumstances. This required the development worker to facilitate farmers in the learning activity. Training in the participation approach is needed in order to improve the skill of development workers in facilitation. In this sense, development workers need to have objectives beyond simply improving productivity. They should have human resources development objectives that include enabling farmers to identify issues affecting their production, and to evaluate and to decide on the potential benefits of improved practices.

Institutions that supported and adopted this model

For the application of the learning group model for extension in the future, it will depend on how agriculture agencies are committed to support this learning strategy. This is because to run this learning group model, there were five main components needed that required support from government:

1. To provide concept of the learning group model
2. To develop technical skills of extensionists
3. To train development workers in participatory approach
4. To motivate the process of extension management system
5. To provide adequate funding.

Thus new administrative extension systems are needed to support this learning group model. Some of these issues are expanded further in the next chapter.
The commitment of farmers

To adopt a learning group model in livestock extension required the farmers’ commitment to meet regularly and to work as a group, therefore, development workers as facilitators need:

• To build rapport with farmers
• To understand the productive and social activity of farmers, such as seasonal calendar (planting times, etc)
• To set up a development agenda with farmers, such as appropriate time frame and adaptive planning
• To understand the issues of the availability of farmers to attend meetings, rather than do other work or social activities, and
• To understand the time of day farmers are available, versus “normal” working days of extensionists/development workers.

These five components are essential for development workers to guide them to attract farmers’ participation.

8.7. Reflection on the role of AR team

One of the objectives of the AR team in relation to its role was to facilitate the working partnership or collaboration between farmers and the AR team, as well as between farmers and the local livestock services department. The result of this role was to enable farmers to identify their problems and needs and to look for possible solutions to meet these needs. There were several outcomes and constraints identified by the team in relation to this approach, that are described below.

Professional development

All the team members felt that they had gained an augmented understanding of the agriculture domain, coming to realise agriculture is not only about producing food or using technology to achieve a high yield of meat or crops, but that agriculture is also a complex human activity system and includes the natural resources system, social systems and the livelihood of farmers.

They also increased their knowledge and skills to work with people through their engagement in PAR. The project team was able to adopt and transform the knowledge gained through their involvement in the project to their professional practices. For example, one of the members of the AR team who was an extension worker observed
that she gained fabulous experience in the implementation of the participatory approach, and that she found that this kind of research improved her ability and dedication to work with farmers, as well as changing the way she approached her clients. She said that:

The first couple of weeks I was involved in this study as a member of AR team, my perception was to solve farmers’ production problem only by technical solutions, and I felt that it was this technical solution only that the farmers want. Now, I understand that farmers have their own need to solve their production problem. I also become patient and became good listener to approach the farmers” (MRT#2).

The village leader improved his approach to working with the people in the village, by giving more voice to the villagers to set up their own agenda for their own social development, such as the establishment of cattle fattening groups. This initiative came from the villagers, and the villagers chose the chairman of the group by themselves without control by the village leaders.

Increased dedication to work with farmers

The AR team had determined its role in working with farmers to be to raise farmers’ awareness about their situation and that they were “an agent” of change for themselves, and to facilitate farmers in any activities that were initiated by them. Therefore the collaboration within the AR team and between the AR team and farmers and development workers in this research project was not simply a superficial working relationship, but an active partnership for doing the process of development through the sharing of ideas, and the exchanging of knowledge and information. The AR team observed that this process could create commitment to support farmers to solve their problems and show solidarity, thus enhancing the commitment to work as a team with farmers as co-researchers and co-learners.

Effectiveness

The approach employed in this study allowed the AR team to share their perspectives and perceptions with other participants through group meetings and group discussions, and they found these to be an effective forum of learning for participants.

The diverse background of knowledge, skills and personalities of the AR project team was useful in facilitating the needs of farmers. However, to achieve this needed the same perspectives within the AR team itself. The expertise of each member was used to
support the facilitation process. For example, the facilitation of group discussion in relation to livelihood analysis, and micro enterprise management, was facilitated by one particular member of AR team as he had a background in economics and management, and used to work in an NGO (see Appendix 5). The other members of the AR team were useful in facilitating the farmers to establish their forage fields through supplying technical information to them. Thus, the facilitation process was carried out by combining the strengths of each member of the AR team. The combination of these strengths was effective in meeting the diverse needs of farmers, and this would have been impossible to do with only one facilitator. In addition, we observed that collaboration around action was found to be the key to effective shared learning. Therefore, the professional must be involved not only in designing the conceptual work but also in the implementation of action.

**Required time**

All the members of the AR team observed that undertaking PAR consumed a lot of time, particularly in the early stages of the PAR process. This stage was found to be important by the AR team to build rapport, leading to the building of trust with the community in the study area. The time was also needed in the PAR process itself, as three meetings with the learning group, one meeting for a learning group discussion and two workshops had to be rescheduled because they needed to coincide with available time of the participants.

**Required readiness of the people**

The concept of equality in conducting PAR was found by some members of the AR team and some of the livestock services staff to be quite challenging for them. They were used to having control themselves, and to impose their ideas on the farmers, and so had to change to the concept of “listening to the people” that was emphasised in this study.

We also found some farmers were not ready for this equal partnership concept, as they too were used to the conventional model of technology transfer. In the learning group of farmers for example, the first three months of the project were used to socialize this process, as prior to this time we found that although they attended the meetings with the AR team to discuss the approach, they did not want to know more about the theory, as for them it was “too academic”. However, their understanding of the
concepts of PAR (learning approach) developed gradually through the process of PAR itself, for example involving them in data collection, designing and implementation of action.

In addition, most of the members of the AR team observed that it was difficult to measure whether this research project had achieved its desired goals, because we believed that PAR was an ongoing process of activity, and agriculture activity was always changing.

Maintaining the on-going learning partnership in Tombolo village

At the time of the evaluation (in workshop), the participants also discussed how the learning partnership could be sustained, and who would be responsible for the future. These two questions became interesting topics for participants to discuss. The development workers commented that the learning partnership that had been established through this research project had resulted from their effort to improve their practices by both development workers and farmers, thus everybody had the responsibility to maintain this relationship.

The development workers commented that as they would continue to work closely with the community, they could continue to motivate the beneficiaries. But the important factor would be the farmers’ motivation and commitment to the outcomes themselves.

In addition, as revealed from interviews, most participants suggested that for the learning model to exist into the future:

1. farmers should be involved in any internal training sessions undertaken by the livestock services department in order to share farmers’ experiences with development workers (mentioned by 56% of respondents)
2. farmers still needed to be encouraged to explore any potential of their practice and possibility for changes to support their livestock production (mentioned by 51% of respondents)
3. farmers and development workers still needed to work closely to learn about changes to improve their situation (mentioned by 87% of respondents).

8.8. My understanding of the facilitation process

My role as a facilitator in this project was important in terms of my social and political position within the research group, the learning group and within the
community group. I had to cooperate with those groups in exploring the issues of livestock production and the role of development workers, and together with them move along a journey to improve their situation. In essence, I explored three elements of social theories:

1. Understanding the experiences of participants in relation to the problem
2. Explaining why the problem came to be, and
3. Offering a possible idea for action that led to changes for situation improvement.

Through this process I came to learn that different people have different experiences with the same problem, and different people have different values about the problem based on the same experiences. Because different people have different ideas, perceptions and experiences, therefore knowledge generated cannot be value free (Selener 1997). The generation of knowledge begins with the identification of problems. To do so, the researcher and the people come together to think, analyse and act for the purpose of solving existing problems. The facilitation of such a process can encourage participants to collaborate to create a new situation. In this context, participants had control over the process that resulted in new knowledge from their experiences, while I was “controlled” by the research process. Therefore, there was a balance between the knowledge and experience contributed by the researcher and that provided by the participants. Maquire (1987, p. 37) expressed such a process saying:

….We both know some things; neither of us knows everything. Working together, we will know more, and we will both learn more about how to know.

Here, facilitation can be described as a process of maintaining a tension between being in control and being controlled by the learning process.

In my earlier experiences of working in the Department of Agriculture in South Sulawesi, I had been in “charge of changes” through my position as trainer and supervisor to agricultural officers and farmers within the framework of livestock development work. However, in this learning project I had to develop a new framework to work collaboratively with my colleagues and farmers. In this process, I had to change my role from that of “an expert” to that of a facilitator; on one hand not to put myself as “knowing everything” and on the other hand helping participants to eliminate their thinking that “I knew everything”. By listening, sharing knowledge and experiences, and appreciating the value of farmers’ knowledge, I became a part of the learning process with participants.
From this, I have identified three philosophical positions that underpin my role when facilitating learning with participants. The first position is creating a change through power balance. Although the concept of power balance has been described before, (see Sections 6), in this context I would describe it as the active critical process that occurs during a group meeting for data collection. As a facilitator, I was active in promoting the process of observation, reflection and transformation. Creating a change in participants maintains a balance of power, while at the same time providing structure, authority and rigor among participants. I realised that as a facilitator, although I made an effort to understand the participants’ lived experiences, I had not personally experienced these; I used this idea as a focus for dialogue with farmers and development workers for situation improvement. Freire (1972) addressed this issue as enlightenment and emancipation. Freire believed that it was important to initially structure the conversation and learning in a group while at the same time using authority to direct the dialogue. I believe this statement is important in the planning and implementation of a participatory group. Participants involved in this participatory approach need to have some structure to understand the process of being a “co-researcher”.

The second position is understanding and illuminating reality in the participation group. The notion of reality needs to be understood and illuminated by the researcher as facilitator in order to discover the social constructs or social conditions of the researched. The social constructs of the people are built up based on day-to-day action. Farmers construct their world through self-knowledge, therefore if he/she is to be involved in the construction of society, then the uncovering of tacit knowledge is required. This process of uncovering is essential when developing social theory through the implementation of the action research spiral.

As a facilitator I understood this to mean that my task was to expose the reality of the participants as well as that of the society. In order to do this, particular questions such as “tell me how do you know” and “tell me why do you think” could provoke discourse that leads to the uncovering of their reality. The questions generated were meant to guide the group toward observing and reflecting on their experiences. The results from this will allow them to understand and to see how their reality may have been influenced in different ways. The notion of reality is thus addressed as a collective rather than an as individual voice.

The third position is accepting both argument and rejection. When undertaking a participative approach, the researcher who acts as a facilitator needs to have a strong
commitment to working collaboratively with the people towards understanding and perhaps altering actions for participants’ improvement. In the process of improvement, the possibility of disagreement and rejection of a particular idea might occur. Disagreement occurs within the dialogic process between the participants and facilitator. Disagreement itself is the participants’ interpretation of a particular idea that is contradicted by their history and social realities. Dialogue is an important method to this end. In this sense, the facilitator should not rush to conclusions or to immediately influence others, but to share, understand and assess the validity of the thinking of participants.

In the context of this study, I facilitated participants to develop forage technology, as participants had perceived it to be one possible solution to solve their problem. However, I needed to be prepared for the possibility that participants with whom I was working may have chosen not to accept, or to reject the idea of this technology. In my experience through this study, any initiative offered to participants was always modified by them. In this sense participants were allowed to choose and to develop their own model of planting forage.

In addition, I found that “ordinary language” was essential to the development and progression of this process. The facilitator needs to be sensitive, thoughtful and wise to the ordinary language of participants. I believed that this process of using ordinary language also promoted trust, respect and empathy within the AR group.

8.8. Conclusion

This chapter has described the outcomes and benefits of PAR as an alternative approach to transfer of technology to enhance the livelihood of some smallholder livestock farmers in South Sulawesi Indonesia. The relevance of this approach to livestock development in the study area was legitimised by the participants, where participants agreed to maintain social networks for ongoing discourse and development. This shift in the development framework was seen as emerging out of their appreciation and recognition of the usefulness of the learning partnerships that they were involved in during this study.

In order to make this learning approach useful to myself and others into the future I decided to develop guidelines for implementing the learning approach for development workers who want to use this in livestock development in Indonesia. These will be
described in the next chapter, and will include the authentication and credibility of this approach.
CHAPTER 9

GENERAL DISCUSSION 2
Implication of the Learning Approach for Livestock Development
In South Sulawesi

9.1. Introduction

This study has demonstrated the limitations of the concept of transfer of technology, which can be summarised as:

1. Applying only scientific knowledge to solve farmers’ production problems without adjusting to the local knowledge and circumstances
2. Overlooking farmers’ experiences in farming in the local environment
3. Ignoring responses to farmers’ needs and the social implication of these technologies
4. Recognising only high yield as the means to achieve its end.

Based on these limitations and the ineffectiveness of the concept of technology transfer, it was necessary to develop an alternative strategy that could enable farmers and livestock development workers to work collaboratively to express and improve their practices with regard to improving livestock production. This called for a major shift in the worldview of farmers and the professionals who helped them. In the learning approach to agricultural research and extension described in this thesis, the focus of research was not on the external development of new technology for more sustainable farming systems \textit{per se}, but on helping farmers to create new learning systems (Sriskandarajah \textit{et al} 1991).

This learning approach has been used elsewhere for development projects in both developing and developed countries, and has been found to be successful in improving the situation in these study areas, including Nepal (Livestock Development Project), India (Forestry Project Formulation and Implementation), Philippines (Agriculture Technology and Technical Training Project Formulation), New Zealand (Community Development) and Australia (Establishment Community Based Land Use Action Plans) (Hedley 2001). Studies have been found that have also applied this approach more generally in agroforestry research based on natural resources management (Izac &
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Sanchez 2001), and participatory research for smallholder agriculture (Collinson 2001), using low external input for sustainable agriculture (Jiggins 1993), learning with farmers (Hamilton 1995), and facilitating social learning for sustainable agriculture (King 2000).

This chapter describes the implication of the learning approach for livestock development in Indonesia; that is guidelines for the practical use of this approach for livestock development workers and the authenticity and dependability of this approach. This guideline provides useful ideas for those wishing to conduct this learning approach with a community. Participation, collaborative inquiry, learning from experience, and applying dialogue instead of debate, are important components of this approach. The guidelines also include the methods and tools used in the inquiry process.

9.2. Principles for using the learning approach

9.2.1. Participation and partnership

Conducting a learning approach needs the full participation of relevant people in the inquiry process. Participation by these people needs to be defined, and is not simply just taking part, sharing and acting together but is also participation in terms of knowledge, skill, and resources. The concept of partnership is employed as a form of participation to work together as colleagues. In this form of participation, power is distributed and the processes of planning and decision-making are negotiated.

The participation process requires time and resources, as well as the good skills of a facilitator and clear objectives for the project, to avoid chaotic meetings and a general loss of direction for the initiative.

Partnership here means development workers and farmers working together toward a common goal. Working includes setting goals, identifying problems, assessing farmers’ needs, making plans and implementing and evaluating those plans. This collaboration should produce shared decision-making and power, and will result in better decisions and results. This relationship is based on collaborative learning and dialogue. This is consistent with Macadam’s (1997) views of the concept of “systemic development” in agricultural research and extension, that is as an iterative quest for improvement in the interaction between people and their environments, through the initiation and maintenance of relationships between the individuals, social group and institutions affected. The focus here is on collaborative learning between all the parties in rural development (Packham 2002b).
9.2.2. Learning from experience

The knowledge produced from this learning approach is through the transformation of experience into meaning, instead of imposing knowledge on farmers. Learning in this sense is treated as a continuous process requiring the resolution of conflicts between dialectically opposed models of adaptations to the world, and involving transactions between a person and her/his environment (Freire 1972; Kolb 1984). The participants learn through the process of finding out and taking action. In this process the participants:

1. Develop a holistic view of the problems and their context (collecting information from many perspectives, brainstorming)
2. Reflect on the situation, make connections and develop themes and topics in order to produce theories
3. Plan means for overcoming problems
4. Take action to test the plan.

Knowledge generated through this process therefore becomes the personal construct of the individual learner, and they then use this practical knowledge to construct propositional knowledge through group learning to inform future action.

9.2.3. Applying dialogue instead of debate

The learning approach is based on the co-researcher concept, therefore dialogue is an important aspect in order to achieve desired goals. As explored through this study, the conventional TOT model shaped thinking about extension practice, which in turn contributed to conflictual, debated-based communication. The result has been dissatisfaction amongst stakeholders in the R&D system. This learning approach however is concerned with engaging local people as co-researchers in a way to understand their needs, local knowledge and circumstances.

Dialogue is a learning process for the participants who are involved in it. Participants learn how to think together in the sense of analysing a shared problem and the creation of shared knowledge in collective ways in which the thoughts, emotions and resulting actions belong to participants as a group, not as individuals (Senge et al 1994). The more usual, debate, is more destructive because no discussion is possible about solutions and collective actions. Dialogue is based on the principle that
conception and implementation are intimately linked, with a core of common meaning (Senge et al 1994).

Therefore, communication based on dialogue is needed to achieve this end. As experienced in this study and based on the literature (Kersten & Ison 1998; Kersten 2000) there are three basic concepts needed for communication based on dialogue.

(1) Creating a conducive environment

The researcher or development worker in the learning approach has as his/her role to facilitate farmers in any activities that emerge from the inquiry process. There is a need to create a space for participants to interact with each other, to express themselves and communicate their experience. There is also a need to build rapport with participants. Firstly, the relationship of facilitator with farmers can be established via attending any social activities in the study area, such as a religious ceremony as well as regularly visiting the study area in order to make informal conversations with the villagers (visiting the villagers in their field). The second level of relationship is built during meetings, workshops and group discussions, which are aimed at producing the trust of the farmers. Here development workers need to put themselves on an equal position, in terms of knowledge and power in decision making, not dominating the conversation; they need to use “active listening”. Furthermore, the facilitator needs to apply the concept of “harmony” in the group discussion, such that there is no right and wrong and everybody has a chance to speak and learn from each other, generally eliminating the feelings of being discouraged.

(2) Mutual respect

Mutual respect amongst participants and understanding each other makes it possible for dialogue to emerge. An important consideration in the process is that participants feel able to express their experience, with no one being better than the other, and understanding the rationale behind decision making. Table 9.1 illustrates the key distinctions between debate and dialogue that would help development workers create a better decision making process.
Table 9.1. Distinction between debate and dialogue (provided by Kersten and Ison 1998)

<table>
<thead>
<tr>
<th>Debate (factors restricting dialogue)</th>
<th>Dialogue (factors enhancing dialogue)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participants come to the meeting as representatives or members of a group;</td>
<td>Participants come to the meeting as individuals with their own unique experiences, uncertainty and deeply held beliefs</td>
</tr>
<tr>
<td>Participants act as members of the group and articulate the group meanings;</td>
<td>Participants articulate their personal understanding at the meeting;</td>
</tr>
<tr>
<td>Little time has been spent in building relationships;</td>
<td>Time has been spent on building relationships before and during the meetings</td>
</tr>
<tr>
<td>Participants have fixed general or stereotyped ideas about other participants and are not prepared to set them aside;</td>
<td>Participants have no preconceived ideas about other participants or they are prepared to set them aside;</td>
</tr>
<tr>
<td>The atmosphere is threatening: -Participants defend or attack statements made; -Participants listen in order to refute other ideas; -Participants do not respect meanings and understanding other than their own; they believe in one reality</td>
<td>The atmosphere is one of safety: -Participants are open to ideas and to asking for suggestions of other participants; -Participants listen actively to other participants with an open mind that is not blocked by preconceived ideas -Participants listen to understand and gain insight (learning) into the beliefs and concerns of other; -Participants respect others meanings and understandings; multiple realities are acknowledged</td>
</tr>
<tr>
<td>Differences within group are set aside or denied</td>
<td>Differences between individual participants are revealed;</td>
</tr>
<tr>
<td>Statements are predictable without new information</td>
<td>New information surfaces;</td>
</tr>
<tr>
<td>Success requires simple impassionate statements</td>
<td>Success requires exploration of the complexities of the use of the issues being discussed</td>
</tr>
<tr>
<td>Operates within the constraints of the dominant public discourse</td>
<td>Participants are encouraged to go beyond the dominant public discourse</td>
</tr>
</tbody>
</table>

(3) Active listening

Active listening is also important to establish better ways to communicate with participants. This can create confidence in farmers to express their thoughts and feelings to other, because by using active listening, development workers can eliminate themselves from dominating the conversation, and they can develop understanding and insights about the situation. This process could enhance dialogue, mutual learning, being sensitive to peoples’ needs and expectations, and being creative and critical.

9.3. Commencing the learning approach (how to get started)

The PAR process begins with some steps that help communication flow between the farmers and development workers, and to focus on topics of common interest. These steps include forming a research team and making contact with farmers (forming farmer groups). There are four phases in conducting this part of this approach: understanding and diagnosis phase, planning phase, implementation phase, and evaluation phase.
Forming research team

The AR team is a professional team that is sensitive (capable and committed to work with local people) and has appropriate technical skills (i.e. is able to facilitate and apply relevant methods and tools, and is able to provide technical information and support, as needed). Ideally, the team is comprised of males and females as well as having a balanced mix of people with theoretical and practical expertise.

Forming farmer groups

Forming farmer groups such as the learning group used in this thesis, promotes good interaction with the farmers in order:

- To meet regularly and to use farmers’ experience and knowledge to make plans and take actions
- To combine their resources to achieve goals
- To obtain confidence and knowledge in working together and in taking action to improve their situation
- To learn from their experience and improve them
- To give farmers control about what they decide to do.

The learning group can be an interested group of farmers who have similar things in common. The group consists of numbers of farmers and women farmers (5-7) who are willing to meet regularly and commit themselves as a group. The groups may need to be single gender, depending on the culture.

The development workers act as facilitators to assist the group to explore the issues concerned and motivate interest to work collaboratively to find possible solutions to solve the problems in order to improve the situation.

Group discussions also can be held with the wider community in order to generate knowledge about the situation of concern. The learning group produces the possible and probable interventions that could be implemented to help to improve the situation (Habibie et al 2002a; 2002b). This is consistent with Pretty and Chambers (1993), Pretty (1994) and Reason (1999) who assert that improving human conditions requires an approach that honors a holistic perspective about what forms valid knowledge.

The changed role of livestock development workers from working with individuals to working with a group encourages farmers to participate in the meetings and workshops. Several benefits of working in groups were observed in this study:
• Working in groups has the potential to explore more complex issues compared to one-off learning activities
• Working in groups is more effective in terms of funding and time
• The learning group provided opportunities for individual farmers to build his/her knowledge in a purposeful manner.

9.3.1. The first step: understanding and diagnosis stage

This phase includes the analysis of the situation by conducting preliminary participant observation, interviews and reviewing secondary information. This is followed by problem identification and then drafting the participatory diagnosis.

The participatory observations and interviews with key informants are used in order to better understand the local situation and to build rapport with local people. These provide more focus and a better understanding about what farmers are doing and why they are doing things in a particular way. Rapid participatory observations such as transect walks and direct observation proved through this study to be especially useful for:

1. Obtaining useful information about seasonal patterns, natural resources and exploration about their use
2. Understanding the way in which local people managed their environment
3. Understanding the local social environment, with special emphasis on status, roles, behaviour etc.

Interviews can be useful in this stage, and are basically a process of inquiring into another persons’ perception about a particular issue. It can include exploring their knowledge, feelings, attitudes, past experiences and expectations for the future, as well as opinions. The workshop is a useful method to collect information from many perspectives, and to discuss the issue with stakeholders as well as to build a rich picture of the situation in the study area.

Farmers identify perceived problem

Farmers group meetings are conducted in order to obtain information about current topics and issues of concern to farmers. Once a problem as perceived by farmers emerges, pertinent data related to such a problem can be collected from different farmers’ perspectives. A key point is to get as much information as possible, including technical and social information.
Diagnosis of the problem

The information collected is then analysed by the AR team in conjunction with the learning group, and then fed back to the community through group discussion, by presenting the results in the form of tables or diagrams. Farmers need to be encouraged to impart their thoughts and to comment on the topics of concern in order to gain their opinion about particular topics. Here, development workers need to recognise the farmers’ needs and re-structure the problem based on their priority. A problem ranking matrix may be used to achieve this end.

9.3.2. Planning phase

Farmers need to be involved in the planning process, and together search for possible solutions to solve the problem. Development workers could offer various options to farmers; However, they need to open debate about the advantages and disadvantages of their options. The systems diagram can be used to help farmers to focus on which option is appropriate, using their local circumstances, to fulfill their need. During this stage, the arrangement of activities needs to be scheduled carefully in terms of time, place, actors involved, what specific skills are needed, who is responsible, what material inputs, etc.

This stage should achieve several results:

- An assessment of the local situation, farming activities, agro ecology, education, etc.
- The identification of farmers’ groups, through common work on participatory appraisal, and analysis of particular problems and solutions to address them
- The identification of supporting groups or institutions and their potential roles in addressing the community’s concerns
- Discussion about the problems with the wider community and prioritisation of actions to put into practice.

The success of the actions undertaken is also dependent on how the action plan is formed and the willingness of people to share the information in order to make common decisions. If there is any conflict of interests during this stage, the facilitator needs to mediate the participants and assist the participants to analyse disagreement through the weaknesses and strengths technique to show the participants which options have benefit to the wider community and are best suited to local circumstances.
9.3.3. Implementation phase

Farmers decide about the implementation action through group meetings. Here development workers assist farmers in conducting any actions, for example plot demonstrations. In this context, development workers provide technical information to the farmers as well as helping farmers to organise meetings to monitor their activities. Activities can be undertaken by individual farmers in their own field, but discussions of their findings can be undertaken as a group. Farmers are encouraged to record their findings in a booklet or diary, and to discuss their findings in the group and with others. Field visits to demonstration plots also helps farmers and development workers to gain insight into the situation of concern, and development workers can explain why certain practices are needed and farmers can explain why certain practices that were recommended to them needed to be modified.

The important thing that needs to be taken into account in doing field activities during this stage is that development workers need to understand the seasonal calendar, rainfall pattern, and social activities of farmers, in order to avoid a lack of participation by farmers in the planning meetings and any unexpected results that may occur during the demonstration plot work because of a failure to recognise the appropriate time for doing the plot demonstration.

9.3.4. Evaluation phase

The evaluation provides an opportunity for both farmers and development workers to reflect on what they have done to improve their situation in order to make decisions about the future. To evaluate the activities, the time framework should be decided with farmers in order to allow farmers to collect the information. The evaluation activities should also be conducted in collaboration with farmers to define the topics that need to be evaluated, and to decide how the evaluation will be done. Interviews or group discussions can be used to collect such information. The following are the steps to be undertaking during the evaluation:

- **Define the purpose of evaluation.** Review the goals and objectives of the initiative as defined during the planning phase, and the reason for the evaluation (what do we want to know?)

- **Define the priority areas to be evaluated.** In this stage, set up the questions that are going to be asked in relation to the areas concerned, such as the impact of the project, degree of participation, did the project achieve its goals, etc.
• **Identify responsible people.** Decide who will do the evaluation (e.g. the wider community in the open meetings, the learning group, or the learning group with the AR team).

• **Identify indicators.** These can be direct indicators or indirect indicators. A direct indicator is a piece of information that directly relates to what is being measured, such as the number of people planting forage, the number of cattle raised by farmers after planting forage, etc. An indirect indicator provides information on aspects which cannot be easily measured such as, the nutrition impact of planting forage on the soil, etc.

• **Communication finding and follow up.** The important thing in this stage is that the results from the evaluation should be given back to the community (ask for public knowledge and opinion). This can be done in a one day workshop or meeting in the study area. By holding this activity, the community can set up action plans for the future.

### 9.4. Authenticity and reliability of PAR results

In conventional research, authenticity is taken to mean how close the finding is to reality; and dependability is associated with the constancy of findings. When conducting PAR, the concept is interpreted somewhat differently; the results may be considered authentic and dependable when their application brings about change or improvement to the situation of concern, and it also produces practical learning outcomes.

Checkland and Holwell (1998) have offered the “F, M, A Model” (Framework of ideas, Methodology and Area of concern) as a notion of “recoverability” in establishing the rigor and validity of action research. However, such a model still does not uncover the manner in which an inquiry was undertaken. Here individual participants need to be included to make their own judgments concerning the authenticity. This is consistent with the Champion and Stowell (2003) model of PEArL, a mnemonic that can provide an action researcher with a framework to reflect on the authenticity of the inquiry process. The PEArL is an intellectual tool to facilitate interested individuals in considering the character of the inquiry process: which is appreciating how that inquiry process was conducted, the manner in which the learning unfolded and the reasons underpinning what decisions were made (Champion 2002; Champion & Stowell 2003). I have therefore adopted this framework to analyse the authenticity of this study, as an
example of how this approach can be used more generally. The PEArL mnemonic emphasises five elements: Participation, Engagement, Authority, relationship and Learning outcomes. These are now discussed below.

**Participation**

Participation of the people in the inquiry process is considered essential to the character of PAR. However, it is difficult to ensure that every single stakeholder is included in an inquiry process. The reasons for non-involvement are important to consider, as are the reasons for participation, when considering the authenticity of the inquiry. Midgley (2000; 2002) identified that boundary judgment was needed for a facilitator to reflect critically upon and make choice between boundaries. For example, boundaries define who is to be involved in the inquiry.

In this study, the choice of participants to be involved in the inquiry process, the criteria for inclusion and non-involvement, were made and decided by the community. For example, gender bias was also considered in the inquiry process where people who were involved in the situation of concern decided who would be involved in the learning group (see more detail in Section 4.2.2, p.76). In this context, forming a group with inclusion of females need to consider the culture and tradition of the community. The inclusion only males in the learning group, was decided by the community and female perception was also taken into account before forming the group.

Females were also involved in activities such as group discussion and training. However the women were included in the activities during the inquiry process. For example, some women found interested to look after the forage fields, so this finding was discussed with the group and the community in order to gain their opinion. Women were then encouraged to be involved in any activities that were carried out during the course of this study. Gender analyses also helped understanding of the tradition and culture of the community in the study area. Through this process the facilitator could understand the most important features of male and female roles in the local culture, and to deal with the issues of gender bias in the inquiry process. This gender analysis can be applied to assessing gender division of labour, gender specific knowledge and practices, gender reproductive role, etc.
Engagement

This sort of research is research *with* people rather than *on* people, and therefore requires the participation, engagement and commitment of people in the inquiry process. However, this process of engagement is not easy to achieve. In order to engage people in the inquiry process, as experienced in this study, the meetings need to be held to coincide with the available time of participants. The meetings, workshops and group discussions were created with a comfortable environment, where the principle of “harmony” was applied to avoid conflict. The important aspects of the inquiry process are designed with participants in order to meet their needs. Furthermore, the resources need to be available locally in order to carry out actions to solve the problem.

Authority

The authority in the inquiry process will influence the degree of “self-governance” of those participating in the inquiry. In this study, in order to shift the power of authority in the inquiry process, the farmers who were directly and indirectly involved in this study had the opportunity to contribute their ideas and to critique the process in community group discussions. Such group discussions were used as a public debate before the implementation of action. Thus, the power of intervention and decision-making were shared with the participants. In addition, the subjects of the study were encouraged to be co-researchers, with the aim of increasing the feeling of autonomy and sense of control of the situation by farmers.

Relationship

Champion and Stowell (2003) emphasise that “relationship” is an important element in the PEArL mnemonic when reflecting on the character of an inquiry. I believe that through using voluntary participation as the grounds of relationship, the inquiry process can produce results that improve the lived situation of farmers and development workers in a rigorous way.

As experienced in this study, by dealing with the conflict and misunderstandings that can cause a breakdown of relationships in the inquiry process, this allows them to analyse how issues of individual power and control can be dealt with. For example, the community themselves decided who would be involved in the inquiry process (learning group) based on their analyses of their situation. Decision-making and power were shared between participants through being open to public opinions and knowledge
before implementing action. This process was found to be useful in legitimating action plans before putting them into practice.

**Learning**

Learning is expected to be the outcome of this inquiry process and it is also considered as authenticating the results of the inquiry process. I recognised that participants in this study could learn through the process of the reflective cycle of the inquiry itself through finding out and taking action. Participants could also develop their individual and communicative learning through the inquiry process. The individual learning occurred at the farm level, when farmers undertook their field activities; and communicative learning occurred when farmers shared their experiences with others, as happened in all phases of the AR cycle.

In this study, people not directly involved in the inquiry process could also learn, through involving them (male farmers and women farmers) in group discussion and any activities that occurred during the course of the study. The evaluation phase that was undertaken in this study was also used to gain a public perception about the learning process that had occurred during the course of this study.

**Reliability**

The participatory approach employed in this study challenged the conventional approach that relied on “scientific” knowledge and external authority to solve farmers problems. In this study, “triangulation” was used to analyse the situation, by using information collected from different sorts of techniques of data collection. This included:

(a) **Comparison of different perspectives.** Different people may have views and perceptions of “reality” that are different from each other

(b) **Use of different methods and techniques for exploring the same topic.** For example, the description of the way the people used their resources may be developed through a combination of transect walks and interviews

(c) **Involvement of different background of disciplines in the team.** This will help to develop the questions in the inquiry process, because different backgrounds will raise different questions about the same issues. For instance, understanding the well-being of farmers might be assessed through the combination of interviews by an agriculturist, and livelihood analysis and group
discussion by the economist, or the people who have expertise in community development.

Employing a variety of techniques allowed information to be collected from many perspectives.

**9.5. Prospect for sustainability**

Using the PEARL mnemonic to examine the authenticity of this study I can conclude that this learning approach was a reasonable and appropriate approach to livestock development in the study area, and it has potential for supporting development on a sustainable basis to enhance the livelihood of smallholder livestock farmers (Checkland and Howell, 1998). Sustainability can be defined as human activities, reasons and agreement, that is a quality that emerges when people use their intelligence to maintain the long-term productivity of the natural resources on which they depend (Sriskandarajah et al 1996). From this definition, Rolling and Pretty (1997) further conclude that sustainability can be seen as a sharing of human experiences, objectives, knowledge, decision, technology and organisation. Thus, in order to achieve agricultural sustainability people must think ecologically, in terms of complex interactions, processes and adaptation to changing conditions.

In the context of this study, this would imply that participants should maintain livestock production to support their livelihood as smallholder farmers, and in the same way maintain the working partnerships that were established during the course of the study. This of course is not an easy task for participants to maintain, because farming itself is a complex and dynamic human activity. The livestock development workers in this context should take their chance to learn from farmers. Packham (2002b) suggests that the issues of inherent unpredictability and complexity can be understood by the participants through a learning approach supported by several essential points of views. Packham (2002b, p.453) draws on work by Stacey (1992) to present several steps that need to be included in the process of a learning approach:

- Develop new perspectives on the meaning of control, where a group itself discovers intention and exercises control
- Encourage self-organising groups that discover their own challenges, goals and objectives
- Design the use of power to allow for open questioning and public testing of assertions
• Provoke multiple cultures and new perspectives
• Present ambiguous challenges instead of clear, long-term objectives and vision
• Devote explicit attention to improving group learning skill
• Invest management resources to allow this to happen.

These ideas bring a new perspective to the ideas of a learning approach. I therefore added that farmers and livestock development workers are prepared to continually observe and listen, question and reflect on their own experiences. Participants become more capable and able to react appropriately to meeting the challenges of the complex and dynamic situation in which they work and live. The argument behind this statement includes:

• Shared experiences in relation to problem identification
• Conceptualising about their own actions or activities, and
• Critical reflection on their knowledge and practices

In addition, in terms of sustainable livestock production in the context of this study, farmers are building their survival strategies through observing, comprehending and changing their farm practices. It is reasonable for the smallholder livestock farmers to develop a diversity of strategies for sustaining their livelihood. This is consistent with the concept of smallholder farmers as described by Netting (1997), that is, smallholders seek diversity rather than specialisation.

9.6. The implementation of a learning approach: barriers and difficulties

This section outlines some of the main obstacles and difficulties in implementation of this learning approach both at the provincial and national level. These include collaborative work (farmers, and development workers), coordination (sustaining the communication), funding and the time framework, institutionalising the participatory approach, and political issues. I also discuss how the development of AR and systemic approach can be integrated with traditional science.

9.6.1. Collaborative work

As discussed in the previous chapter, conducting a learning approach requires collaborative work, so it needs the cooperation of the people both at the field level, including farmers, field workers and other stakeholders, and at the administrative level. I found these issues to be challenging for the implementation of the learning approach,
because addressing challenges of equity and inclusion so as be able to claim “full participation and collaboration of all stakeholders” (Pretty 1998), including voice and choice, and the rights and entitlements of stakeholders, is a difficult idea to implement. I now discuss some of these issues.

**The dilemma of voice and choice**

This learning approach gives the opportunity to farmers, both male and female, to influence decision making for their own development. However, it is not simply about getting farmers into the process, but more about how and whether the involved farmers represent other farmers’ interests; whether they raise their voice and whether development workers take account of their voices. Some of the constraints to farmers (male and female) participation in the process of decision making include:

(a) **Time**

(b) Social constrains such as being illiterate, being capabilities and social role, particularly gender; and

(c) Lack of public speaking experience.

In addition, the approach may need to take account of the local culture (norms) and ethics. To deal with these sensitive issues, development workers need to respect the local cultural context, and then engage with this cultural environment in a way that is relevant to the purpose of the inquiry process. This realisation is similar to that described by Lynton and Pareek (2000, p.1) who assert that dealing with the local cultural context not only needs to be taken into account and adjusted to, but rather to be actively interacted with through mutual adjustment and development in tandem.

Giving choice to farmers such as addressing the “critical mass” (Gustavsen 1996) in decision making is also a challenge to this approach, because this may be dominated by innovative farmers, and by males. Development workers need to have the ability to deal with these issues. Employing tactics such as allowing participants to speak out in the meetings and holding the meetings separately between men and women, and then seeking to integrate women with the male group are examples of ways to overcome these issues. Fieldstein and Jiggins (1994) discuss a range of tools for tackling gender issues in the field.
Right and entitlement

The promotion of farmers’ participation as a change from the status quo is sometimes implemented in a top-down way (Cornwall 2003). The way in which farmers’ participation is encouraged is critical for addressing the transformation from a “receiving” to a “learning” orientation. The distinction between forms of participation, from functional, instrumental consultative to transformative, needs to be understood by development workers and needs to be opened up so that participants have the opportunity to realise their rights and entitlements in the process of decision making.

9.6.2. Coordination (sustaining communication)

An important part of the learning approach at the field level is how researchers, development workers and farmers manage their interactions. The continuous on-farm interaction between researchers, development workers and farmers is an ideal way to conduct a learning approach. However, in practice it is not easy to maintain this communication relationship. The ability to coincide times for meetings with farmer availability, as well as the cost of travel to plot demonstrations, can be a barrier to conducting this process. In practice, if there is an expectation of results from the plot demonstration, particularly for short-term benefit, this may affect the participation of farmers, and can lead to the low adoption of technology, particularly for new innovation technology. This is related to what Martin and Sherington (1997) assert when they note that the maintenance of continuous management during the on farm trial is essential to avoid vulnerability and risk to the success of the project.

9.6.3 Funding and the time framework

Another difficulty for the implementation of the learning approach is that it is faced with an unpredictable process, and this can be hard to reconcile with a program’ structure, time framework and funding, particularly if the program is funded by an international institution (donors). The result could be that accountability of the project is focused towards the donor (upward) rather than on the farmers (onward).

9.6.4. Institutionalising PAR

I found that there is a risk to the implementation of the participatory approach into the formal agricultural system. This could occur when there is rhetoric about participatory research, but without moving much beyond an instrumental approach. A
critical area here is the capacity of farmers to carry out the research and how they and other stakeholders are encouraged to participate in the research. This issue also has been discussed by several authors such as Farrington and Bebbington (1993), Martin and Sherington (1997), Collinson and Lightfoot (2000) and Collinson (2001). They assert that the most important challenge for maintaining a dynamic and relevant participatory program is to establish effective management and a sustainable institutional context.

Therefore, implementation of the learning approach makes great demands on management innovations, skills and procedures. There are several areas that need to be managed, namely:

Farmers’ organisations – strengthening institutional capacity of farmers such as farmers’ organisation in order to meet the needs of men and women farmers.

Building linkages – adopting the concepts of “collaborative work”, means there is a need for participants from different institutions to contribute to the planning process, programme review, etc.

Skill development and training – developing the ability of researchers and development workers to interact with farmers. Develop knowledge and skills for conducting a participatory approach, in terms of both theory and practice.

Provision of incentives – for researchers and development workers to conduct more farmer oriented work.

In addition, as a researcher, I observed that the issues of self-concept and personal meaning have also become open to question. For example, the questions of personal behaviour and understanding threatened some participants who had the authority to defend their principles about their knowledge and action; these included how development workers were able to accept the criticism of their ideas and how farmers needed to give up their receiver status in the development process. In addition, the current practice of transfer of technology in livestock development has created a hierarchical structure which is associated with power relations, and this also needs to be considered. Careful handling is required in the effort to form creative and flexible co-operative inquiring systems.

Individual behaviour

The learning approach requires the participants to reflect on their practices and knowledge and to make meaning of their experiences in order to better understand their situation. This process needs to deal with the values and doctrines of science.
Furthermore, another challenge of this learning approach is that it involves numbers of people. Each individual who engaged in this learning process could have several perceptions of reality, and these are often dissimilar for different functions. As the approach was also an open system, individuals were free to move in and out (King 2000). This can be problematic because there is an assumption in PAR, the participants would need to follow the same line through the learning process. As experienced in this study, in order to have people involved in an activity the AR team needed to coincide the time of activities with the availability of participants, and at the same time sustain group harmony through negotiation to avoid conflict.

**Institutional level**

The work of livestock development was under the responsibility of the livestock services, and included extension services. Therefore the adoption of this learning approach depended on these institutions that had the political mandate for livestock development. These institutions work within a policy framework to improve livestock production through recommendations of technology to farmers and they expect farmers to adopt these technologies in order to improve livestock production and improve the income of farmers. It was clear that the function of these institutions was to generate knowledge and transfer it to farmers.

Based on this framework I observed that the practical use of the learning approach was difficult to apply within the context of livestock development workers. The practice of a line command approach from the top, and the following of department routines was a challenge to this approach. This approach requires a self critical and self reflective and pioneering organisation, whose members are capable of taking personal initiatives and taking responsibility for their own action (Senge 1992). Pretty (1995b) further asserts that this learning approach requires a “creative interaction” among participants.

In this study, this issue was discussed with the head of livestock services and the livestock development workers in the study area. The acknowledgement of the benefit of this approach by the livestock development workers in this study area came through participating actively in this study. The government was aware of the usefulness of this approach to livestock development. Some of the livestock development workers in this study area have been trained in the participatory approach by government at provincial level. The implementation of this approach was a challenge to the new livestock
development workers to shift from the conventional model of technology transfer to a learning approach.

Training for transformation might be the first policy decision to be organised, including conducting one or a series of workshop and field activities to expose the staff to the new “people centred approaches”.

9.7. Action research, the systemic approach and tradition science

PAR has been criticised by many scientists on methodological grounds, in terms of the scientific validity of results, the control needed to establish sound empirical conclusions, and in regard to knowledge construction. These issues have been discussed in Chapter 3. From my experience through this study, as well as from my exploration of the literature of action research, I have concluded that AR and the systemic approach are quite different from traditional science, therefore we cannot compare which one is better than the other in terms of good research. It seems to me that good research is one that produces valid knowledge through a rational process, and I think either action research or traditional agricultural science can generate valid knowledge. Although both AR and agricultural science are not similar, they can be integrated using the philosophy of the pragmatists. This process has been described by Swepson (2003) who compared two basic theories of Popper and Habermas to examine both Action research and science. Swepson (2003, p. 108) concluded that another criterion for good research could be pragmatist in “that the methodology suits the problems; i.e., it is fit for its functions”. She further asserts that systematic, critical and cyclic inquiry within the contingencies of a specific social context could provide the basis of a common definition of rigor for collaboration between action research and science.

Furthermore, Midgley (2000; 2003) defines the term “observation” as the basis of science and the term “intervention” as the basis of action research. He argues that observation should be viewed as just one type of intervention although many authors such as Popper (1976) suggested that observation and intervention are opposites. Midgley (2000; 2003) used the term “construction” to determine that observation is undertaken purposefully by an agent to create changes in the knowledge or practice of a community of people. Because scientific observation is constructed under controlled conditions by a particular agent who is involved in observation, there are two levels of construction “interpretation”, and “value judgment”. These indicate that observation is
an aspect of intervention. (Midgley 2003, p. 88). For instance, in terms of “interpretation”, the scientific observation depends upon the involvement of an agent, who is actively constructing the observation, where observation takes place using conceptual and emotional frameworks of interpretation (Maturana & Varela 1988; Midgley 2000; 2003). In terms of “value judgment”, these are involved in setting the goal of the parameters of observation, where the agent making the value judgment chooses what to observe, and how exactly it should be observed (Midgley 2003).

I agree with Midgley (2003) and Swepson (2003) who assert that although action research and science are different, there is the possibility to integrate them. Scientific techniques of observation are welcomed into the pluralistic armoury of intervention methods, alongside methods for exploring value, reflecting on subjective understanding, planning future activities, etc. Here, both science and action research are guided by the aim to solve real world problems, to be honest, and to deal with local problems, while employing a methodology that suits and is practical for the local conditions. From these arguments, I concluded that a common methodology of AR and science might:

1. Employ systemic and scientific methods of sampling, collecting and analysing first, second and third order data, that is relevant to the research purposes within the contingencies of the local context
2. Employ participatory process
3. Focus on solving real life problems, and
4. Collaborate in the inquiry process to lead to social action

Such an approach can only benefit the livelihoods of farmers in South Sulawesi.
CHAPTER 10

CONCLUSION

This study was conducted using participative action research and a systemic approach to improve the livelihood of some smallholder livestock farmers in a rural area of South Sulawesi, Indonesia. In this context, action provided changes and research provided understanding. The PAR methodology also provided rigour through the spiral of cyclical processes.

Previously development workers and extensionists approached the farmers in this study area through the employment of only technical intervention, and the farmers’ knowledge and circumstances were not taken into account. I brought the idea of AR and a systemic approach, and the general idea of participative learning to this study, based on my strong passion to undertake research that would be of benefit to the local people and bring about changes for the better within the situation of concern.

I began action researching with the notion of first understanding the situation being studied, and also of having participants (farmers and development workers) directly involved in the inquiry process. This was considered vital to generate collective action as well as to develop participants’ skill through “learning by doing” (experiential learning) as a means to promote their self-reliance. Forming a learning group of farmers enacted this, and I believed that this self-reliance would enable farmers to solve the complex issues for themselves.

From the use of PAR and associated theories of learning in this research, I gained valuable experiences that improved my personal practices and the professional practices of these development workers who were involved in this study.

As the facilitator of this learning process, I benefited from having a specific problematic situation to deal with explicitly, with participants gaining from the experiential learning process and action learning concepts. Through this process I could provide a focus for learning about such things as developing forage technology to demonstrate to participants how learning occurred in the group, and how they could share their experience with others for collective action to improve the wider situation (livestock production). By having more nutritious feed for their animals, farmers could enhance their livelihood through improved livestock production; having more cows to raise, and having more time to undertake other productive activities. More specifically,
availability of green forage or fodder for animal feeding such as Napier grass, *Gliricidia sepium*, *Leucaena leucochepala*, *Calopogonium mucunoides*, and *Centrosema pubescens* could increase the live gain weight of cattle. This leads to reach market weight faster than the traditional feeding systems as well as the possibility increasing the market price of cattle. The improvement in cattle production could enhance the income of farmers and could increase the number of cattle raised by farmers.

Within the livestock development context, this study enabled my colleagues and myself to work participatively and collaboratively with farmers, prompting significant changes in our practice of facilitation. My colleagues and I developed a more congruent practice of participation and collaboration through the action researching of our practice of facilitating farmers to improve the situation of concern.

In addition, my personal commitment did not end with the formal phasing out of this research as I continued to be a part of the livestock development team with the role to improve livestock development in Indonesia particularly in South Sulawesi Province. However, the key challenge here was to identify the immediate steps forward that would be most acceptable to farmers, to identify similar groups who could operate the same systems to better use limited rural and development resources, and to find cost-effective methods for understanding farmers’ systems. As proposed for livestock development in the future, there are two factors which need to be improved. The first factor is improving the research process, as livestock development agencies need to ensure that their technology recommendations fit into the local farming systems, that is to be congruent with local circumstances including farmers’ priorities, strategies and resource endowment. From there, the technology recommendations need to be put on a level of flexibility that is open to modification based on local conditions. The second factor is to improve the mandate and structure of the institutions that serve the needs of smallholder farmers. This needs to shift from a disciplinary specialist approach (commodity mandate) to a collaborative interdisciplinary approach. This shift in approach can be employed:

1. To help express farmers’ needs
2. To provide information and understanding of local farming as a resource for development programs and policy formulation
3. To create ideal options to improve farmers’ production problems, based on farmers’ needs and circumstances.
Furthermore, institutional arrangements to improve the information management processes to support this learning approach are essential in order to capture information from multiple sources. The transition to this approach can be started from the ground level through building up the research capacity of extension staff by training them towards the concepts of the participatory approach, in order to give them better understanding of:

1. smallholder farmers’ circumstances, the challenges they face, and the way they take decisions
2. their role in farmer-to-farmer R & D, and the better understanding of the concept of institutional partnerships
3. the implications of a demand driven R & D agenda

As a trainer and supervisor I have the opportunity to implement this learning approach to agricultural development in South Sulawesi through the facilitation of and participation in the development of the cognitive maps of development workers in concert with other stakeholders, with the purpose of informing both methods of livestock production and to enhance the livelihood of smallholder farmers. I also had the opportunity to educate and learn with my colleagues and farmers, to enable them (a) to develop a participative worldview, and (b) to develop their capability to be self-critical and reflective of their own knowledge and action. This may produce a “new generation of agricultural practitioners” who are willing to share power with their peers and other stakeholders, and who are willing to learn from and with other stakeholders as equals.
APPENDENCES
Appendix 1.

A Paper prepared as a tool to support practical used of PAR in Tombolo village (refers to section 4.2.1)

PARTICIPATORY ACTION RESEARCH

PAR is research with people rather than on people in which all those involved in the research process are engaged in the process of investigation, collecting data, reflecting on that information (analysing), transforming about the nature of the problem under investigation (theorising). Here, the people who are involved in the inquiry come together to explore the issues of concern and interest. The participants contribute to the ideas to improve the situation concerned.

In other word, the relation between researcher and the people under study is acts as co-researchers, whose thinking, and idea, contribute to generate decision making, designing and managing the project, as well as drawing conclusions from experiences about the project.

Collaborative exploration that emphasised in this research helps participants to understand how to develop an increasingly sophisticated understanding of the problems and issues that are perceived by them. In this sense, the role of researcher is as facilitator rather than an expert or professional.

There are four phases in PAR that form a cycle, consisting of: observe, plan, act, reflect. This process helps participants to explore the issues of concern and then find out possible solutions to improve the situation.

**Phase one, observe,** is the process where participants are to agree the issues they wish to address. In this stage farmers are asked in a facilitated discussion about current practices, what works and what does not. The question to be asked in this circumstance is “*apa itu*” meaning “what is it”. Build a picture about the situation and describe the
situation (define and describe). The outcomes of this stages are (a) participants understand the situation being studied; (b) Identification problems are perceived by participants.

**Phase two, reflect**, is the phase where participants work in a group to document and assess the current practices. What is happening here? (explore and analyse), and then interpret and explain: how/ why are things as they are.

**Phase three, plan**, is the phase where participants develop an action plan, looking for several options to improve the situation concerned.

Phase four, act is the phase where participants formulate practical solution to solve they perceived problem. The phases described are iterative.

There are three basic principles that need to be recognised by researchers at each stage of the PAR phases namely (a) develop relationships, (b) establish communication, and (c) participation.

**A Develop relationships:**
- Avoid conflict
- Maintain harmony
- Accept people as they are
- Promote feelings of equality

**b. Establish communication:**
- Listen attentively to people
- Is truthful and sincere

**c. Participation:**
- Allow people to perform significant task
- Provide support for people and encourage them to act for themselves
- Active involvement
- Voluntary involvement (adapted from Stringer 1996, p. 38)
Appendix 2

The Price of Maize in Tombolo Village (refers to section 5.12)

Farmers found that since 1996 the maize price was fluctuating. Previously, farmers sold their Maize at the price of Rp.1000 per kilogram. It dropped dramatically during a period of 5 years from Rp.1000/Kg to Rp.500/kg in Year the 2000. Table 1 shows the maize price during the 5 years period.

Table 1. Maize prices during period 1995 - 2000 identified by farmers

<table>
<thead>
<tr>
<th>Year</th>
<th>Price (Rupiah)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995</td>
<td>1000</td>
</tr>
<tr>
<td>1996</td>
<td>850</td>
</tr>
<tr>
<td>1997</td>
<td>600</td>
</tr>
<tr>
<td>1998</td>
<td>550</td>
</tr>
<tr>
<td>1999</td>
<td>550</td>
</tr>
<tr>
<td>2000</td>
<td>500</td>
</tr>
</tbody>
</table>

Figure 1. Maize prices during period 1995-2000
Appendix 3

The Three Strata Forage System (TSFS) (refers to section, 6.6)

The Three Strata Forage System (TSFS) is a technology of planting and harvesting grass, ground legumes, shrub legume and fodder trees, so that a source of livestock feed is available all year around (Nitis 1989a)

Description of TSFS

Land Classification

One unit of TSFS is 0.25 ha (2,500 m²) land consist of:

(a) 0.16 ha (1,600 m²) core area.

The core area is located in the centre. It is planted with food crops such as maize, soybean and cassava that are commonly grown by farmers.

(b) 0.09 ha (900 m²) peripheral area.

This area is a buffered zone of 5 m width, located between the core and circumference areas. It is further subdivided into lots of 45 m² size (9m length X 5 m width). Each lot is planted with Cenchrus ciliaris cv. Gayndah, Urochloa mosambisensis, Panicum maximum var. Trichoglume, Centrosema pubescens mixed with the Stylosanthes scabra cv. Seca and Stylosanthes hamata cv. Verano in that order. This 900m² improved grass and legume pasture is designated as the first stratum.

(c) 200 m circumference area.

The circumference area is a border around the peripheral area. Fodder trees, i.e. Ficus poacel, Lannea corromandilica and Hibiscus tilliaceus are planted at 5 m spacing along the circumference. Fifty shrub legume Glicicidia sepium and fifty shrub legume Leucaena leucocephala or Acacia vilosa are planted alternatively between the two fodder trees. The 1,000 Glinicidia and 1,000 Leucaena are designated as the second stratum. The 14 Ficus, and are 14 Hibiscus designated as the third stratum. All these form a hedgerow fence around the TSFS unit.

Therefore one, unit of TSFS consists of 0.016 ha cash/food crops for humans, and 0.09 ha of pasture, 2,000 shrub legumes and forty two fodder trees for cattle.

Management of TSFS

Cutting of Glicicidia, Ficus and Lannea are planted accordingly at the onset of the wet season while cuttings of the Hibiscus is planted during the wet season. The length
of the tree cutting is 2.25 m; while the length of *Gliricidia* cutting is 1.25 m. Seeds of the grass, legume and *Leucaena* or *Acacia Villosa* are planted during the rainy season at the rate of 1 kg per plot after appropriate scarification (Maize, soybean and cassava) are planted annually according to the farmers’ practice.

The first and the second strata are allowed to establish for one year, while the third stratum is allowed to establish for 3 years.

Cattle are integrated in the system in the second year. The animals are always kept in the stall. Feeding is by the cut and carry system.

The botanical composition of the forage offered to the cattle depends on the season. During the wet season, the botanical composition of the forage offered consists of 65 percent first stratum and 35 percent second stratum for the first 3 years. Consequently, during the wet season, it consists of 65 percent first stratum and 25 percent second stratum and 10 percent third stratum.; while during the dry season, it consists of 35 percent first stratum; 40 percent second stratum and 25 percent third stratum. Maize stovers and cassava leaf tops are fed straight after harvest, while soybean straw and cassava stems are stored for the forthcoming prolonged dry season.

**Mode of TSFS Application**

The application of the TSFS technology is through the integration of TSFS with cash/food crops and livestock production. With this integration it is expected that:

(a) There will be better control of the TSFS, since farmers usually go to their fields every day to look after their cash/food crops.

(b) Livestock will not disturb the crops, since the TSFS hedgerow fence acts as protection

(c) Tethered grazing of the livestock can be minimised, since TSFS will supply the green feeds

(d) Soil fertility can be increased, since the barnyard manure can be spread regularly in the field.

(e) The cash/food crops and the TSFS will cover the farmers’ daily needs, while the livestock will cover the farmers’ unexpected expenses.
## Appendix 4

### The Number of Forage Fields Recorded at Evaluation Time

#### Table 1. Farmers’ forage fields recorded at evaluation time (after 18 months)

<table>
<thead>
<tr>
<th>No</th>
<th>Name</th>
<th>Plot size (m²)</th>
<th>Needs as perceived by farmers</th>
<th>Type of forage area planted</th>
<th>Participant</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>M. Arfah</td>
<td>45</td>
<td>Forage that is suitable with uncultivated land, rice field and maize field as a line fence and cover ground</td>
<td>Napier Grass, Calopo Centro, Gliricidia</td>
<td>Learning Group</td>
</tr>
<tr>
<td></td>
<td></td>
<td>23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>24</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>M. Datsir</td>
<td>21</td>
<td>Forage that can be grown in the maize or cotton field and vegetable garden</td>
<td>Centro, Napier grass and Gliricidia,</td>
<td>Learning Group</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>M. Anwar</td>
<td>12</td>
<td>Forage that is suitable with the stony land or under kapuk tree.</td>
<td>Napier Grass, Gliricidia</td>
<td>Learning Group</td>
</tr>
<tr>
<td></td>
<td></td>
<td>16</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Jamaluddin</td>
<td>24</td>
<td>Forage that is suitable for stony land (uncultivated land)</td>
<td>Napier Grass, Gliricidia, Calopo</td>
<td>Learning Group</td>
</tr>
<tr>
<td></td>
<td></td>
<td>12</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Bohari</td>
<td>15</td>
<td>Forage that can be grown in the rice bund.</td>
<td>Napier Grass, Gliricidia</td>
<td>Learning group</td>
</tr>
<tr>
<td></td>
<td></td>
<td>12</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Azis</td>
<td>15</td>
<td>Forage that can be grown in maize field.</td>
<td>Napier Grass, Calopo, Centro</td>
<td>Learning group</td>
</tr>
<tr>
<td>7</td>
<td>H. Baharu</td>
<td>24</td>
<td>Forage that is suitable to grow in the borders of maize or cotton field.</td>
<td>Napier Grass, Gliricidia</td>
<td>Learning group</td>
</tr>
<tr>
<td>8</td>
<td>Rasyid</td>
<td>16</td>
<td>Forage that can be grown in maize field</td>
<td>Gliricidia, Napier grass</td>
<td>Farmer</td>
</tr>
<tr>
<td>9</td>
<td>Mattoanging</td>
<td>14</td>
<td>Forage or fodder that is suitable to grow near cattle stall</td>
<td>Napier Grass, Gliricidia</td>
<td>Farmer</td>
</tr>
<tr>
<td>10</td>
<td>Syamsuuddin</td>
<td>13</td>
<td>Forage that can be grown near the houses</td>
<td>Napier Grass, Gliricidia</td>
<td>Farmer</td>
</tr>
<tr>
<td>11</td>
<td>Juma</td>
<td>15</td>
<td>Forage that can be grown in the cotton field as a border</td>
<td>Gliricidia, Leucaena</td>
<td>Farmer</td>
</tr>
<tr>
<td>12</td>
<td>H. Syamsuri</td>
<td>22</td>
<td>Forage that is suitable in the back yards and maize field</td>
<td>Napier Grass, Calopo Gliricidia</td>
<td>Farmer</td>
</tr>
<tr>
<td>13</td>
<td>Sangkala</td>
<td>12</td>
<td>Forage that can be grown in the stony land</td>
<td>Napier Grass, Gliricidia</td>
<td>Farmer</td>
</tr>
<tr>
<td>14</td>
<td>Syafaruddin</td>
<td>12</td>
<td>Forage that can be grown in the stony land</td>
<td>Napier Grass</td>
<td>Farmer</td>
</tr>
<tr>
<td>15</td>
<td>Wahid</td>
<td>28</td>
<td>Forage that can be grown on the field bund of rice field</td>
<td>Napier Grass, Gliricidia</td>
<td>Farmer</td>
</tr>
<tr>
<td>16</td>
<td>Alimuuddin</td>
<td>24</td>
<td>Forage that can be grown in the maize field as a border and near the cattle stall</td>
<td>Gliricidia, Napier grass</td>
<td>Farmer</td>
</tr>
<tr>
<td>17</td>
<td>Ishak</td>
<td>13</td>
<td>Forage that can be grown in uncultivated land</td>
<td>Napier Grass</td>
<td>Farmer</td>
</tr>
<tr>
<td>18</td>
<td>Hasanuddin</td>
<td>15</td>
<td>Forage that can be grown in the back yards near the cattle stall</td>
<td>Napier Grass, Calopo Gliricidia</td>
<td>Farmer</td>
</tr>
<tr>
<td>19</td>
<td>Hatti</td>
<td>11</td>
<td>Forage that can be grown in uncultivated land</td>
<td>Napier Grass</td>
<td>Farmer</td>
</tr>
<tr>
<td>20</td>
<td>Hajrah</td>
<td>14</td>
<td>Forage that can be grown near the house as a fence and can be used as firewood</td>
<td>Gliricidia, Leucaena and Napier Grass</td>
<td>Women farmer</td>
</tr>
<tr>
<td>21</td>
<td>Harun</td>
<td>16</td>
<td>Forage that can be grown near the cattle stall</td>
<td>Napier Grass, Gliricidia</td>
<td>Farmer</td>
</tr>
<tr>
<td>22</td>
<td>Rallu</td>
<td>20</td>
<td>Forage that can be grown around the maize field and uncultivated land</td>
<td>Gliricidia, Napier grass</td>
<td>Farmer</td>
</tr>
<tr>
<td>23</td>
<td>Ramasing</td>
<td>54</td>
<td>Forage that can be planted around the maize field, near the homestead, cover ground</td>
<td>Napier grass, Leucaena, Gliricidia, Centro</td>
<td>Farmer</td>
</tr>
<tr>
<td>24</td>
<td>Rahman</td>
<td>28</td>
<td>Under kapuk tree, uncultivated land near the maize field</td>
<td>Napier Grass, Gliricidia</td>
<td>Farmer</td>
</tr>
<tr>
<td>25</td>
<td>Amiruddin</td>
<td>27</td>
<td>Forage that can be grown near homestead</td>
<td>Napier Grass, Gliricidia</td>
<td>Farmer</td>
</tr>
<tr>
<td>No.</td>
<td>Name</td>
<td>Age</td>
<td>Description</td>
<td>Species</td>
<td>Role</td>
</tr>
<tr>
<td>-----</td>
<td>---------</td>
<td>-----</td>
<td>----------------------------------------------------------------------------</td>
<td>----------------------------------------</td>
<td>--------------------</td>
</tr>
<tr>
<td>26</td>
<td>Moding</td>
<td>36</td>
<td>Forage that can be grown around the maize field and uncultivated land</td>
<td>Napier Grass, Gliricidia</td>
<td>Farmer</td>
</tr>
<tr>
<td>27</td>
<td>Lamassa</td>
<td>45</td>
<td>Forage that can be grown near the house as a fence and can be used as firewood</td>
<td>Napier grass, Gliricidia</td>
<td>Women farmer</td>
</tr>
<tr>
<td>28</td>
<td>Duding</td>
<td>25</td>
<td>Forage that can be grown in the stony land</td>
<td>Napier Grass</td>
<td>Farmer</td>
</tr>
<tr>
<td>29</td>
<td>Sira</td>
<td>49</td>
<td>Forage that can be grown on the field bund of rice field</td>
<td>Napier grass</td>
<td>Women Farmer</td>
</tr>
<tr>
<td>30</td>
<td>Sangkala</td>
<td>20</td>
<td>Forage that can be grown in the maize field as a border and near the cattle stall</td>
<td>Napier grass, Gliricidia</td>
<td>Farmer</td>
</tr>
<tr>
<td>31</td>
<td>Baharu</td>
<td>21</td>
<td>Forage that can be grown in the cotton field as a border</td>
<td>Gliricidia</td>
<td>Farmer</td>
</tr>
<tr>
<td>32</td>
<td>Hamsir</td>
<td>25</td>
<td>Forage that is suitable in the back yards and maize field</td>
<td>Napier grass, Gliricidia, and Leucaena</td>
<td>Farmer</td>
</tr>
<tr>
<td>33</td>
<td>Amiruddin</td>
<td>16</td>
<td>Forage that can be grown in the stony land, and adjacent land in the field</td>
<td>Napier grass, Gliricidia</td>
<td>Farmer</td>
</tr>
<tr>
<td>34</td>
<td>Nusu</td>
<td>18</td>
<td>Forage that can be grown on the field bund of rice field, Around the field, cover ground</td>
<td>Napier grass, Gliricidia, Centro, and Calopo</td>
<td>Farmer</td>
</tr>
</tbody>
</table>
Appendix 5.

**Group Discussion on Well Being and Livelihood Analysis (refers to section 5.12)**

The aim of the group discussion was to gain information about the farmers’ perspective on their livelihoods and well-being, to understand the income and expenditure pattern of households and to facilitate farmers in the analysis of their farming systems. Furthermore, this meeting also provided an insight into how farmers categorise their households, as well as providing local definitions of well-being.

The meeting was held in *Kantor Balai Desa* (Village Office Hall) with 14 participants. The participants were representative of six sub villages plus the learning group. Myself and two members the research team facilitated the activity. In this activity we applied PRA tools in order to gain information about how the people categorised their household.

The participants started the discussion by analysing the criteria for what was to be considered a household. They then categorised well-being in terms of the house construction, and such as things as crops and animals owned, since these materials were tangible and easily identified. They categorised well-being into four categories: the rich, described as those who owned a permanent house, a motorcycle, and who owned more than 1 Ha maize, cotton and rice fields, more than 3 cows and horses as well as other forms of wealth such as television and radio. The medium category was those who owned semi-permanent houses, ownership less than one hectare of maize, cotton and rice field farms, ownership of livestock, no a motorcycle, no television but own a radio. The poor were described as those who owning houses which are constructed of wood and roofing with zinc or palm leaves, owned less than 0.5 hectare land, owned one cow or horse, and no radio. The poorest are those who do not have their own farm or livestock (*tesang* farmers) where the farm belongs to the rich people, they are employed by rich people to look after the farm) but owned a small numbers of chickens.

After the participants did the well-being exercises, we asked the participants to analyse their livelihoods. This livelihood analysis helped the participants to understand their income and their household expenditure and also to understand about the seasonality of stress in their livelihoods. The participants were asked to write their sources of income, the number of their family in the house, land owned, and number of livestock owned. We also asked them to write their opinion what the have learned after
they analysed their farming, maize farm, cotton farm, rice farm and livestock. In this exercise we facilitated the farmers to analyse their farm income. For example, how to distinguish between input and output, how to calculate the output, etc. The summary of the livelihood analysis is presented in the table 1.

Table 1. Livelihood Analysis done by farmers

<table>
<thead>
<tr>
<th>HOUSEHOLDS</th>
<th>Jamaludin</th>
<th>Datsir</th>
<th>Anwar</th>
<th>Arfah</th>
<th>Bohari</th>
<th>Asis</th>
<th>Hatti</th>
<th>Wahid</th>
<th>Samsur</th>
<th>Ishak</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Men</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>b. Women</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>c. children</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>2</td>
<td>4</td>
<td>5</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>

Animal Owned

| a. Cattle | 1 | 1 | 1 | 2 | 1 | 1 | 2 | 1 | 2 | 1 |
| b. Goat   | - | - | - | - | 1 | - | - | - | - | - |
| c. Horses | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 |
| d. Buffalo| - | - | - | - | - | - | - | - | - | - |
| e. Chicken| 7 | 15| 9 | 14| 10| 18| 12| 6 | 13| 11 |

Sources of income

<table>
<thead>
<tr>
<th>Monthly (Rupiah)</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Agriculture</td>
</tr>
<tr>
<td>- maize</td>
</tr>
<tr>
<td>- cotton</td>
</tr>
<tr>
<td>- rice</td>
</tr>
<tr>
<td>b. Livestock</td>
</tr>
<tr>
<td>d. labour</td>
</tr>
</tbody>
</table>

The table shows that farmers earn cash mostly from maize and cotton sales, and a small amount from estate crops such as cocoa and cashew. Most of the farmers plant paddies just for home consumption even though two of them sold half of their paddy yield for cash money. The farmers raised animals only for part time activity or for savings and labour, although some of them have started to raise cattle for cash generation purposes. The farmers sold their cows if they needed cash money for urgent purposes such as education, marriage, religion ceremony and medical treatment.

It was revealed in the group discussion that farmer experienced economic stress during the period of the dry season which usually occurred from August to December. Farmers spent most of their money during the period of the planting season, and also related to religious activity such as during *ramadhan* and *Idulfitri*. Farmers also found that they spent a lot of money in periods of illness where there was a need to spend for medical expenses. They found that illness was a main cause of vulnerability. This was because during that period they could not look after their farm; as well, they had to spend money on medicine. The farmers’ income peaked in July and March with higher sales of maize and cotton however, it depended on the yields they got on the market price. During this period of income peak, usually they go for saving money to prepare
for the next planting season or buy new clothes. Most farmers mentioned that it was hard for them to invest their farm; extending their cultivated land and buying more livestock such as cows or goats.

In addition, farmers mentioned that it had become important to improve their skill in raising livestock. Crop farming alone did not provide enough cash or food, particularly when faced with a poor harvest and unstable market prices thus they needed a supplements for periods of financial stress. With more access to credit it would help them to established activities to enhance their income.

**Learning outcomes from group discussion on well-being and livelihoods analysis**

The participants showed a lot of interest in calculating their farm practices. They realised how important it was to keep records about their farming. Previously, they never calculated or recorded their expenditures, they just followed their simple lives.

The use of this participatory approach to a group discussion demonstrated that well-being and livelihood analysis methods were effective in giving participants an understanding of their situation and their livelihoods as well as the possibility of finding ways to improve their income. This not only provided information on the distribution of households according to well-being, but also provided insight into the basis of this classification, and how the households were differed.

Participants also imparted their perceptions about what well-being meant which were:

- having yield surplus to sell for cash to buy other necessities and for schooling the children.
- having enough food from their own farms for feeding their household members
- maintaining good health so they could work and sustain their livelihood.

The three factors mentioned above indicate how farmers relied on their own food production for gaining a better life. However, crops production alone did not guarantee a sustainable income.
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