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1-Citrus: Citrus Packhouse to Port Transportation Harmonisation

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Table 1: Document details

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Checked	Name	Signature	Date
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Table 3: External Document Approval

Organisation	Name	Signature	Date
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Fruit Producers Export Forum (FPEF)			
Steering Committee Chairman			
FPT			
Commercial Cold Stores			
333 Logistics / 328 Logistics			
Go Reefers (ECS)			
Durban South Cold Storage			
Somerset Cold Storage			

Table 4: Document version control

Version #	Date	Authorisation	Author	Description
1	19/08/2010	A Crickmay	R Giles	First Draft
2	23/09/2010	A Crickmay	R Giles	Second Draft
3	04/10/2010	A Crickmay	R Giles	Third Draft
4	02/11/2010	A Crickmay	R Giles	Final Document

1. INTRODUCTION

1.1. THE PURPOSE OF THIS DOCUMENT

The compilation of this document is a collaborative effort between Crickmay and the Citrus Industry. The purpose is to align the thinking of all interested and effected parties, both externally and internally, including Crickmay, their agents and possible future service providers.

Some of the information contained herein may be well known to some role players, but potentially not to others, and therefore it has been included to establish a basic understanding for all as a foundation.

The document aim is to provide a catalyst and framework to constructive debate on the issue and to provide a mechanism to formally agree on the various project details and a way forward.

The vision and scope (user requirement) document serves as part of a proven project process that will minimise problems relating to differing expectations, deadline issues and price fluctuations.

The research, discussions and concept design required in the development of this vision and scope document is completed by Crickmay at no charge to the industry and therefore remains the Intellectual Property (IP) of Crickmay.

1.2. PROJECT BACKGROUND

In June 2010, representatives from the Citrus Growers' Association (CGA) approached Crickmay to investigate the citrus supply chain from packhouse to port. The objective was to provide supply chain improvement advice and suggest solutions for issues which have been identified ultimately to enable significant savings for all citrus role-players.

Crickmay spent three days orientating themselves to the issues in the Citrus Industry, as well as being guided by CGA personnel. Crickmay briefly visited representative aspects of the supply chain in the KZN region including a citrus farm in Ixopo, citrus packhouse in Ixopo, citrus exporter in Durban, citrus cold store at the Port of Durban, FPT Durban and relevant truck-stop in the Durban area.

This was followed by a two day visit to the Cape, where Crickmay met with the University of Stellenbosch, the Council for Scientific and Industrial Research (CSIR), Post Harvest Innovation Programme, PALTRACK and Dole.

By and large it was observed that there are many sophisticated and capable systems and technologies, excellent facilities and quality equipment, but there is inefficiency present in all aspects of execution in the supply chain.

A major change occurred with the deregulation of the industry in 1997 resulted in the severe fragmentation of the industry into more and more role-players with less and less centralised control and coordination, as well as more independent systems resulting in

less control, decreased efficiency, increased cost and loss of confidence in the supply chain.

Cost, social and environmental pressures are a reality and need to improve in order to remain sustainable and to hold the position of one of the globe's largest and most competitive citrus industries.

Citrus export is a highly competitive supply chain with many role-players, but at the same time it requires cooperation or none will survive. Parallels can be drawn between the current Citrus Supply Chain and the well-established economic principle of the 'tragedy of commons' which is a dilemma arising from the situation in which multiple individuals, acting independently, and solely and rationally consulting their own self-interest, will ultimately deplete a shared limited resource even when it is clear that it is not in anyone's long-term interest for this to happen.

The principle of "think big and start small" is important to this project and significant thought should be given to the rollout strategy. The immediate focus should be to manage the Durban transport issue.

1.3. CRICKMAY AS SOLUTION PROVIDERS

The Crickmay approach promises large scale improvements by approaching supply chain/ logistics opportunities through a simple, tried and tested methodology of continuous improvement, which is mirrored in the latest international supply chain thinking. The following are pertinent to this project proposal:

- Crickmay's principle tool is the creation and exploitation of the benefits of supply chain visibility.
- Crickmay has over 26 years experience in improving the sustainability of entire industries' bulk supply chains, including the sawmilling, timber, sugar cane and coal industries, particularly in sub-Saharan Africa in the strategic, tactical and operational environments.
- Crickmay have a proven record of extracting, managing and providing extremely confidential and even competitive information in a manner that is beneficial for all role-players, while still preserving the necessary confidentiality.
- Crickmay are accustomed to working in supply chains where there are thousands of role-players, and the environment is highly politicised as well as severely fragmented supply chains experiencing skills and systems shortages.
- Crickmay have proven that enormous opportunity exists in minimising the inefficiency created at supply chain role-player interfaces (Figure1).

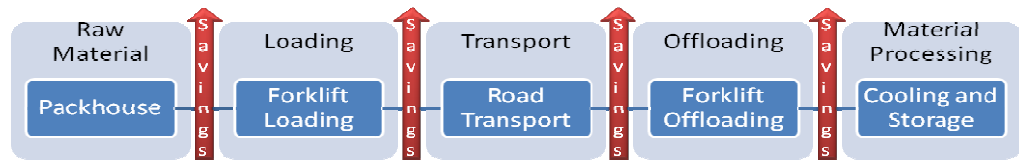


Figure 1: Citrus industry supply chain

- Experience has shown that projects such as this are only going to be successful if approached in a systematic process, but ensure high return low risk improvement. This approach is completely unique and bridges the gap between problem and successful solution (Gartner, an IT based statistics organisation, published that seven in eight IT projects are considered failures by the client).
- Crickmay understands that projects such as this are in fact the beginning of a journey of continuous improvement, where one project inspires the next and the savings are exponential.
- Crickmay exploit their independent position, as often supply chain wide projects are impossible if promoted/conceived by a supply chain role-player.
- Crickmay are unlike any other supply company in that we have no preconceived ideas or solution that we want to sell the clients, but rather seek to understand the real problems together with the clients. Once this has been achieved, Crickmay then identify the world's best of breed solutions to address these specific problems and then work together with the clients to implement the solutions and ultimately realise the gains.
- In a number of cases Crickmay only get paid proportionately from savings as they are confident in what they do.
- In the last decade, Crickmay have won three gold Logistics Achiever Awards (2003, 2004 and 2009) and one NPI Award (2004), all on projects very similar to the one presented here.

1.4. PREVIOUS AND RELATED WORK

In order to build upon previous work and not to 'reinvent the wheel' the following brief review of previous studies and their outcomes was completed:

- The CSIR have undertaken a number of studies in recent times, including the National Fruit Logistics Study (FruitLog). Key findings including:
 - That if viewed in the appropriate context, cold store facilities at ports are adequate.

- The continuous supply of fruit needs urgent attention. This will require the installation of IT infrastructure and software for the transport management system.
- In addition, the following are considered relevant recommendations made to the fruit industry with regard to aspects that need attention or warrant further investigation:
 - a) Analyse and address the factors affecting the continuous supply of the right fruit at the right time from the cold stores to the quayside, especially in the greater Durban area before the citrus peak.
 - b) Invest in logistics and supply chain awareness and management training in all links of the fruit export supply chain.
- The study concludes that there is no need for investment in hard logistics infrastructure in the ports, but that the fruit flow to the ports needs to be addressed. This will require, amongst other infrastructure, investment in IT infrastructure and software. Although logistics infrastructure provides some challenges, information sharing, collaborative planning and productivity will be the deciding factors between failure and success in getting the fruit to the markets without delay and in good condition.
- The 2001 Trade and Industry South Africa (TISA) National Supply Chain Strategy Study, considers physical and technology infrastructure one of the essential elements required by an industry (sector) for gaining a competitive advantage. Related to this are the services that are provided on this infrastructure, which have a direct impact on the export competitiveness of the industry. The TISA study identified, amongst others:
 - operational inefficiencies at ports,
 - high inland transportation costs, (increased supply chain costs and lead times).
 - At an industry level they recommend investigating collaboration around cold storage facilities at ports, logistics collaboration and sharing of facilities.
- In his 2002 State of the Nation address, the South African President made specific references to improving South Africa's competitiveness and efficiency. He said improving competitiveness requires “. . . lower input costs . . .”, “. . . more efficient port operations . . .” and other infrastructural efficiency improvements.
- It was made clear that there appears to be a similar understanding of the problems at hand and commonality in the message emanating from a number of studies namely
 - a) the SA Fresh Fruit Exports Logistics and Cold Chain Study which concluded, *“Progressive improvement will be required needing greater cooperation between players.”*
 - b) the Western Cape CPF Supply Chain Gap Analysis also provided a detailed map forward citing information sharing and transparency as the first recommended intervention (IN9) and largest realisation of savings (see Figure 2 below).

- It can be reasonably concluded from this series of highly credible studies, that span a period of more than a decade, that the issue facing the citrus industry is not understanding what needs to be done, but rather actually implementing change and effecting the improvement. The value in the remainder of this document will be to propose such a means to effect the improvement and not to produce further reports stating the same problems and solutions.

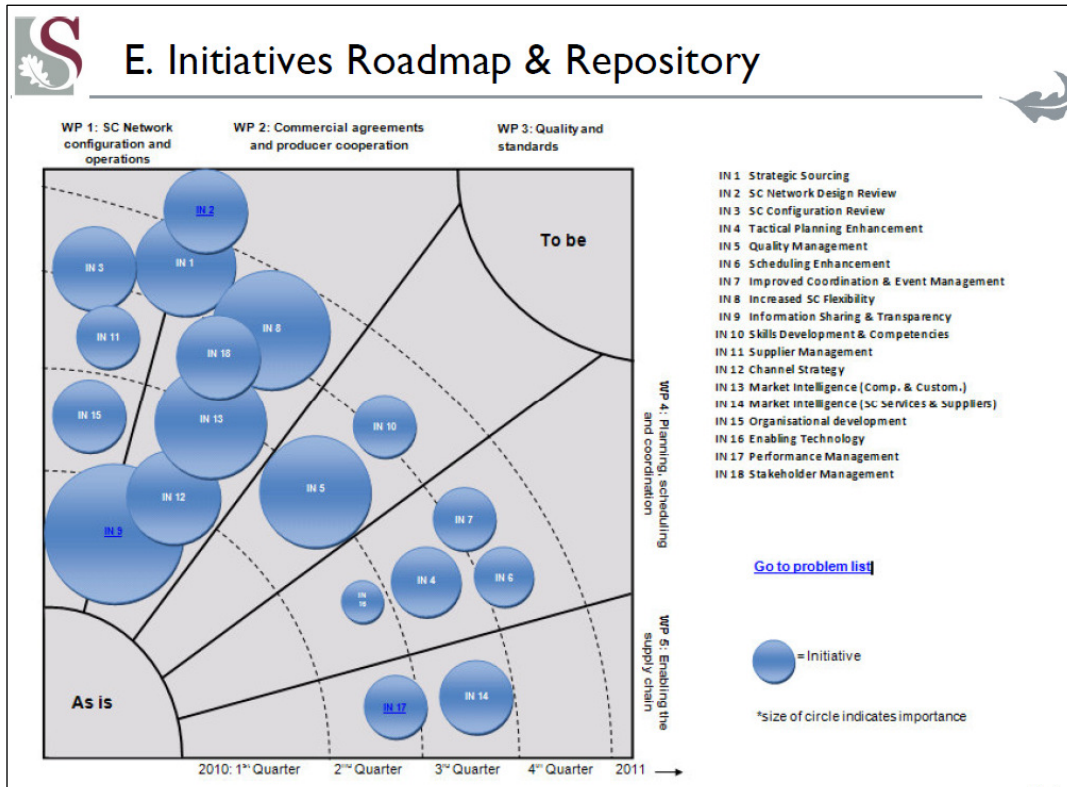


Figure 2: Initiatives Roadmap & Repository from Western Cape CPF Supply Chain Gap Analysis (diagram courtesy of Stellenbosch University)

2. THE CITRUS EXPORT SUPPLY CHAIN – PACKHOUSE TO PORT

2.1. SUPPLY CHAIN PHYSICAL ACTIVITIES AND PRODUCT FLOW

- Deciduous fruit is produced on a year round basis (see Figure 3 for a fruit calendar) and there are 75,000 hectares of deciduous trees and vines planted in South Africa. In 2002, some 2,5 million tonnes of deciduous fruit was produced in South Africa. During the same time period, there were 2,450 deciduous fruit farmers/producers employing 104,440 people directly in the industry.
- The sub-class citrus fruit is split into oranges, grapefruit, lemons, limes and soft citrus (also known as easy peelers, such as naartjies, mandarins, etc). Citrus fruit is produced in eight of the nine provinces. There are currently 1,073 citrus growers directly employing some 100,000 people. It is estimated that during the citrus season more than 1,4 million tonnes of citrus is exported.

- Approximately 62% of citrus grown is exported, 23% juiced with the balance of 15% sold on the local market. In general, producers do not supply one market exclusively, but rather a proportion to each in parallel.
- Seasonal nature of citrus is depicted in the fruit calendar depicted in Figure 3 below.



Figure 3: Fruit calendar

- Map of citrus producing regions



Figure 4: Regional map of Sub-Saharan Africa showing the Citrus producing regions

- South African fruit is currently exported through the ports of Cape Town, Port Elizabeth, Durban and Maputo. Citrus is exported in cartons on pallets, either in refrigerated (reefer) containers (that are handled through the ports' container terminals) or in bulk, i.e. the pallets are loaded into the hold of a specialised

refrigerated vessel in conventional (fruit) terminals of ports. Almost no fruit is exported via air freight as it is too expensive. In addition to the container terminals, there are six dedicated fruit terminals (conventional terminals) at the four ports for loading specialised refrigerated vessels.

- Prior to deregulation in 1997, the fresh fruit industry was regulated with one exporter each for citrus and deciduous fruit. Since then much has changed. The competition and complexity in the SA fresh fruit industry have increased dramatically (with many hundreds more exporters and brands entering the industry) and prices have dropped. Producers were ill prepared for operating in the new deregulated environment, having had no prior experience in such a market. Many fruit farms have been liquidated and exporters have disappeared as fast as they had appeared.
- This fragmentation of the industry has also led to increased pressure being placed on all facilities in the logistics chain. In 2003, there were approximately 70 accredited and registered exporters, with another estimated 216 producer/exporters (farmers who export fruit through private contract directly to an overseas retailer/client) giving a total of 386 enterprises engaged in the export of fresh fruit from South Africa. In the same year there were some 420 packhouses and 300 registered cold stores in South Africa through which fresh produce is packaged, palletised and cooled to the required temperature. To ensure optimal quality of the fresh produce in the foreign market, strict temperature regimes/protocols have been developed for each fruit type by the national inspecting body; the Perishable Products Export Control Board (PPECB) and must be adhered to.
- Product flow diagram from Packhouse to Port

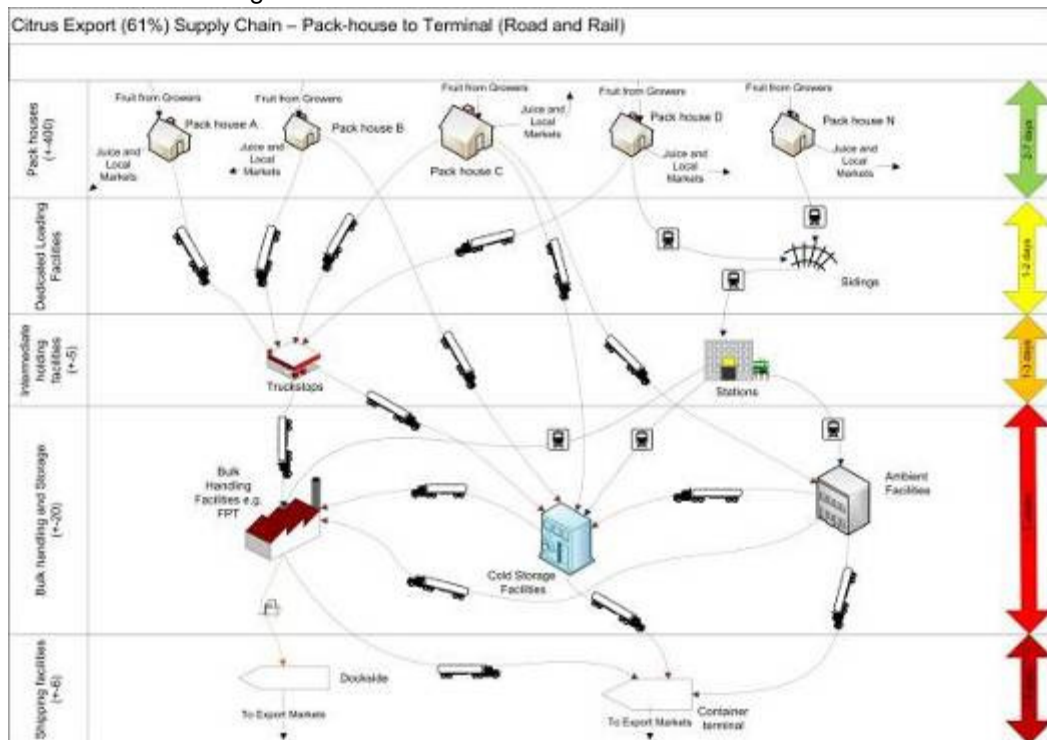


Figure 5: Citrus export supply chain showing the large number of transport permutations and cumulative dwell times

2.2. SOFTWARE SYSTEMS, DATA FLOW AND DATA STORAGE

A number of different good systems and technology are used within the industry and can be leveraged off. Huge value exists in integrating these datasets which is not being taken advantage of. Systems used within the packhouse to port citrus supply chain include:

- PALTRACK (including PALTRACK Lite etc)
- WMS and other warehouse systems
- PPECB systems together with DoA systems
- Multitude of exporters systems eg. Fresh Connect
- Multitude of Vehicle on -board computers
- Individual personal computers, networked computers, mobile phone hand sets

3. PROBLEM DEFINITION

3.1. VISIBLE SUPPLY CHAIN CHALLENGES

3.1.1 Logistics inefficiency and resultant negative impact on productivity and cost

- Extremely long and unnecessary delays to offload trucks at destinations resulting in delays at offloading facilities of between one to as much six hours EXCLUDING time at the truck-stop.
- Long delays at truck-stops, an average of between six to twelve hours, with a high of 24 hours not being uncommon.
- Extremely long and unnecessary delays to load trucks at loading facilities of between one to three hours.
- Trucks being delayed at RTI facilities for overloading, particularly for axle overloads when transporting high cube pallets.
- The impacts of other commodities including other fruit products flowing through the same supply chain.
- Truck productivity is low, which means more trucks are being used to do the same job.
- Excess dead kilometres due to empty trucks moving from one facility to another, as there is no/reduced capacity to load the trucks.
- Due to the above the cost of transport is higher than it should be.
- General lack of good citrus supply chain information on which to base decisions is making the scheduling of vehicles extremely difficult.
- Supply chain 'pulsing' with a 'feast and famine' situation, as well as a seeming mismatch between cold store capacity and product flow on a day by day basis, creating equipment and infrastructure capacity problems.

- The negative effects of weather and climatic issues on growing, harvesting and packing of fruit.
- Increasing and still seemingly ineffective stock holding to compensate for logistics uncertainty and mismatch between export and harvest operations.
- Multi drop or split loads requiring an unnecessary number of truck movements per drop-off cycle.
- Trucks having to wait for loads to be accumulated at the packhouse.
- Administration errors e.g. pallet barcodes wrong.
- Long waits for paperwork at both loading and offloading sites.
- Seeming questionable facility capacity.
- Inefficient stock holding strategies e.g. non mobile stacking.
- Increased rates being paid for transport, impacting profitability and ultimately sustainability.
- Growers and packhouses are transport 'price takers' and at the mercy of market transport rates.
- Fruit not necessarily moving to the optimal destination.

3.1.2 Fruit quality impacts

- Unnecessary delays impact negatively on quality of delivered fruit and increase the proportion of rejections.
- Direct damage is increased e.g. due to falling over, or indirect damage such as taking a long time to get to cooling, which increases the susceptibility to disease.
- Increased cooling capacity and duration needed for warmer fruit, particularly fruit that has been standing at truck stops for long periods under tarpaulins, this increases the costs.
- The resultant loss in profitability.
- Reputational risk and potential client relationship damage.

3.1.3 Information impacts

- There is sufficient good information, but many systems making it difficult to synchronise data into a coherent set of information.

- Different formats and transfer mechanisms.
- Data and information standards established, but not always adhered to.

3.1.4 Social and safety impact

- To combat the inefficient environment, some operators are resorting to unsafe or even unlawful activities to compensate, such as truck overloading, speeding and drivers working excessively long hours.
- Quality operators are leaving due to the unsustainable environment and less reputable operators are operating, ultimately risking the entire industry.
- Increased risk taking all round.
- Truck congestion on roads is a direct risk to both industry personnel, but also to the public.
- Risk to industry good image.
- Significant and increasing antagonism and distrust between supply chain role players.

3.1.5 Environmental Impact

- Increased carbon footprint due to both increased stop-start terminal times and resistance to move to newer technology due to the low margin environment.
- Risk associated with disposing of fruit that has failed certification process.

3.1.6 Credibility

- The throughput and storage capacity of loading facilities, transport, cold stores, terminals etc being brought into question when there should not be a problem.
- Poor credible knowledge of supply chain capability and capacity to get the job done.
- Packhouse, transport, cold stores and terminals throughput obligations are not being fulfilled.
- Reactive decision making strategies are seemingly ineffective.

3.2. ROOT CAUSE

- Lack of supply chain visibility. The concept of supply chain visibility is best illustrated by the analogy of four blindfolded men touching an elephant and trying to figure out what it is (Figure 6). Each man has a different idea of what it may be, by virtue of the

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fact that one is touching the tusk, one the tail, one the leg and so forth and each individually thinking what they are touching is a pipe, a broom and a tree trunk. However, a man who can see the entire elephant can see that it is an elephant; his assessment is quick and more accurate than each of the blind men. The ability to 'see' is the basis on which all of the future tasks must be built, and in our experience on its own creates enormous value as it changes attitudes, priorities and helps to build trust.



Figure 6: Picture depicting supply chain invisibility

- In the context of the Citrus supply chain, the multitude of supply chain role players and elements from packhouse to quay side operate in a relatively uncoordinated or even chaotic fashion.

This between

- multiple packhouses
 - packhouses and transporters
 - multiple transporters
 - packhouses and cold stores
 - transporters and cold stores
 - multiple cold stores
 - multitude of exporters
- This is made more challenging by:
 - Large and increasing number of role players as a result of deregulation.
 - Systems developed prior to 1997 are not capable of managing the far more complex environment of today (and it's only going to get worse).
 - Extremely fragmented supply chain, meaning that the many islands of excellence operate in isolation and most often in opposition to each other. This is ultimately detrimental to each of them in such a dependant supply chain. This results in huge amounts of variability and uncertainty. This is made worse due to the

misconception that the role-players and elements can operate in isolation is a myth where in fact they are highly dependent.

- The Citrus supply chain is highly competitive and cooperation and sharing of information is misconstrued as giving up competitive advantage.
- There is little tactical and operational planning as a group.
- No real standard for logistics execution thus undermining those role-players who operate within the law and at required standard reducing their sustainability and ultimately reducing the sustainability of the chain as a whole.
- There is little coordination or technology to enable the smooth and efficient flow of product and associated logistics.
- The existing technology is not working properly/as intended in a number of cases.

4. PROJECT OBJECTIVES

- To credibly, reliably and accurately measure various aspects of the supply chain to understand and highlight where the supply chain inefficiencies lie, thereby identifying the need for appropriate solutions and framework for implementing them, ultimately seeing to assist the industry.
- To immediately investigate applicable and available software applications (such as the Joint Planning Tool (JPT) used in SA timber and Australian sugar industries) and to customise, develop, pilot and implement the '1-Citrus' packhouse to port transportation harmonisation tool for the specific citrus road (accommodating but not managing or measuring rail) supply chain environment. It is envisaged that this tool will in the future ultimately incorporate rail consignors as well.
- The solution will be required to interface with other industry systems to enhance their functionality and increase the systems' performance.
- The proposal will require a significant mindset change, as it will be the largest change in the industry in the last decade.

5. PROJECT POTENTIAL

5.1. LOGISTICS COSTS SAVINGS

Savings resulting from addressing transport inefficiency alone are conservatively estimated to be worth approximately R154,834,833 per annum (see Table 4 below) if one quantifies the extra cost associated with vehicle standing time coupled with lost backhauling opportunities on some routes.

For the sake of clarity, the costs savings per route were calculated by comparing the rates gathered through a survey done by CGA of the current actual costs for transport

being paid per route against the potential cost of transport if the efficiency was improved to a realistic level.

The potential cost was calculated by using a sophisticated transport specification, simulation and costing model, namely HTM, which was initially calibrated to the actual rates paid for transporter using the efficiency parameters of the current supply chain which were then systematically changed to reflect the realistic efficiency parameters of the theoretical improved supply chain e.g. improved turnaround times at the cold stores.

The cost saving per route (shown below in table 3) is therefore the difference between the current costs paid for transport and the potential costs paid for transport based on a reduced delays in ports and better management of backhauling opportunities..

Table 3: Estimated transport costs savings per route per annum

	Maputo Port	Durban Port	Port Elizabeth	Cape Town Port	Totals
	(R)	(R)	(R)	(R)	(R)
Zimbabwe		5,495,723			5,495,723
Messina / Tshipse		14,424,328			14,424,328
Letsitele / Letaba / Tzaneen	4,280,513	19,316,138			23,596,650
Hoedspruit	2,148,947	6,123,600			8,272,547
Marble Hall / Groblersdal		15,602,625			15,602,625
Nelspruit	1,045,997	3,856,781			4,902,778
Karino	677,236	1,078,566			1,755,802
Malelane	2,057,400	13,701,150			15,758,550
North Swaziland	424,659	652,303			1,076,963
Pongola		1,477,406			1,477,406
Nkwalini Valley		9,320,063			9,320,063
Ixopo		2,922,075			2,922,075
Fort Beaufort EC			4,602,825		4,602,825
Sundays River			11,055,023		11,055,023
Patensie			4,248,450		4,248,450
Swellendam				743,175	743,175
Citrusdal				21,988,125	21,988,125
Kakamas				7,591,725	7,591,725
Totals	R 10,634,752	R 93,970,758	R 19,906,298	R 30,323,025	R 154,834,833

If the figures in Table 4 are reduced to a per load savings per supply chain grouped per port, the savings range from approximately R2000 per load to nearly R4500 per load (Figure 7).

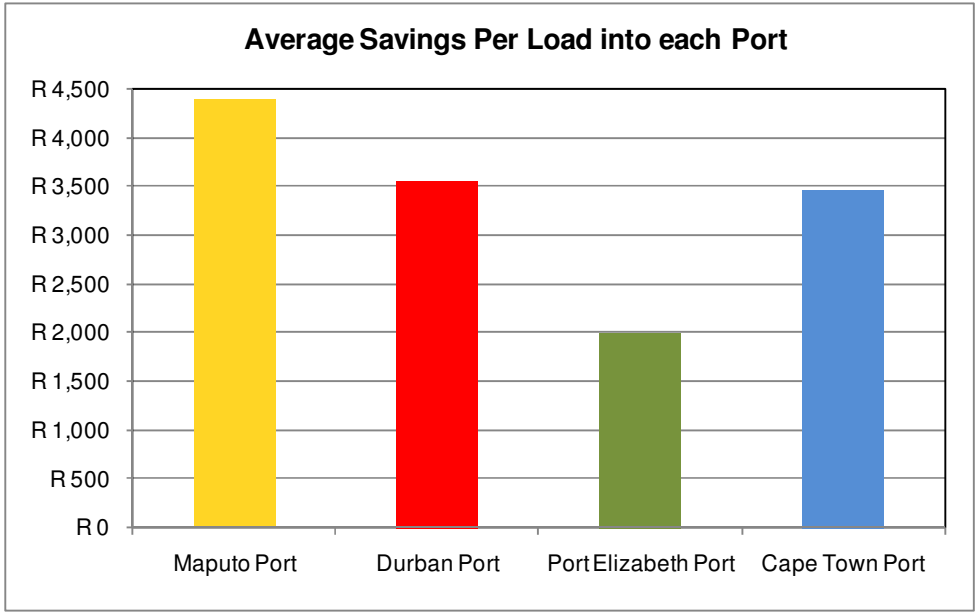


Figure 7: Average savings per load into each port

If reduced the savings are further reduced to reflect the average savings per pallet, the savings range from as approximately R10 per pallet to R270 per pallet (Figure 8).

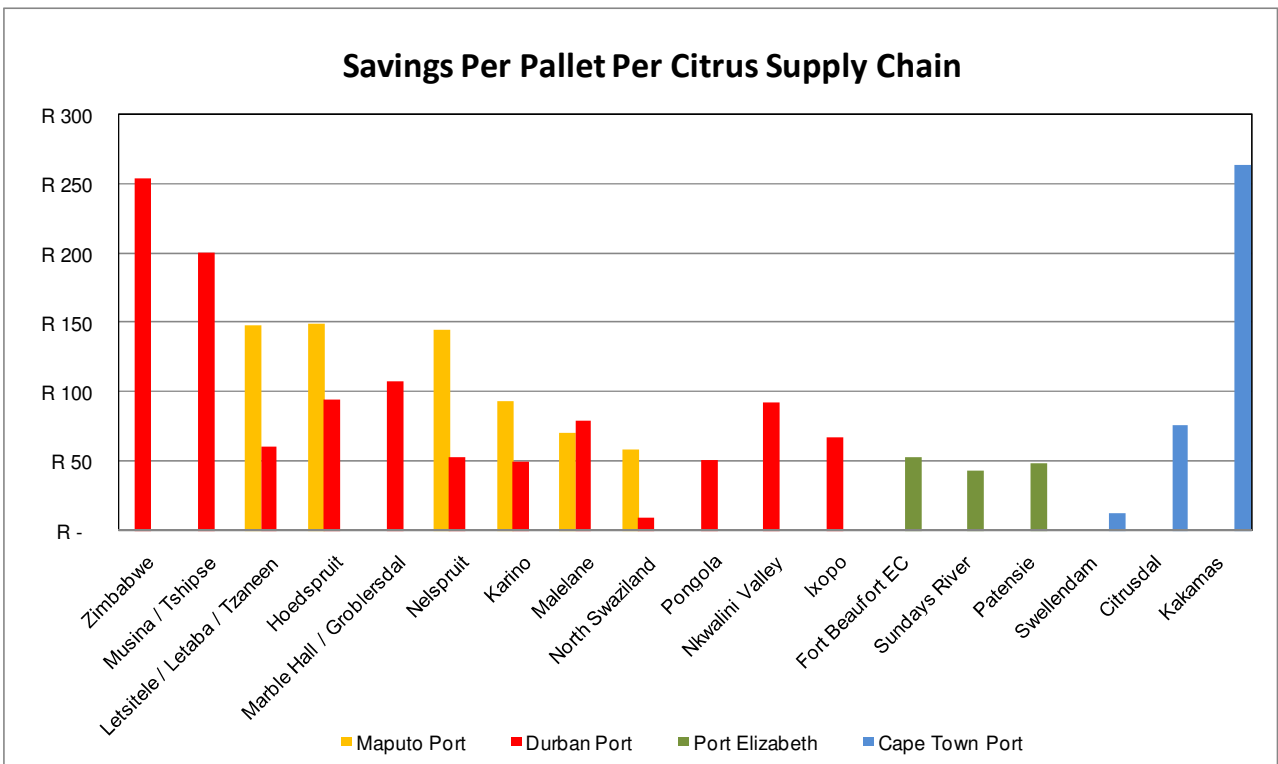


Figure 8: Savings per pallet per citrus supply chain or route

5.2. ENVIRONMENTAL AND SOCIAL IMPACT

- Carbon emissions reductions due to increased logistics efficiency – right product going to the right place as economically as possible.
- Reduced accidents and road deaths due to operators not having to ‘cheat’ (speed, overload, drive excessive hours etc) to remain sustainable due to the logistics inefficiency.
- The resultant reduction in risk to the good image of the industry.

6. SPECIFIC SOLUTIONS

One needs to bear in mind that in the single biggest challenge facing the citrus industry in such a project can be summarised by the old adage that ‘*It’s 20% technology, 80% people*’ - needs to be remembered.

The problem does not lie in knowing what to do, as the problems are very similar, it lies in ‘how to implement what is needed’. Crickmay’s assessment is that one has to begin a process of continual improvement headed by a body recognised by all the players as being representative e.g. project would be doomed to fail if headed purely by CGA as it would be perceived as a ‘grower’ initiative.

Having established some hope, the most important task is to create “*supply chain visibility*” referred to as IN 9 in the WC CPF – Supply Chain Gap Analysis; this is the key.

6.1. SUPPLY CHAIN VISIBILITY TOOL: LIP

LIP or the Logistics Information Platform has been and continues to be custom developed for the specific needs of bulk supply chains and is the tool that has driven all of Crickmay’s supply chain improvement projects for more than a decade.

- In the last five years, LIP has created operational visibility across the transport modes of road, rail and conveyor in the region of 80 million tonnes of coal, 20 million tonnes of timber and 22 million tonnes of sugar cane, 5.6 million tonnes of pulp and paper and 0.8 million tonnes of biomass per annum, across four countries and three continents.
- Importantly LIP is completely web based and requires no special programs or installations and is therefore accessible to any authorised user anytime anywhere regardless of technology and systems (NB: this form information access is key for industry wide projects).
- LIP produces over 4,500 daily, weekly, monthly reports per month (either automatically emailed or made available by password on the web) and/or emailed exception reports, as well as ± 55,000 sms per month to over 2,000 individual users.

- The system creates visibility using any number of systems such as vehicle onboard computer data (OBCD) from most OBCD manufacturers, weighbridge data, ERP system data, warehousing system data, scheduling and planning system data and a number of other third party systems.

6.2. CITRUS - JOINT PLANNING TOOL

Crickmay were asked what tool they would recommend to solve the visibility and lack of coordination problems of the citrus supply chain. A tool developed by Crickmay called the Joint Planning Tool (JPT) for timber and sugar biomass industries which has worked in both South Africa and Australia is Crickmay's recommendation for a pragmatic, low risk and high return solution to the fairly unique problem as exists in the South African Citrus Supply Chain where:

- there are many hundreds of independent and often competing role-players (growers, packhouses, loading operations, transporters, temporal storage facilities, warehouses/cold stores, exporters etc.) with little industry formal unity i.e. a very complex, very fragmented and very competitive industry.
- all role-players essentially planning independently and in an uncoordinated fashion.
- the role-players operate in a fairly 'open' system i.e. the supply chain role-players don't operate exclusively in export citrus.
- the supply chain is fairly immature from a solutions perspective i.e. project starting from scratch and not enhancing existing solution and systems.
- There are a large number of good existing systems and existing data warehouses available and on which to draw from but formally integrating with them would require an inordinate amount of cost and effort.

JPT is a completely web based solution (www.jointplanningtool.com) hosted in a secure environment that allows all of the supply chain role-players to plan and check the performance of all logistics operations on an hour by hour basis. This is achieved on a single platform by entering in and viewing their respective information with the objective of increasing the efficiency and decreasing the delays and wastage in the supply chain.

By way of example the diagram depicted in Figure 9, from JPT in the sugar biomass operation in Australia, explains how each role-player interacts with JPT.

1. Administrator creates and manages a JPT user account for every user (offloading point, supplier, and transporter). This account limits the information and functionality determined by user configuration. This can be set to three modes, either in 'ceiling' mode where JPT limits bookings to what an offloading point is capable of or 'open' mode where unlimited bookings are available and the offloading site changes offloading capacity to suit or a hybrid of the two.
2. The offloading point gathers all relevant information on plant production plans, outbound product schedules, maintenance schedules etc. and creates an offloading time slot schedule for every hour of the week that they can guarantee.

3. The offloading schedule is uploaded and made live i.e. slots now available for booking for all JPT users to view.
4. & 5. Either Suppliers or their Transporters go onto JPT and view available slots for the destinations they want to deliver into firstly at the daily summary level and then at a specific hourly slot level.
6. A booking is made that details specific required information (e.g. delivery ETA, Supplier, transporter, product type, delivery note number, payload and truck registration etc.) and optional information (e.g. product owner).
7. A delivery note is printed on the user's local printer used as proof of a booking slot at the offloading point (if required).
8. Booking slots can be edited by users if required. All JPT information is forwarded to the Logistics Information Platform (LIP) for to create SUPPLY CHAIN VISABILITY. This includes a number of reporting systems on all historical and future delivery information to effect both planning and historical information to assist in understanding problems areas.
9. & 10 Reports are available on the web on www.logisticsinformationplatform.com in tabular and graphical format all of which are interactive for the user. A particular characteristic of LIP is the ability to quickly develop and automatically distribute new reports to satisfy user specific requirements.

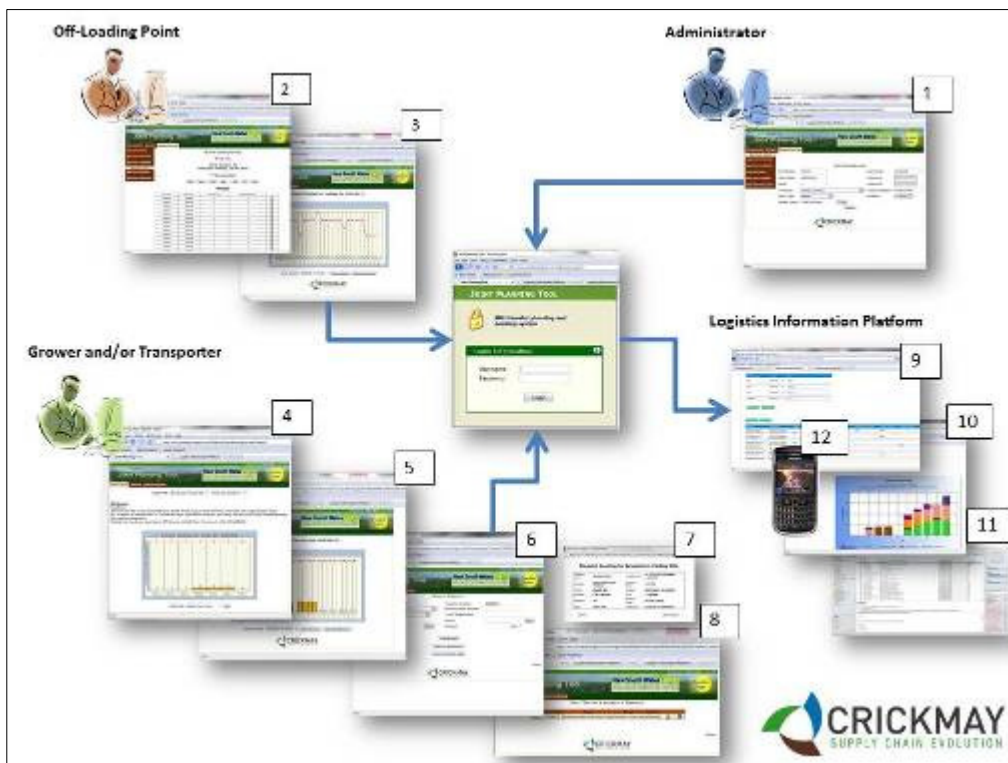


Figure 9: Flow of information on the current Australian Sugar Biomass and Timber JPT

11. Reports automatically sent to users via email given a set of 'rules' to trigger the event e.g. send a booking report automatically to Users X email at the beginning of every weekday and the end of the month.
12. Automatic sms notification to any users cell phone based on a set of predetermined rules e.g. sends sms to User Y number when delivery booking reach 90% of maximum hourly offloading capacity or confirm booking to supplier 12h before pickup time.

6.2.1 Additional Functionality for Citrus

To ensure JPT meets the unique needs of the Citrus industry thus enabling the tool to be effectively used and thereby maximising the probability of realising the savings, some customisation will be required. More specifically the following conceptual changes (Note: this functionality covers project Phases 1 & 2 described later in the document):

- Interface with offloading facility warehousing systems in order to display warehouse stock level and therefore live congestion status from a stock holding and future throughput perspective.
- Enhance JPT to have the ability to interface with truck OBCD units in order to track vehicles enroute and adjust arrival profiles accordingly.
- Provide a system to calculate Estimated trip times and estimated transport cost to enable savings to be forced back to growers when efficiency improves
- Ultimately provide a system of load brokering to assist with backhaul opportunities or even primary citrus transport where required
- Provide a facility for each consignor and consignee to uniquely setup its business rules for their facility
- For the information to be extremely accessible in real-time (24/7) to all certified users anywhere over the internet.
- The data and information should be stored and accessed in an appropriately secure manner and depersonalised where necessary.
- Needs to be developed in a relatively short space of time therefore giving quick gains relatively easily. A high level plan of pilot in 2011 with full roll-out in 2012 needs to be born in mind
- Provide this DATA to an INFORMATION system, namely LIP so that the information can be readily accessed and/or distributed via the web, sms and email.
- Is able to interface with other systems to enhance their operations.
- Needs to be supported remotely 24/7.

7. PHASES OF IMPLEMENTATION

Countless examples exist of failed IT based projects that were a technology step too far too soon, not because the solution was wrong but because it was implemented before the supply chain environment was ready or capable to take such a dramatic change. To mitigate this risk a very deliberate phased approach to the project is strongly recommended. The phases are as follows:

- **Phase 1A – Intelligent Visibility through Information:** Create the foundation of supply chain visibility using LIP leveraging initially off historical data and thereafter off live data from the various good information systems available in the supply chain. This phase will position the project well as it provides information foundation required “information is power” and at the fingertips of any registered user anywhere anytime. This is critical from three perspectives:
 - To enable supply chain wide visibility from high level information right down to the smallest detail, historically and in the live context, manually and automatically and via a multitude of mechanisms including internet, email and sms/mms technologies;
 - To understand and diagnose issues correctly as they arise based on fact and NOT perception
 - to measure the impact of changes made to establish whether the changes make a positive impact, no impact or even negative impact to provide a system to measure improvements against
- **Phase 1B – Pilot Static JPT:** Enhance/customise, test and pilot JPT in the Durban area and supplying regions i.e. essentially using the JPT tool with basic fundamental functionality with suppliers or transporters booking and offloading facilities specifying offloading rates.
- **Phase 2A - Rollout Static JPT:** Incorporate the learnings from the Durban pilot and to roll out JPT across all ports thereby smoothing supply and reduce delays making transport cheaper. Also to identify where logistics challenges lie.
- **Phase 2B - JPT Live Enhancement:** This phase’s objective is to include the standard trip times and to track vehicle and consignment progress live to enhance the visibility of transport for all role-players including the grower, packhouse, coldstore, exporter or any other interested and authorised party. The effect is to accommodate the multitude of real life and unavoidable issues experienced in transport and communicating this automatically where applicable thereby smoothing arrivals further making transport cheaper. Also produce more information which will show up more areas of improvement.
- **Phase 3 – Encourage Transport Savings:** Through route optimisation, route cost benchmarking, load brokerage, backhauling brokerage role-players will be important to ensure the cost reductions realised from better efficiency are fed proportionally down to those who pay for transport. Effects to make a step change in logistics and to significantly again reduce cost and increase confidence in the system. Also provide more information to show more opportunities.

- **Phase 4 - Rollout Across Other Fruit Supply Chains:** To mitigate against congestion caused by other supply chains sharing the same infrastructure in an uncoordinated manner ultimately both LIP and JPT must be rolled out across the entire fruit supply chain.
- **Phase 5A – Ensure Citrus is Transported Responsibly:** A set of SABS Standards, namely RTMS Standards for Transporters, Consignees and Consignors, should be implemented and audited leveraging off the supply information contained in LIP with the two part benefit of both ensuring that the citrus product is transported in a responsible and safe manner but also to allow for the negotiation of concessions with Government that can have significant impact on supply chain efficiency e.g. minimal weighing at RTI weighbridges, or PBS vehicles capable of carrying legal payloads of upward of 46tons
- **Phase 5B – Measure and Reduce Carbon Footprint:** Again the industry wide information transport aspect of the citrus supply chain contained in LIP can be leveraged to provide a real time measure of the carbon footprint of the chain. This information can both enable the various role-players to understand where the carbon intensive activities are and to initiate projects to address this but also to compliment or make use of similar initiatives already working in the supply chain e.g. initiative by Colours Fruit.

8. INFORMATION ACCESS AND INFORMATION CONFIDENTIALITY

Much of the information gathered, warehoused and disseminated is of a confidential nature and should be treated as such. The systems and technology are in a constant state of improvement and are upgraded periodically.

To affect the required level of protection and system continuity the following mechanisms are used:

- Https encryption is used on all information transfers so that information cannot be intercepted
- User name and password protection administered centrally with an audit trail of all interactions
- Appropriate firewalls
- Appropriate agreements governing privacy and confidentiality developed by Michalsons Attorneys using the appropriate Acts
- Security is audited by KPMG periodically
- Periodic and offsite information backup
- Fall-over infrastructure (hardware and communications)
- 24/7 support (hardware and application)

9. FUNDING MODELS AND ACCESS TO BUDGET

It is important to remember the savings of the order of R150 Million per annum that are at stake and to keep the project funding component in context. All too often projects such as this fail over relatively small sums of money preventing much larger sums being saved.

The following models are proposed in order of preference:

- To fund the scoping process out of industry funds and then to provide the LIP and JPT at no upfront charge and to employ 'pay as you go' type funding e.g. pay per booking and pay per information accessed.
- Direct funding from role-players or through levies per carton
- Funded through cold store handling rates
- Sponsorship from an outside but interested/affected party e.g. DoA or DST
- Seed funding DTI or SPII
- Combination of the above can be considered

10. KEY SUCCESS FACTORS

Through experience in projects such as this in four industries, a number of key success factors need to be executed upon or the project has a high probability of requiring far more input and resources than planned or in extreme cases even failing outright.

- A dedicated project manager driving the project daily with the appropriate capability, capacity and authority.
- Formal and upfront commitment and buy-in from key stakeholders e.g. cold stores and terminals, CGA, FPEF etc
- A strong Steering Committee with a formal and agreed Terms of Reference made up of a balanced set of representatives representing the entire scope of the supply chain that are formally nominated to represent their respective constituents.
- Regular steering committee meetings (strongly suggest meeting monthly)
- Accessible, credible, accurate and appropriate information and solutions (strongly recommend live information)
- Information confidentiality and de-personalisation where necessary
- Sufficient funding to see the project through

- Following a process of formal sign-off at all aspects of the project development to ensure delivery meets specification
- Design all systems with full roll-out in mind but start small and ensure that all the assumptions made are correct and modify designs if found to be incorrect.

11. PROJECT SCOPE

Typical of such projects is a natural tendency to 'grow' or 'scope creep' as the project progresses. This is due to the very nature of the immense power of measuring across the entire supply chain and approaching solutions at an industry level thereby exposing areas of opportunity continuously.

Identifying and recording these areas of opportunity are extremely valuable and in fact is part of the major value of projects such as this but the risk is the project is diluted and core momentum lost to the point where it fails and should therefore be guarded against.

To mitigate against this risk, the following are recorded as the scope inclusions and exclusions at this point in the project. If at any point the scope is challenged, it may be changed but it needs to be clearly understood that scope changes impact on timeframes and/or cost

11.1. INCLUSIONS

- From packhouse - packed product ready for dispatch
- To product offloaded at cold store/ container terminal e.g. FPT or break-bulk loading facilities
- Provide information and solutions to citrus industry including all associated solutions infrastructure
- Provide for both LIP and JPT services to the road supply chain from Pack house to Ports
- Provide project management services
- Provide steering committee convening, information and venue services
- Provide a managed service for JPT

11.2. EXCLUSIONS

- Fruit other than Citrus
- Rail is excluded although it will be accommodated in JPT by means of 'blocking out' destination capacity when trains are due to offload.
- Any aspect of the packing process or growing process
- Anything relating to the fruit after it leaves cold store/FPT/container terminal
- Making any of the current incumbent systems work
- Not going to formally interface with any other systems from an output perspective at this point but can provide the information in report format for users to use as they please.
- Not eligible for any voting rights on the steering committee

12. PROJECT RESOURCING AND COMMUNICATION

12.1. CRICKMAY PROJECT RESOURCES

In order to provide the project with the highest probability of success the following resources shown in Table 4, each with specialist skills at Crickmay, will be available to the project at the appropriate time.

Table 4: Crickmay project resources being made available on the 1-Citrus Project

Surname	Initials	Title	Academic Qualifications	Project Role
Crickmay	A.G.	Mr.	MBA, BSc.(Forestry Management)	Client liaison and cross industry synergies
Giles	R.C.	Mr.	MSc Engineering, BSc Engineering (Bio Resources)	Senior Project Manager and Supply Chain Systems Architect
Barnard	R	Mr.	MBA, B.Eng (Industrial) <i>Hons</i>	Project Quality Assurance
Lane	J.S.	Mr.	BSc.(Forestry Management)	Information Systems Development and Safety
Hillermann	H	Mr.	B.Eng (Industrial)	Project Implementation Management
Kubheka	L	Ms	-	Data Provision and Quality Assurance
Burne	D	Mrs.	-	Project Administration

In addition to the Crickmay resources, the bulk of software development/enhancement is completed by SUMIT Solutions who are located on the same premises and which have been Crickmay's software partner and all server hosting services for almost a decade. All hardware is either provided through SUMIT or through a number of specialist hardware vendors used regularly by Crickmay on other industry logistics improvement projects

Communication will be formal, through progress reports, presentations and the appropriate project documentation at selected milestones. In order to improve the quality of deliverables and to ensure the successful outcome of the project, informal communication between all stakeholders is widely encouraged, although any scope amendments will be formal and in writing.

CGA will ensure the following:

- Management commitment
- Availability of key stakeholders
- Access to the required information
- Arranging of critical meetings

12.2. PROJECT STEERING COMMITTEE (TO GET BUY IN AND DRIVE PROJECT)

- As described before, critical to drive project and to provide a forum to discuss and resolve issues is a Steering Committee. In addition neutral chairperson resolves a number of the vested interest issues typical of such a project. Of significant value and by virtue of it being a committee one will naturally get involvement and buy in from all role players.

- Suggested Committee Members:
 - 2 x CGA
 - 1 x DoT and/or Dept Agric
 - 1 x Exporters Forum
 - 1 x PPECB
 - 1 x FPT
 - 5 x Cold stores (one from each region)
 - 2 x Transporters
 - 9 x Packhouses/growers (one from every two regions or maybe half packhouses half growers)

12.3. PROJECT INTERNAL AND EXTERNAL PROMOTION

In order to mitigate against the very real problem of incorrect project assumptions and also to create awareness, the 1-Citrus project requires exposure amongst role players continually. Promotion will be required in two forms, namely internal and external promotion:

- Internal promotion
 - Industry web sites
 - Industry print media (e.g. newsletters)
 - Industry conferences e.g. CRI symposium

- External promotion
 - On the various application websites
 - Flyers, posters etc at cold stores

13. IDENTIFIED PROJECT RISKS

Table 5 below summarises the expected project risks with the associated mitigating actions.

Table 5. Project Risks and mitigating actions

Project Risk	Mitigating Action
Project seen as CGA project therefore being resisted by other industry role-players	<i>Set up a project steering committee with representatives from all aspects of the supply chain and an appropriate 'neutral' chairmanship</i>
Coordination of the chain as a whole will be a significant paradigm shift for most role-players and significant resistance will undoubtedly be encountered.	<i>Regular steering committee meetings (monthly) with 'information page/discussion forum' on JPT website where these issues can be raised and fed back and disseminated</i>
In their eagerness to make a positive impact, people follow a solution based approach potentially misunderstanding the real root cause of the problem and/or implementing the incorrect solution, which wastes time and money and damages ones reputation.	<i>Following a proven methodology and analysis tools provided by Crickmay</i>
Data and information not provided by role players due to competitive nature of information.	<i>Initially non-competitive information will be required and once confidence is gained with Crickmay, they can then act as the information hub, warehousing data in a secure manner and filtering the specific data to the appropriate users.</i>
The project never gets off ground and insufficient momentum.	<i>Regular monthly steering committee meetings with appearances at each region over the period of the first year to explain what's happening and project objectives</i>
Project scope creep diluting focus to solve core problems.	<i>Well defined and formally accepted (i.e. signed off) Vision and scope document specifically referred to in the Terms of Reference of the steering committee.</i>
Lack of readily available funding.	<i>To initiate to the project, CGA funds the Conceptual and Functional Scoping phase. Thereafter mechanisms for funding including levies (less than 40c per carton) or pay per booking are viable options.</i>

14. HIGH LEVEL PROJECT PLAN

The following high level project plan (Table 6) is presented as an indicative plan based on project phases only. A far more detailed and formal plan will be developed including all effected parties managed by Crickmay and reported against weekly to all relevant role-players should the project go ahead.

It should be clearly noted that based on experience in a number of similar industry wide projects, the biggest risk to deadlines not being met is client signoff. Therefore to guard against this, the client should be well prepared for the document delivery and all necessary meetings etc. should be planned to facilitate and expedite the signoff.

Table 6: High level project plan

Phase	Deliverable	Time Frame	Estimated Start	Estimated Completion	
0	Vision and Scope	Vision and Scope	Complete	n/a	n/a
1	Conceptual Scoping	Conceptual design	6 weeks	Nov 2010	Jan 2010
2	Functional Design	Functional & technical design	6 weeks	Jan 2010	Feb 2011
3	Solution development and lab testing in offline environment	Functional software product	10 weeks	Mar 2011	May 2011
4	Pilot in the operational environment	Working solution signoff	8 months	May 2011	Dec 2011
5	Full scale implementation	Software signoff	On going	Jan 2012	On-going

15. PROJECT COSTS

As per CGA request, the costs for the project are presented in Table 7 and include all costs within the defined scope for a combined and single project, dubbed 1-Citrus. It includes both a complete industry wide measuring and information provision component and a Joint Planning Tool component for the citrus industry.

All costs exclude VAT or any other Sales Tax.

At this point, only the conceptual scoping phase should be considered a formal quote, while all the other project costs should be treated as indicative and are for budgeting purposes only, as these costs will be firmed up on as the preceding project phase is completed and all aspects of the phase are better understood.

These costs constitute complete project costs and include hardware, development, licences, communications and time but do not suppose how the project will be funded, as a number of different options are being investigated. These costs also do not assume internal citrus industry costs such as lobbying internally, mechanisms to achieve decisions etc and have been excluded as they are completely unknown to Crickmay.

The signing of this document will be considered as acceptance of the quote for the conceptual scoping phase which has been included in this document. This procedure will be adopted at each successive phase to ensure that all parties agree and are satisfied with both the work completed and the future project phase definition and scope.

