FINAL REPORT

(due on completion of project)

Part 1 - Summary Details

Cotton CRC Project Number: 3.02.20

Project Title: Understanding the value added by vocational training investment in the cotton industry.

Project Commencement Date: 1/07/2011 Project Completion Date: 28/02/2012

Cotton CRC Program: Human Capacity

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Part 3 – IP and In-kind

Since the November 2011 6 monthly report, please outline the additional IP and in-kind that has been generated in the project.

1. Intellectual Property developed within the project.
None

2. Project In-kind
The only in-kind contribution consisted of 12 interviews averaging 1.5 hours with farmers and industry stakeholders.

Cotton Growers:
Barb Grey
Robert Carter
Richard Dousett

Development team were:
Mark Hickman (DEEDI)
Duncan Weir (DEEDI)
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VET sector
John Bird (DEEDI)
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Cotton Industry (all 3 hours)
Bruce Pyke (CRDC)
Ken Flower (CRC)
Yvette Cunningham (CRC)

Part 4 – Final Report Guide (due at end date of project or 31st May 2012)

Extension Opportunities

- Detail a plan for the activities or other steps that may be taken:

In the short term, there is the opportunity to invest in some practical case studies of current farm level employee development practice. This could include the collection of labour metrics for the farm enterprise, a skills audit of current employees and a training program based on a skills gap analysis. These case studies could be used to

create awareness of the potential for measuring and managing training of employees through publications such as Spotlight or the industry conference.

There has been interest expressed by the VET sector in supporting an action learning process with cotton growers that explores the practical application of the concepts of identifying and measuring the value of employee capacity development. This would involve pilot groups working at regional scales to share their current practice of employee skills development, test the proposed metrics of valuing training, develop a training plan based on their enterprise needs, create awareness of options to meet their training needs and work with the VET sector to describe what a constructive training partnership would look like.

Publications

Presentations (conference, field days, workshops etc)

Presented at the Cotton CRC Science Forum, March 2012.

Part 5 – Final Report Executive Summary

This project has sort to identify the potential to measure the value added from training of on farm employees. This has been achieved by reviewing the literature on valuing training and interviewing industry stakeholders to develop an understanding of the training system. Once the system was defined, opportunities to measure and improve the systems were identified.

There is significant diversity in the labour productivity metrics such as area per employee (174ha to 290ha per employee), bales per employee (1260 to 2290) and cost of labour per bale ($23 to $36). These differences do require further analysis to allow meaningful benchmarks as machinery assets and use of contractors for farming and picking impact them. Although there are challenges to compare metrics between farms, in their current form they do provide useful measures for the same farm over time.

The process of shifting employees towards their productive potential will require an understanding of the specific skills required for cotton production tasks on farm. The Cotton Basics course provides a logical breakdown of the task that are impacted by employee capacity. This project recommends that the Dreyfus Model of skills acquisition be used as scale of capacity for each of these tasks. By breaking down the employees role and ability to specific tasks and skill level, capacity development can be targeted and value to the farm business quantified.

Realising value from training is not limited to the quality of the training event. Current training evaluation research has identified pre training attitude and post training application as more critical to realising value than the training event itself. This emphasises the role of the employer making clear the need for the training and how it will impact the farm enterprise, and post training re-enforcing the new skills and knowledge through practical application. This is very difficult if the training provider does not know the particular skills needs of the farm business, or the employer does not know what the trainer is providing.

Ultimately, the value of this research will be realised by growers and farm managers improving the productivity of their enterprises by attracting and developing the people who work on their farms. It would be useful to have a fuller understanding of the skills and attributes that are valued, the relationship of these skills and attributes to specific farm practices, and the current practice of employee capacity development.

There are currently about 4,000 permanent employees on cotton farms, with many more seasonal and casual workers. The vast majority of training is currently done on farm. Initial analysis of production figures suggests a significant difference in contribution to farm productivity between employees, and therefore significant gains to farm productivity from employee capacity development.

For more information on this project, please contact Warwick Waters on 0437 937074 or email watersw@internode.on.net.

Cotton Industry Value of Training

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Abbreviations

AACC	Australian Agricultural College Corporation
AQF	Australian Qualification Framework
ASQA	Australian Skills Quality Authority
CA	Cotton Australia
CRDC	Cotton Research Development Corporation
DEEDI	Dept of Employment, Economic Development and Innovation
DEEWR	Dept of Education, Employment and Workplace Relations
DET	Department of Education and Training (NSW and QLD)
ISC	Industry Skills Coucils
JNP	Job Network Provider
NQC	National Quality Council
NTIS	National Training Information Service
NSSC	National Skills Standards Council
RDA	Regional Development Australia
RTO	Registered Training Organisation
RPL	Recognition of Prior Learning
QRITC	QLD Rural Industry Training Council
STA's	State and Territory Training Authorities
TAFE	Technical and Further Education
VET	Vocational Education and Training

Introduction

The Australian Cotton Industry is facing similar workforce issues to other rural industries of attraction, retention and development of its workforce. A specific component of that broader issue is the role of employee training. This project is a pilot study, based on work in the New Zealand dairy and beef industries, looking at the potential to quantify the value of employee training to the cotton industry. Cotton industry context has been provided through twelve semi-structured interviews with growers, members of the cotton development team, vocational training funders and providers, and industry leaders.

This report aims to do four things: First, it will explore the current system of training to identify potential areas where value can be considered and measured. Then it will consider previous research into measuring return on investment for training to provide a theoretical basis for a model to measure the value of training in the Australian cotton industry. Third, based on the current system and the proposed model, practical steps towards measuring the value of training will be proposed. And finally, recommendations for improving the employee training system will be suggested based on the feedback of the interviews conducted.

The scope of this project is firmly focused at the farm level. It sits within a wider context of workforce issues of which schools programs and the skills development of growers and service providers are closely linked. This report acknowledges the work of organisations such as the Primary Industries Centre for Science Education (PICSE), the gateway schools project, the UNE Cotton Production Course, myBMP Certified Farm Manager process among others. While there will be some overlap with these programs, the focus will be on the capacity building of existing cotton farm employees.

Summary of Recommendations

Recommendation 1: *That an economic analysis of the farm business data be conducted to see if agreed labour metrics could be calculated that are standardized for tractor size and contractor costs.*

Recommendation 2: *To help identify and prioritise training needs, the cotton industry should provide a clear description of expected standards for each level of skill acquisition for relevant tasks. It should also define industry standards for the minimum competency standards for different classes of employees.*

Recommendation 3: *That the cotton industry continues to innovate and develop career path options that allow employees to develop with the business, acknowledge the reality of competition from other sectors such as mining, and can articulate a positive case for employment in the cotton industry.*

Recommendation 4: *That pilot grower groups, as an action learning exercise, develop an individual capacity building program for their employees that includes target levels of skills acquisition for specific tasks, timeliness of training input, preferred training providers and specific productivity results.*

Recommendation 5: *The VET sector is motivated to better understand the training needs of the cotton industry. Currently, this relies on the input of a few industry representatives and an external skills auditing process. By industry working with growers and managers to identify and implement employee capacity building, they should be able to develop constructive feedback loops to the training sector on needs, ideas for improvement and what is working well.*

Recommendation 6: *Work with the VET sector to see if changes can be made to allow collection of industry data on number of cotton farm employees being trained and the competencies being delivered. Currently, it is not possible to identify how many VET trainees are working on cotton farms or to know what units of competency they are completing. There is also no formal system of identifying if there are multiple employees from the same region seeking the same training that could be more cost effectively delivered as a group.*

Ultimately, the value of this research will be realised by growers and farm managers improving the productivity of their enterprises by attracting and developing the people who work on their farms. It would be useful to have a fuller understanding of the skills and attributes that are valued, the relationship of these skills and attributes to specific farm practices, and the current practice of employee capacity development.

With or without this industry intelligence, an action research process could be implemented with pilot groups of growers. They could assess the development potential of their employees, and develop training strategies that included input from individuals, industry and the VET sector. These groups would be well place to provide input and feedback on the potential of practically measuring changes in employee value and recommend options to innovate current training practice.

Section 1- Background to the training system in Australia

There are three main areas of the employee capacity development system that will be addressed in this report. The first is the vocational training system, the second is other industry and informal off farm training and the third is within the farm business.

The Vocational and Education Training (VET) System

There are a number of organisations at federal, state and industry level that contribute to the functioning of the VET sector. To help provide an understanding of how the system works, a list of definitions is provided in appendix 1 to explain the important components of the system. Below is a discussion of the various elements of the Vet system at federal, state and industry level.

Federal Level

Skills Australia is the peak federal body that oversees vocational training in Australia. They oversee a federally standardized process of competency standards, assessment and qualifications. They support eleven Industry Skills Councils, which provide intelligence on current and future skills needs for the industries they represent. Agricultural industries are represented by Agrifoods Skills Australia. The role of Agrifoods Skills Australia is:

"Complementary to its vision of 'sustainable economic growth of agrifood industries through world class capabilities', AgriFood's role is to:

- provide industry intelligence and advice to industry, governments and Skills Australia on workforce development, skills and labour needs – which includes an annual Environmental Scan on the factors shaping and impacting on agrifood industry workforce development;
- provide independent skills, workforce, education and training needs advice to enterprises, matching identified needs with best-practice solutions (including facilitating PPP training places);
- advise governments on VET reform and related policy impediments;
- continuously improve Training Packages and their implementation in delivering job-ready people and enhancing enterprise capability." (http://www.agrifoodskills.net.au/aboutus/)

Also at the federal level is the Australian Qualifications Framework (AQF), which is overseen by the Australian Qualifications Framework Council (AQFC). This body oversees the qualifications standards for all education sectors, of which the Vocation Education and Training (VET) sector is a part. More specifically, the Australian Skills Quality Authority (ASQA) has the responsibility of:

- Registering training providers as RTO's.
- Recommending RTO's that can train international students (CRICOS).
- Accrediting VET courses.
- Ensuring RTO's comply with standards, including carrying out audits.

The ASQA was created in July 2011 and at this stage it does not have jurisdiction in all states and territories. It currently operates in NSW, and will operate in Queensland later in 2012. The relevant federal government department is the Department of Education, Employment and Workplace Relations (DEEWR).

State Level

At a state level, there are Departments of Education and Training (DET) for NSW and Queensland, the Queensland Department of Employment, Economic Development and Innovation (DEEDI) and the NSW Department of Primary Industries play a role in the process of facilitating industry input into the training packages and units of competency on offer. They also have direct input into state run training providers. It is at this level that individual industries have their greatest opportunity for input into the VET process organisations such as Cotton Australia and Queensland Farmers Federation providing representation.

Industry Level

At an industry level, cotton has chosen to predominantly deal with two training providers to develop industry specific training packages. These are Tocal College in NSW and the Australian Agricultural College Corporation (AACC) in Queensland. These partnerships have developed out of a responsiveness of AACC and Tocal to tailor training to the needs of the cotton industry. They had developed cotton specific qualifications as summarized in Table 1.

TABLE 1: Examples of formal cotton training supported by the VET sector.

Certified BMP Farm Manager	Cotton Basics	Technical Industry Training
Monitor and manage Business operation	Establish cotton crops	ChemCert
Manage risk	Maintain and monitor environmental work practices.	IPM Short Course
Develop and manage a chemical strategy	Maintain cotton crops	Field to Fabric Short Course
Manage enterprise OH&S	Perform specific machinery maintenance	Cotton and Grains Irrigation Course
Manage staff	Pick cotton crops	
Plan for and manage long term weeds, pests and disease		
Manage agricultural crop production		
Develop and use a sustainable land use plan		
Develop and use an irrigation and drainage management plan		

Enterprise Level

At an individual level, and employee or employer will make a consumer decision about which Registered Training Provider (RTO) will best suit their needs. An RTO can be government, privately or industry run, as is the case with the National Centre for Dairy Education Australia (NCDEA). Although there are significant advantages in the employer being involved in the VET process, it is not required, and some employees will choose to train without their employer knowing. This is sometimes the case where the employee is seeking a different job and requires training to do so. The RTO is obliged to keep the trainees information confidential if requested by the trainee.

At the RTO level, there are four funding streams:

1. VET revenue general is provided by the state government. Each unit of competency has a nominal number of hours for a person to complete. The trainee contribute $1.45 per hour (in Queensland) to the delivery of each competency.
2. If costs are greater than what is covered by general revenue (due to less students or a remote location), a fee for service with employers can be arranged.
3. Under a User Choice agreement, a contract is developed between a trainee and an employer, usually an apprenticeship.
4. Direct contracts can be negotiated between a number of clients who want a particular skill or recognition of prior learning. This could be a community program, corporate client or an industry. Indigenous communities often have separate funding for VET services.

Within an RTO the key roles are:

- An instructor who delivers the course and conducts the assessment. They may not do all of the training and can bring in skills as required. As a minimum, a Cert IV in Training and Assessment is required to be an instructor, although they can supervise others without a Cert IV TA to deliver specific training. The quality of the instructor can have a significant influence over a clients decision to use a particular RTO.
- A training coordinator will work with individual employees and employers to develop training plans to best suit the needs of the clients. These plans can align to existing training packages, or consist of specific units of competence required. A training coordinator can do a gap analysis of enterprise skills needs and current skill sets of the employees.
- A business development officer has a more sales oriented role of promotion and product development.

From the interviews conducted, there was consistent feedback that there is a low level of understanding of and motivation to use the Vocational Education and Training (VET) system in the cotton farming community. Although the VET sector and the cotton industry would like to improve the impact and effectiveness of structured training for cotton farm employees, the ultimate decision to engage rests with the growers and their employees seeing the value of training outweigh the costs (like time spent off farm and the cost of training). The next section looks at the theory of establishing the Return on Investment

(ROI) from training, and proposes a model establishing a value of training that may be adapted to agricultural industries.

As well as the VET sector, the cotton industry has a strong culture of industry developed and delivered training. Being grounded in the theory of extension and adult learning, this training is more focused at practice change than assessable change in competency. Advantages of the industry training approach are that it is often demand driven, timed to match seasonal information needs and delivered in small specific blocks. Traditionally this training has been targeted at growers, although it could be adapted to target employees if the demand warranted it. There has been a crossover between industry and VET sector training, with some industry training providing the option of assessment to contribute to a formal qualification.

Currently, the majority of employee capacity building occurs on farm in an informal manner. This embedded culture will not change easily. The approach that a grower takes to managing the development of employees will be influenced by their own experience of skills acquisition as well as years of action learning from having to make daily decisions about how to manage their employees. Unfortunately, this could be "throw them in the deep end and see if they survive" in some cases. In other cases there may be methods and techniques of on farm training that growers have developed that should be recognized and promoted as best practice.

This is a part of farm management that growers have been left to work through themselves, with the stakeholder interviews providing little evidence of industry support for HR training in the past. The stakeholder interviews also identified cases where there had been negative experiences with the VET sector in the past, which would have to be overcome if off farm training was to be considered as an option. Another issue identified is the case of longer-term employees with good farm management experience but little HR experience being suddenly required to supervise and manage staff.

Section 2 - Measuring ROI of training

Key elements of ROI measurement

How do you place a value on improving the skills and knowledge of cotton farm employees? The classic economic method of Return on Investment (ROI) would analyse the same economic system with and without training, and divide the cost of training by the difference between the two. This may be possible in a shoe factory with tightly controlled inputs and outputs and the ability to run production units in parallel with few other variables. Farming systems are a different story. They are complex, variable and difficult to monitor. For this reason, there has been limited research into the value of training beyond the training event in agriculture. However, it is useful to explore the background of training ROI theory to inform the decision of how the cotton industry can continue to improve employee training.

Historically, training has been measured from the perspective of what happened during the training program: did the participants enjoy the experience; was the content relevant; did learning occur? In the last ten years there has been a paradigm shift from training for activity to training with a focus on bottom-line results (Phillips, 2003).

The literature (Phillips, 2003; Rylatt, 2003) generally attributes the beginnings of research into ROI on training to Donald Kirkpatrick who, in 1959, developed an evaluation model for training programs. More recently, ROI methodologies have expanded from Kirkpatrick's four step model to five, six and in some cases seven step models. The aspect in common among the more recent models of ROI is that the additional steps are concerned with strategies for calculating return on investment, a facet Kirkpatrick did not address. None of these models was specifically designed for assessing ROI on agricultural training.

As stated, Kirkpatrick's 1959 ROI methodology involved four steps or levels: reaction; testing; transfer of learning to the workplace; and results. Subsequent models (Phillips, 2003) have added a fifth level which pertain to converting data to a monetary value, and some recent models (Kearns, 2005; Phillips, 2002b) include the equivalent of a sixth level which pertains to communicating the result of the ROI to clients and stakeholders. Rylatt (2003) argues for the inclusion of two new levels in ROI methodologies: sustainability and shared purpose. As discussed below, these two new dimensions have to do with ensuring lasting success for the good of the individual, the company and society as a whole.

Levels one and two can be carried out at the time of the training, but levels three and four must be measured when participants return to the workplace. This requirement presents challenges in the case of agricultural training where the participants return to their individual, geographically spread workplaces. Levels one and two are relatively easy to carry out, but levels three, four and

particularly five, where data is converted to a monetary value, present many challenges to practitioners (Phillips & Stone, 2002). In the case of agricultural training these steps are complicated by factors such as the difficulty of collecting both hard and soft data pre- and post-training, and the lack of control over whether the participants get to utilise their new knowledge when they return to the workplace.

Talk of ROI methodology invariably includes discussion on identifying not only tangible but also intangible benefits and whether these should be considered in ROI calculations. Misko (2001) argues that most successful training programs result in some intangible benefits. Misko describes intangible benefits as positive results that either cannot be converted into monetary values or would involve too much time or expense in the conversion to be worth the effort. Intangible benefits can include such things as effects on teamwork, job satisfaction, communication and customer satisfaction. Phillips and Stone (2002) argue that intangible benefits should be measured and reported as part of the ROI methodology.

One question asked of most ROI methodology is how to ascertain whether it is actually the training that is making the difference. Some methodologies (Kearns, 2005; Phillips & Stone, 2002) discuss the use of a control group to identify the variables that affect training and its outcomes, but in the case of agricultural training this is probably not feasible. Kearns (2005) argues that the more specific you are about the purpose of the training, the business needs and the needs of the individual, then the less you should worry about attempting to separate the variables unless you are very experienced at training assessment and need this level of sophistication.

Given these requirements for ROI methodology, the next step was to look at what ROI models exist and which ones held potential as models that could be used to inform assessment of ROI on cotton vocational training.

Return on Investment Models

As stated, the literature review identified no models that specifically pertain to ROI in agricultural training in Australia or overseas. Therefore, this necessitated the search for ROI models from other industries and disciplines that held potential for assessing ROI on cotton vocational training. In order to think about how ROI in agricultural training might be undertaken, it was necessary to consider several models from business management and improvement. This was to either identify the model that most closely align with agricultural training or to synthesise and adapt strategies from several models into a model that took account of the cotton industry training environment.

The models that appeared to hold most potential for this purpose were: Moonen (2003); Phillips (2003); Kearns (2005); and Rylatt (2003). The purpose of this section is to provide a brief explanation of each model and discussion on why it might be useful to consider when contemplating how to assess ROI on agricultural training.

Moonen's (2003) model provides a simplified approach to ROI, but more importantly sets a platform for discussion about the value of certain aspects of ROI in training. Moonen discusses six basic principles of ROI and then provides procedures to calculate ROI, with a case study in his method's application. The case study considers how to calculate three perspectives: economic, quality, and efficiency. These perspectives align with the principles and levels of both the Kirkpatrick and Phillips models. This model is worthy of consideration because it provides a starting point for discussion that could lead to more explicit thinking about the value added by training.

The second model, Phillips (2003), is founded on the principles and steps of Kirkpatrick's levels of training evaluation. Phillips adds a fifth level, return on investment. Thus the model consists of: level one, reaction/satisfaction; level two, learning; level three, application; level four, business impact; and level five, return on investment. Phillips includes a sixth unofficial level, reporting. The Phillips model provides a very comprehensive and useful discussion of the ROI process, the levels and the techniques that can be used to collect, process and analyse data. In particular, the discussion on calculating return is very full and well explained. This model also considers the issue of intangible outcomes and whether these should have a monetary value ascribed to them. A final benefit of this model is the section on communicating results. In this section the principles of communicating results are discussed and information and case study examples are provided on strategies and techniques to put the principles into practice.

The third model of ROI worthy of consideration for the agricultural training context was developed by Kearns (2005). It builds onto and expands the earlier principles of Phillips. In particular, Kearns makes the key points that: training evaluation can be a simple subject if you keep it simple; evaluation should be considered before the training; and that evaluation methods need to take account of whether the training is intended for 'basic' or 'added value' purposes.

In response, Kearns developed a model of ROI that is very firmly focused on the value training can add to individuals and organisations. He makes the point that value added implies much more than just financial return. To achieve this, his model places particular emphasis on gathering baseline data, data to ascertain whether the learning is being applied at work, and then conversion of this data into a monetary value. Kearns provides techniques, strategies and discussion points about how these steps might be accomplished.

Rylatt's (2003) model brings two new dimensions to the discussion of ROI: Sustainability and shared purpose. While the models of Kirkpatrick and Phillips provide a sound basis for thinking about ROI, Rylatt argues, sustainability and shared purpose must be considered in a world that emphasises greater accountability to business, social, environmental and economic goals.

By sustainability, Ryatt is referring to attention being paid to not only the change itself but also to the context and environment of the change, so that the capabilities and competencies being learnt are actually helping a business prepare for the future. His notion of shared purpose refers to evaluation, which

asks whether business knowledge is adding value and helping others – suppliers, customers, partners and society as a whole.

Table 2 is an attempt to summarise the key elements of the different approaches to ROI explored.

TABLE 2: A summary of the levels of training evaluation suggested in the liturature.

Author	Date	Level	Description
Kirkpatrick	1959	1	Reaction to training at the time of training
		2	Testing of learning at the time of training
		3	Transfer of learning to the workplace
		4	Result of training evident in the workplace
Phillips	2003	5	Conversion of results to a monetary value
Kearns	2005	6	Communication of the value of training to clients and stakeholders
Rylatt	2003	7	Sustainability aspects of training to the individual, company and society quantified
		8	Shared purpose of training
Moonen	2003		Proposed a simplified and achievable approach that builds on available quantifiable data, then uses qualitative indicators of change. This does not provide an absolute return of investment, but helps organisations identify the aspects of training that need to be focused on for improvement.

Reflections on the challenge of measuring ROI for agricultural training

The literature cautions us that assessing ROI can be difficult, complex, time-consuming and that it is often poorly done (Phillips, 2002b; Parry, 1997b). Phillips and Stone (2002) speak of the difficulties of 'selling' the ROI process to members of the training team. They caution that organisations are likely to experience resistance to the notion of ROI from staff members who may feel threatened by discussion of accountability.

They also speak of the importance of professional development for staff members who are to implement the ROI process. The literature review for this research identified many models of ROI, some quite complex and others which adopt more simple approaches. However, all of them require a high level of understanding of the principles of learning and evaluation. Therefore, staff members will likely require professional development to enable them to implement effective ROI measurement.

This point is particularly pertinent to discussion and evaluation of ROI in agricultural training. Where there are no ready-made models that can be applied, it is a matter of identifying the best model from the general field of performance improvement and adapting it to fit, taking cognisance of the unique features of agricultural training.

Finally, implementing an effective ROI process is time-consuming (Parry, 1997b). The five or six steps involved, depending on which model is used, require considerable input of time, especially at the higher levels of four, five and six. Parry (1997b) cautions that to attempt to cut down time input at these levels could well lead to less than effective ROI results.

A Model for Measuring Value Added

As distinct from a strict ROI, looking to measure the value added by training follows the suggestions of Moonen (2003) and Rylatt (2003) of not getting over complicated or bogged down in too much detail. We can also draw in the work of Brinkerhoff (2001) who identified that the general adoption of good adult learning principles into modern training process, the main opportunities for improvement are mostly in the pre and post training environments. This means placing a greater focus on the motivation of the trainee before the event (whose idea is it, what do they want out of it etc) and application of the learning post event. He suggests that the majority of the benefit from training is lost if it is not re-enforced within two weeks following the training event. The importance of the pre and post training process firmly points to the importance of the employer or manager in the training process.

The model proposed for measuring value added from training in agriculture involves:

1. Identifying **who** receives value from training. This provides us with the units of measurement such as time, money, safety record, years retained in one enterprise etc.
2. Identifying **what** parts of the farming system an employee has an influence on, and what proportion of the enterprise they influence.
3. Identifying **how** training or skills acquisition makes a difference to the outcomes of the relevant parts of the enterprise.
4. Once the relevant components of the farm system are identified and some scale of influence of skill level is proposed, options to measure the impact of training on the shift in skills acquisition are explored. These may be quantitative, such as a measurable amount of time that supervision is required, or qualitative, such as the attitude towards caring for machinery.

Based on this model and with feedback from industry stakeholders, Table X provides a starting point for the refinement of an on farm model for measuring the value of training to the Australian cotton industry.

Table 3: Stakeholder feedback on the potential sources and measures of value from training.

Who Receives Value	Sources of Value	Measures of Value
Employee	Career progression Increased income Job security Social contact with other trainees	Income Job satisfaction Career intentions

Farm Enterprise	Farm Productivity Staff retention Compliance Safety Personal satisfaction of building capacity in others. Decreased stress	Reduced time for managers spent on lower order tasks. Reduced time needed to supervise. Increased productivity Increased profit
Cotton Industry	Pool of skilled employees Succession potential	Number of farms needing more staff. Number of environmental breaches. Positive image of industry.
Cotton Communities	Improved economy Transferable skills Reduced unemployment	Community services supported (health, education)

Following the principle of keeping the model simple, the next section will consider the value that can be measured within the farm enterprise. It will focus on tasks that an employee has influence over and the impact that skills acquisition has on these tasks.

Section 3 – A business case for training employees

As mentioned in the introduction, this report will consider value at the four levels of the individual employee, the farm enterprise, the cotton industry and the wider community. These are really four different scales of organization, with any benefit at the smaller scales flowing through to the larger scales.

Farm Enterprise Context

When considering the business case for training employees, it helps to break down the context they are operating in. To frame this discussion, the financial analysis by Boyce & Co of the 2005-06 season will be used. While they provide a guide for the discussion, it is not suggested that these figures be used as benchmarks of good or bad performance. The top and bottom 20% were identified based on profit, so the metrics quoted will be in the profit context, not necessarily the top and bottom of labour management metrics. The aim is to identify the measures an individual farm may explore to monitor performance over time. Area of cotton grown, production and basic financial results are shown in Table 4.

TABLE 4: Basic financial measures of the comparative farm groups

	Average	Top 20%	Bottom 20%
Hectares grown	936	921	640
Yield per hectare	9.9	10.5	9.0
Cost of production per bale	$337	$235	$458
Operating profit per bale	$42	$158	($51)

The next step is to look more closely at measures of labour within these groups.

Table 5: Indicators of the labour component of the farming system for the sample groups.

	Average	Top 20%	Bottom 20%
Average number of employees	5	3.2	3.6
Employee wages total	$306,000	$227,000	$211,000
Contractor picking and farming	$252,000	$131,000	$294,000
Employee wages per bale	$32	$23	$36
Contractor costs per bale	$27	$14	$50

To make sense of these figures, some thinking around the factors that enable an employer to realize a production benefit from their employees is required. As previously mention, cotton farms are complex and variable systems and caution should be exercised when comparing metrics. This project is focused on understanding the role that employee capacity has on the production system, but to do so, other physical and managerial factors need to be considered. These could include:

- The machinery assets on the farm
- The physical resources of soil, topography, water availability etc.
- The production management ability of the farm manager (skill, knowledge, timeliness etc.)
- The people management ability of the manager (communication, teamwork etc.)

The financial and production figure provide some insight into these variables (Table 6).

Table 6: Production statistics on a per labour unit (LU) basis.

	Average	Top 20%	Bottom 20%
Hectares grown per LU	185	290	174
Bales grown per LU	1547	2299	1260
Tractor horsepower per LU	127	205	101
Picker heads per LU	0.76	1.10	0.00
Average wage per employee	$61,000	$71,000	$58,000

It can be seen from Table 6 that there are significant asset difference between the comparative farms, with double the tractor horsepower available to each labour unit on the top 20% farms compared to the bottom 20%. While the extra horsepower may reduce variable costs in normal years, it will have implications on debt servicing and risk of highly asset-geared farms during droughts due to less flexible cost structures. The top 20% farms pay significantly more per employee. It would be interesting to know from these employers what employee attributes justify the extra costs.

Recommendation 1: *That an economic analysis of the farm business data be conducted to see if agreed labour metrics could be calculated that are standardized for tractor size and contractor costs.*

It is interesting to note that there are significant factors beyond the managers control that are influencing the profitability of the farm systems, with the obvious figure of water charges, which is $2.60 per bale for the top 20% farms and $62.00 per bale for the bottom 20% farms. Water charges alone accounts for about 90% of the operating profit per bale difference between the Average and Bottom 20%.

Key messages at a farm enterprise scale:

- There are some simple metrics of labour productivity that allow you to compare performance over time, such as hectares grown per LU, bales grown per LU and wages per bale.
- It is important to consider differences in farm system if comparing your farm to another, with significant variables including tractor horsepower per LU and the reliance on contractors for farming and picking. Comparing the same enterprise over time is more meaningful that comparing different enterprises.
- Labour productivity is not just about the skill of the employee and the infrastructure on the farm, management skill is also an important factor to assess and develop.

Individual Employee Context

At an individual employee level, the stakeholder feedback identified sources of value such as increased income, job security and career progression. To provide

a common language to describe what changes in an employee as they progress through a career and develop their capacity, a model of skill acquisition will be described and the implications for training explored.

In the VET system, a person is assessed as being competent or not to carry out a task. When considering the impact of the individual employee on the productivity of the farm, it is useful to think of capacity as a scale rather than an absolute yes or no. A common scale proposed by the Dreyfus Model of Skills Acquisition consists of five levels; novice, advanced beginner, competent, proficient and expert. A sixth level of mastery is also described, but this is extremely rare. Table 7 provides a summary of the key characteristics of each level of skills acquisition.

Table 7: The characteristics of the five stages of skills acquisition.

<table>
<tr><th>Stage</th><th>Characteristics</th><th>Recognition of relevance</th><th>How context is assessed</th><th>Decision making</th></tr>
<tr><td>Novice</td><td>Sticks to taught rules or plans.
No discretionary judgment.
Little perception of the situation.
Knowledge is explicit, or can be verbalized.</td><td rowspan="2">None</td><td rowspan="3">Analytical</td><td rowspan="3">Rational</td></tr>
<tr><td>Advanced Beginner</td><td>Begins to recognize patterns in the situation
Instruction now assumes some understanding of the context</td></tr>
<tr><td>Competent</td><td>The number of features in the situation that are now recognized becomes overwhelming, so goals and plans become important to simplify and focus performance.
Mental models are well developed to start ignoring the normal and identify the exception.</td><td rowspan="3">Present</td></tr>
<tr><td>Proficient</td><td>After multiple experiences of the consequences of actions and plans in a context, there is less conscious deliberation about actions and plans.
Knowledge is more tacit.</td><td rowspan="2">Holistic</td><td rowspan="2">Intuitive</td></tr>
<tr><td>Expert</td><td>Decision making is reduced to “knowing” by feel and familiarity.
Complex situations are intuitively managed, without the need for formal plans or goals.</td></tr>
</table>

Stage 1: Novice

Normally, the instruction process begins with the instructor decomposing the task environment into context-free features, which the beginner can recognize without benefit of experience. The beginner is then given rules for determining

actions on the basis of these features, like a computer following a program. For example, the student automobile driver learns to recognize such interpretation-free features as speed (indicated by his speedometer). Timing of gear shifts is specified in terms of speed.

Stage 2: Advanced beginner

As the novice gains experience actually coping with real situations, they begin to note, or an instructor points out, easy to understand examples of meaningful additional components of the situation. After seeing a sufficient number of examples, the student learns to recognize them. Instructions maxims can now refer to these new situational aspects. We use the terms maxims and aspects here to differentiate this form of instruction from the first, where strict rules were given as to how to respond to context-free features. Since maxims are phrased in terms of aspects they already presuppose experience in the skill domain. In our example of the driver, the advanced beginner uses (situational) engine sounds as well as (non-situational) speed. They learn the maxim: shift up when the motor sounds like it is racing and down when it sounds like it is straining. No number of words can take the place of a few choice examples of racing and straining engine sounds.

Stage 3: Competent

With increasing experience, the number of features and aspects to be taken into account becomes overwhelming. To cope with this information explosion, the performer learns to adopt a hierarchical view of decision-making. By first choosing a plan, goal or perspective which organizes the situation and by then examining only the small set of features and aspects that they have learnt are relevant given that plan, the performer can simplify and improve his performance. A competent driver leaving the freeway on a curved off-ramp may, after taking into account speed, surface condition, criticality of time, etc., decide he is going too fast. He then has to decide whether to let up on the accelerator, remove his foot altogether, or step on the brake. He is relieved when he gets through the curve without mishap and shaken if he begins to go into a skid.

Stage 4: Proficient

As soon as the competent performer stops reflecting on problematic situations as a detached observer, and stops looking for principles to guide his actions, the gripping, holistic experiences from the competent stage become the basis of the next advance in skill. Having experienced many emotion-laden situations, chosen plans in each, and having obtained vivid, emotional demonstrations of the adequacy or inadequacy of the plan, the performer involved in the world of the skill "notices," or "is struck by" a certain plan, goal or perspective. No longer is the spell of involvement broken by detached conscious planning.

Since there are generally far fewer "ways of seeing" than "ways of acting," after understanding without conscious effort what is going on, the proficient performer will still have to think about what to do. During this thinking, elements that present themselves as salient are assessed and combined by rule and maxim to produce decisions.

On the basis of prior experience, a proficient driver fearfully approaching a curve on a rainy day may sense that he is travelling too fast. Then, on the basis of such

salient elements as visibility, angle of road bank, criticalness of time, etc., he decides whether to let up on the gas, take his foot off the gas or to step on the brake. (These factors were used by the competent driver to decide that he is speeding.)

Stage 5: Expert

The proficient performer, immersed in the world of skillful activity, sees what needs to be done, but must decide how to do it. With enough experience with a variety of situations, all seen from the same perspective but requiring different tactical decisions, the proficient performer seems gradually to decompose this class of situations into subclasses, each of which share the same decision, single action, or tactic. This allows an immediate intuitive response to each situation.

The expert driver, generally without any attention, not only knows by feel and familiarity when an action such as slowing down is required; they know how to perform the action without calculating and comparing alternatives. He shifts gears when appropriate with no awareness of his acts. On the off ramp his foot simply lifts off the accelerator. What must be done simply is done.

Experts are rare, and often find it hard to articulate why they do what they do. They do not use simple rules that can be described to others because they are intuitively assessing a complex mix of factors in their decision making.

Assessing skill acquisition in the cotton production

In respect to the cotton production system, qualitative and quantitative assessments can be made of an employee's skill acquisition level for each of the key stages of the production system identified through the stakeholder interviews. This assessment could be refined and standardized across farm enterprises as agreement is reached on the definitions of each stage in the context of the specific management practice. For example, a novice tractor driver has less than one year experience, needs to be supervised at the beginning of each task to ensure the set up is correct and given specific instructions. A competent tractor driver probably has more than three years experience, can be left to carry out standard tractor maintenance, be given direction on the task required and set up the tractor and implement unsupervised.

Recommendation 2: *To help identify and prioritise training needs, the cotton industry should provide a clear description of expected standards for each level of skill acquisition for relevant tasks. It should also define industry standards for the minimum competency standards for different classes of employees.*

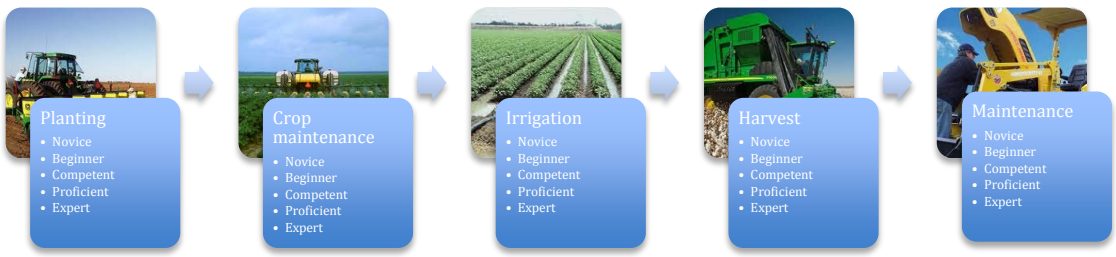
In an ideal world, all employees would be competent or better, but the reality is that people always have to start some time as a novice, and there is not a ready pool of competent recruits to choose from. This means that employers constantly have to manage employees through the process to a stage where the labour skill set matches the needs of the farming system. In some cases, it may seem like a never-ending battle to achieve the desired mix of competence and reliability in their employees.

The challenge for employers and the providers of training is that the preferred learning process changes as people move from novice to expert. For the novice and advanced beginner, a safe learning environment will allow them to ask the most basic questions and give them simple rules to follow. Competent and proficient learners are much more familiar with the context, so a safe learning environment for them can include assumptions of previous experience, context rich problem solving like case studies and challenges that require them to work out solutions for their own situation. It requires moving from general rules of thumb to specific solutions for their context (generally the farm business).

The Human Resource section of myBMP provides a useful template for assessing an employees performance at a range of tasks using a qualitative 1 to 10 rating systems. To develop this process to include a quantitative component it would require:

1. Industry agreed definitions of novice to expert skill levels to allow uniform classification of employees. This could be based on indicators such as level of supervision required, level of performance and consistency of performance. Employers may benefit from training in how to assess employee performance.
2. An understanding of the implications of skill level change, which will probably vary between task areas. As a staring point, the current employee skill level could be compared to the farm system skills requirement based on area of crop, machinery available and grower supervision and labour input. As an example, there may be more value in shifting skills in irrigation from competent to proficient than in harvesting.
3. Moving from a tactical (seasonal) to strategic (business growth) timeframe, what are the drivers for career development of employees to enable the farm business to meet growth and development goals. This may mean developing skills and ability in anticipation of transitioning employees.

The indication from the Boyce & Co financial analysis is that more profitable farms have fewer, higher paid employees, indicating higher skill and experience levels. Given the increasingly competitive labour market, the ability to "buy in" experience labour is decreasing, which places a greater priority on developing the capacity of the existing and available workforce pool.



Career Path

Over the longer term, the levels of skills acquisition translate to a career path. The on farm career path for cotton employees progresses from farm hand to

farm manager. There seems to be little potential to work towards farm ownership in the cotton industry. It was common for the stakeholder interviewees to classify two general types of employees; "tractor drivers", whose employment objective is a stable, hands on work with limited management or decision making responsibility, and a second group that were motivated to advance to more senior on farm positions. The suggested career pathway is:

There has been some feedback that it is preferable that those aspiring to be farm managers have a tertiary qualification, mainly for communicating with service providers and consultants. The difficulty is how to start a tertiary qualified employee in the system, where their initial skills level does not justify a professional level income. This provides a challenge for the industry to develop an entry pathway for tertiary trained employees into the on farm labour pool.

A second issue with career path is "buy in" to the industry. At this stage, retention of employees as they progress through the career path is on personal satisfaction with the job or the attraction of the community. There is no investment in capital assets that shift the path to a wealth creation strategy beyond a salary.

Finally, rate of progression along the career path has a significant impact on the value realized from skills acquisition. At an individual level, there is the obvious increase in income associated with career progression. At a farm enterprise level, the implications of rate of progress become more complex. If the farm does not have the capacity to utilize the increased capacity there is a risk that an employee may move on to another job where the opportunity of development exists.

One response to this challenge suggested in the stakeholder interviews was to flatten the management hierarchy. By removing layers of supervision and focusing on areas of interest and strength, they were able to continue to develop employees without creating more management positions, and allow employees to focus and develop in their own area of interest (such as building and maintenance or crop management). This change in HR structure includes ongoing conversations about job satisfaction and expectations to ensure employees are feeling motivated to stay.

Recommendation 3: *That the cotton industry continues to innovate and develop career path options that allow employees to develop with the business, acknowledge the reality of competition from other sectors such as mining, and can articulate a positive case for employment in the cotton industry.*

Key messages at an individual employee scale:

- Employees are an asset that allow up to 290 extra hectares to be grown, not a variable cost to me minimized.
- Employee capacity development will be influenced by their attitude and aspirations as well as the ability of the employer to facilitate development and the ability of the farm business to accommodate the increased capacity.

Industry Context

The capacity development challenge for the employer is to accurately identify where each employee is at and to have a goal of realistically where they should be. The next step is to decide how that skills acquisition is going to occur. The main options available are to:

1. Learn on the job (the most common response),
2. Utilize some form of formal training or education (not preferred or understood by many)
3. Utilize informal industry training programs (not necessarily targeting farm employees at this stage),
4. Try to find someone who has been trained up already by someone else.

The feedback from stakeholders supported the findings of the report on Regional Skills Development and the Agrifoods Industries 2010, which found:
"*In the cotton industry the main driver for grass roots growers is the skills needed to get the job done, not the qualification. For both employers and workers the focus is on building blocks of skills and experience. They struggle to differentiate between formal and informal learning. They think about field days, grower groups, and workshops, not TAFE and qualifications. These views have been confirmed by a recent set of structured conversations held with groups comprised of producers and farm services in four locations in June 2010 (Emerald, St George, Dalby and Narrabri)*."

The cotton industry has a rich history of providing targeted and effective training. Recently, steps have been taken to integrate industry training with the VET sector targeted at growers and managers. There appears to be an opportunity for the industry to provide similarly targeted training for employees, where this would have a direct impact on industry priorities such as water use efficiency. Directly targeting employees should also be considered in some cases where they are the main end users or implementers of new research and technology.

In summary, the farm financial data shows there is variability in employee performance, therefore opportunity to develop and improve employees. The Dreyfus model provides a framework for defining levels of skill from novice to expert and the implications of those levels on farm productivity. The career

pathway provides the practical expression of the skills acquisition levels in the cotton industry. By bringing together the financial data on employees with the impact of skills level on the farm enterprise on a seasonal timeframe (skills impact on farm tasks) and a longer term timeframe (career progression), the value of skills acquisition can be measured, therefore if training successfully changes skills, the value of training can be measured.

In the next section we will consider the enabling environment for value to be realized from the training of employees.

Section 4: Where to from here?

Once an employer has assessed their farm system to identify the number of employees and the skills needed to run the system, the capacity building process of bridging the gap between the systems needs and the current employee capacity needs to be considered. The objective of this capacity building process is not ultimately about training, it is about a material change in the way the farm business operates, which requires consideration of more than just the "training" part of the process. Let's begin by considering the employers themselves.

In an address to the 2010 CRC National Conference, Joanne Grainger identified the key employer attitudes that needed to change if the cotton industry was to improve in the area of attracting and retaining labour:

- Value training
- Understand the benefits of training
- To have some concept of the costs and potential returns of training
- To be aware of the training environment
- To be aware of the opportunities available.

These employer attitudes are critical to any process of improving the value realized from employee training.

A Grower Driven Response

Ultimately, the value of this research will be realised by growers and farm managers improving the productivity of their enterprises by attracting and developing the people who work on their farms. There is some indication of the skills and attributes that growers value from the small sample contacted in this project. It would be useful to have a fuller understanding of the skills and attributes that are valued, the relationship of these skills and attributes to specific farm practices, and the current practice of employee capacity development.

With or without this industry intelligence, an action research process could be implemented with pilot groups of growers. They could assess the development potential of their employees, and develop training strategies that included input from individuals, industry and the VET sector. These groups would be well place to provide input and feedback on the potential of practically measuring changes in employee value and recommend options to innovate current training practice.

Recommendation 4: *That pilot grower groups, as an action learning exercise, develop an individual capacity building program for their employees that includes target levels of skills acquisition for specific tasks, timeliness of training input, preferred training providers and specific productivity results.*

Engagement with industry and VET training

While engagement has been limited to date, there are significant benefits for the cotton industry of utilizing the VET sector. The rigorous, national and holistic curriculum should provide a solid basis for employee capacity development that can be tailored to an individuals needs. The hierarchy of qualifications effectively reflects the progression in skills acquisition from novice to expert as proposed by the Dreyfus Model, providing a practical framework for career development. They are also a resource of trainers and funding that the industry should seek to maximize.

Recommendation 5: *The VET sector is motivated to better understand the training needs of the cotton industry. Currently, this relies on the input of a few industry representatives and an external skills auditing process. By industry working with growers and managers to identify and implement employee capacity building, they should be able to develop constructive feedback loops to the training sector on needs, ideas for improvement and what is working well.*

Recommendation 6: *Work with the VET sector to see if changes can be made to allow collection of industry data on number of cotton farm employees being trained and the competencies being delivered. Currently, it is not possible to identify how many VET trainees are working on cotton farms or to know what units of competency they are completing. There is also no formal system of identifying if there are multiple employees from the same region seeking the same training that could be more cost effectively delivered as a group.*

Training Costs

As previously mention, there are several funding options for VET delivery. Matching delivery of training to industry needs is impacted by the preferred location of the training, the number of trainees, the type of trainees (new entrants or existing employees) and the qualification. If funding is on a fee for service basis, all these limitations can be overcome at the expense of the employers. If general revenue is relied on, then limitations of timing, numbers, location and flexibility of content become issues.

Other Factors

Role of Consultants

Consultants play a significant role in the cotton production system, with the average farm investing $57,000 in consulting fees (Boyce & Co 2007). The input from consultants centers on the crop management aspects of the business (weed and insect control, irrigation etc) rather than the human resource aspects. These consultants can still play an important part in helping employers in their training and up-skilling of employees by providing feedback on the impact of employee executed tasks on the productivity of the system.

Peak Labour Demand

Managing peak demand of labour in the growing season is a challenge. Some farm enterprises choose to employ permanent labour that is close to meeting their peak labour demand. This reduces stress and fatigue at peak times, but creates an oversupply during quieter times. It also creates an opportunity for employee capacity building during quieter times.

Supervision Time

At any stage of employee skills development there is a management tradeoff decision between risk of tasks not being executed correctly and management time to supervise the task being performed. As employee skill and experience increases, the time required by management to supervise is reduced. This reduction is supervision time should be factored into the value gained from skills acquisition.

Retention of Staff

There is debate in the cotton community of the relative contribution of training to employee retention. This will depend on the objectives and values of the employee and the capacity of the farm enterprise to utilize and reward increased skills.

One significant benefit identified from other agricultural industries has been the shift from a component to holistic view of the farm system. This shift has an impact on the motivators of personal mastery and sense of purpose. Employees have stated that the shift to a holistic systems understanding of the farm

enterprise has been significant in them seeing the value of their role and a way forward for their career in the industry. The tasks being performed are no longer seen as an end in themselves, but as a significant contribution to the whole farm enterprise. This is not only influenced by the skills and knowledge acquisition of the employee, bit also the willingness of the employer to share information on the whole farm enterprise.

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Appendices

Appendix 1 - Definitions

Training Package: A nationally endorsed set of competency standards, assessment guidelines and qualifications for a specific industry. They describe the skills and knowledge required to effectively perform in a workplace. The training package does not set out how the training is to be delivered, that is the role of the RTO.

Units of Competency: Define the units of skills and knowledge, and how they need to be applied to perform effectively in the workplace.

Accredited Course: Where industry, enterprise or community needs are not met by a Training Package, an Accredited Course can be developed by combining existing units of competency, or creating new units of competency. The Accredited Course is approved by a state or territory accrediting body.

Qualifications: Groups of units of competency that range from Certificate 1 through to Graduate Diploma levels. They can be achieved through completing a Training Package or an Accredited Course.

Assessment Guidelines: The industries preferred approach to assessment of competency, including the skills and qualifications of the assessors and the design of the assessment process.

Endorsed Material: These are the components of a training package that need to be endorsed by the Australian Skills Quality Authority. There is other non-endorsed material in a training package that is the responsibility of the RTO, such as the learning strategy, assessment resources and professional development material.

Training Package Review: The industry, through the Industry Skills Councils (Agrifood Skills Australia for the cotton industry), continue to review training packages to ensure they are meeting existing and emerging industry needs. They must be resubmitted for endorsement every three years to the NQC.

Australian Qualifications Framework: a unified system of qualifications across all sectors of education and training and all state and territory governments. Of the 16 qualifications, eight of them can be delivered in the VET system. There are four levels of Certificate qualification, followed by diploma and degree qualifications.

TABLE 2: A breakdown of the national qualifications framework by sector.

School Sector	VET Sector	Tertiary Sector
		Doctoral degree
		Masters degree
	Vocational Graduate Diploma	Graduate diploma
	Vocational Graduate Certificate	Graduate certificate
		Bachelor degree/Honors
	Advanced Diploma	Advanced diploma

	Diploma	Diploma
Senior Secondary certificate of education	Certificate IV Certificate III Certificate II Certificate I	

Apprenticeship: The apprentice system provides a way to combine training and employment. It requires a National Training Contract between the employer and the apprentice. This contract outlines the employers obligation to provide training, specifies the qualification to be achieved and explains the apprentices obligations.

Packaging a qualification: Most Training Packages have a set of core competencies as well as elective competencies that can be "packaged" to suit the particular needs of the student or enterprise.

Skill Sets: Recognise that sometimes a partial completion of a qualification may still meet a regulatory or licensing requirement, or a defined industry need. Skills Sets may be a single unit of competency, or an industry agreed grouping of units.

E-Learning: Uses a range of electronic media to deliver education and training. It allows for connection of trainers and students that would not normally be possible.

Recognition of Prior Learning: Is a process to recognize and assess existing skills and knowledge that may form part or all of a qualification. The principles of assessment are the same as those used in a training process, but the methods of assessment could be quite different, including work examples, interviews with supervisors etc.