The Australian Seafood Cooperative Research Centre and the Australian Prawn Farmers Association

FINAL REPORT

"Passion for Prawns" – Benchmarking Performance

prepared by

CDI PINNACLE MANAGEMENT

17 September 2008

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Our clients are innovators, early adopters and industry leaders and agencies. They are corporations in the food and agribusiness industry, small to medium enterprises (SME's), individual producer/marketers (and Grower-Packer-Marketers), producer groups, development and Government agencies, and marketers and processors.

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ACKNOWLEDGEMENTS

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Without your assistance the detail presented in this report would not have been possible and most importantly the associated software program would not have been developed.

CDIPM would also like to express our thanks to the APFA Executive, for their preparedness to be of assistance and to offer advice. In particular, CDIPM we would like to express our gratitude to Jeff Harrison, Nick Moore and Matt West who acted as valuable touchstones and references points for the project and also to the two Executive Officers, Scott Walter and Helen Jenkins.

Lastly, we wish to express our thanks to the APFA Executive for the opportunity to conduct this consultancy. We greatly enjoyed the opportunity to work on this project and to contribute through our efforts to a more profitable Australian prawn industry.

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1. Introduction

The "Passion for Prawns' Benchmarking Report has three distinct components. The first component relates to the collection of information pertaining to the production, processing and marketing practices currently undertaken by Australian aquaculture prawn growers. Further, this information has been used as the starting point for the development of a prawn industry specific benchmarking software tool that will allow for the ongoing entry of growers' data and the calculation of both quantitative and qualitative Key Performance Indicators (KPI's). The benchmarking software is provisionally referred to as "PrawnBM".

The second component of the report provides an outline of the key findings from the research that was undertaken with both post-farm gate members of the prawn supply chain as well as growers. In particular, it attempts to highlight the principal areas where CDIPM believes that the industry may benefit from investing time (and funds) that will allow the industry to achieve greater sustainability by providing a product that meets the needs of consumers. These focus areas can be grouped into cost reduction strategies, additional revenue generation activities and improved product quality activities.

The third component provides a series of recommendations on how the focus areas identified in the second component of the research may be undertaken by the industry, so that the industry and its members are given the tools to improve their economic performance and sustainability.

2. Project Objectives & Methodology

2.1 Project Approach

During 2007, CDIPM was jointly approached by the Seafood CRC and the APFA to assist them with developing a project that involved the development of a benchmarking program that allowed the APFA members to:

- Compare their business performance (technical, marketing and financial aspects) against that of other farmers (anonymously if required);
- Allow farmers to evaluate / test new production and marketing processes against standard industry benchmarks to evaluate if it provides a business improvement; and
- Allow farmers to carry-on their day-to-day business with minimal time input required as the program was proposed to be run by the AFPA on an ongoing basis.

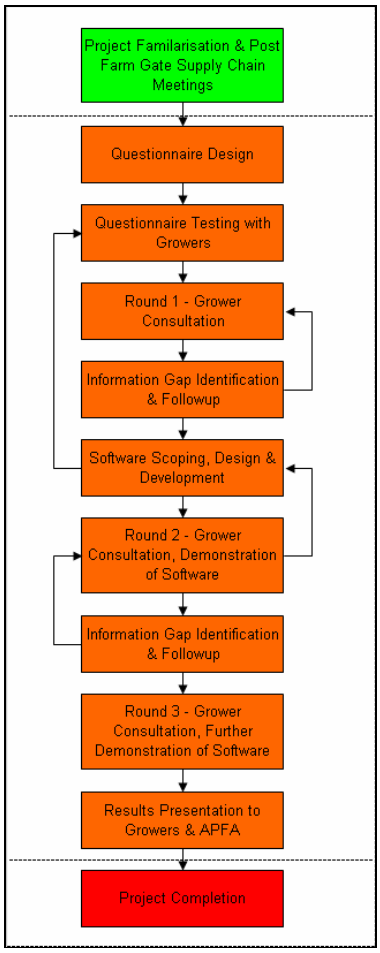
Further, it was proposed that the outputs of the benchmarking program were to be used to identify discrete projects that the APFA or others needed to undertake to further improve farmer profitability and chain efficiency.

This project addressed one of the key strategic objectives of the APFA, namely "To grow the Australian prawn farming industry in an economic and environmentally sustainable manner".

2.2 Overall Approach

The consultation approach utilised by CDIPM is described diagramatically in Figure 1.

Figure 1: Benchmarking Performance Consultation Process



This consultation process was followed with the exception of a number of instances where the number of follow-ups and gap filling discussions with growers were more numerous. This was a major contributing factor to delay in completion of the project.

2.3 Post Farm Gate Supply Chain Consultation

During late 2007 and early 2008 meetings were held by CDIPM with individuals and companies located in Brisbane, Sydney and Melbourne involved in the handling of Australian aquaculture prawns. Sectors of the supply chain with whom meetings were held included:

- Brokers
- Wholesalers (agents and merchants)
- Sydney Fish Markets
- Chain Retailers

- Fishmongers, and
- Food Service (restaurants, fish & chip operators, QSR).

The purpose of these meetings was to obtain information in relation to the following:

1. Most importantly, understand from their perspective/s what factors influence their ability to generate sales / profits from the sale of prawns.
2. Most importantly, understand what they believe are the major factors / issues that the Australian aquaculture prawn industry need to address so as to increase sales and / or increase the per unit price that growers receive.
3. Most importantly, understand from the consumers perspective what it is they are 'looking for' when they purchase prawns (whether Australian aquaculture, wild caught or imported).
4. Understand their role in the supply chain as it relates to the handling of Australian aquaculture prawns.
5. Understand the importance that Australian aquaculture prawns have in their business particularly in relation to the usage of other prawn types and sources.
6. Understand factors / issues that impact on their use of Australian aquaculture prawns.
7. Develop an understanding of the structure of the supply chain and the interrelationships that exist so that the chain can be diagramatically represented.

The meetings held did not rely on the use of a formal questionnaire as initial discussons indicated that those consulted would not respond well to such an approach.

The results of these discussions are presented in Section 3.

2.4 Growers Consultation

2.4.1 GROWER LIST

The APFA supplied a list that to the best of its knowledge were the current growers of prawns in Australia. A total of 30 businesses were identified. Not all of these businesses were members of the APFA.

A total of 15 businesses when approached agreed to be part of the project. The names of the contributing businesses to the study are contained in Table 1.

Table 1: Prawn Farming Businesses Contributing to Project Study

Business Name	Business Name
Australian Prawn Farms Pty Ltd	Pacific Reef Fisheries (Australia) Pty Ltd
Coral Sea Farms Australia Pty Ltd	Ponderosa Prawn Farm Pty Ltd
Clem Jones Qld Prawn Farm	Prawns North Pty Ltd

Business Name	Business Name
Fortune Enterprises Australia – Mission Beach & Yamba	Rossman Pty Ltd
GI Rural	Seafarm Pty Ltd – Cardwell
Gold Coast Marine Aquaculture	Seafarm Pty Ltd – Mossman
Melivan Pty Ltd	TPF Management
Monagold Pty Ltd	

CDIPM would suggest that as part of the next round of data collection for the 2007/2008 season that ALL growers should be invited to contribute, so that a full understanding of the range of production, processing and marketing practices can be captured, in addition to showing the financial results of these practices.

No grower when approached declined to be a project participant.

2.4.2 GROWER DATA COLLECTION ISSUES

The following issues occurred or were identified as issues in respect of grower data collection:

1. Grower Confidence. A number of growers were and possibly remain skeptical in regards to the benefits that this project will provide to their businesses. This skepticism resulted in a number of growers being unwilling to supply financial information about their businesses. A number of growers who initially indicated that they would be happy to supply financial information changed their mind during the course of the project. As a consequence the data captured in some areas is less than was anticipated or desirable. It is hoped that with the presentation of this report, and the information that has been compiled as a result, that more growers will be willing contributors to the next study.

2. Confidentiality. A number of businesses cited confidentiality as a reason not to supply information. Again, it is hoped that with the presentation of the data from this report that these growers will 'come on board' next year.

3. Uniformity of Production and Processing Reporting Systems. Every grower had a wide variety of systems for the collection of production and processing information. As a result the accuracy of some of the data may be brought into question.

4. Uniformity of Financial Reporting Systems. No two growers have the same financial information collection systems. This made the 'lining up' or 'homogenising' of data difficult in some instances. For instance, not all growers separated out processing costs, or separated packaging costs. Some growers include a cost for their own labour whereas others did not. Other growers included a provision for depreciation and amortisation while others didn't. Other growers may have included costs into repairs and maintenance which in other cases may have been included as capital items. CDIPM has used its best efforts to harmonise the data by communicating backwards and forwards with growers on the financials.

5. Peer Review / Competition. Some growers who had a poor season in the 2007 financial year (F2007) chose not to supply information. We believe this was due to their concerns about being perceived as 'poor growers' in the eyes of other growers, despite the fact that the identities of growers are kept confidential.

2.4.3 CONSULTATION QUESTIONNAIRE

A questionnaire was developed that was used as a prompter for the information that was required to be collected. It was regularly the case that aspects of the business practices were identified that were not considered in previous interviews. As a consequence the questionnaire should only be viewed as a guide to the information collected.

A copy of the questionnaire is attached at Appendix One.

3. Australian Aquaculture Prawn Supply Chain

3.1 Australian Aquaculture Prawn Supply Chain

3.1.1 GROWER MARKETING

The Australian aquaculture prawn supply chain is relatively simple. By far the greatest majority of aquaculture prawns are sold fresh or frozen having undergone no form of value adding prior to being supplied to the consumer. Restaurants are an exception to this.

Growers market their prawns by four principal methods:

1. In-house or own marketing to brokers, wholesalers, direct to retailers (chain and fishmongers) and food service. Generally the larger business units handle their own marketing, while smaller business rely on marketing their prawns through brokers or the Sydney Fish Markets.

2. By using the services of brokers. Currently there are two principal brokers, Aqua Marine Marketing and Blue Harvest. Aqua Marine Marketing handles the greatest proportion of product outside of individual businesses, athough over the last 12-24 months there has been some re-organisation of the supply base among the two brokers. Aqua Marine Marketing is an Approved Supplier to Woolworths and is their primary supplier in all of the eastern states of Australia. Blue Harvest is an Approved Supplier to Coles in NSW and Victoria.

3. Sydney Fish Markets (SFM). Two growers were identified that sell all or the vast majority of their product through the Sydney Fish Markets, either using SFMLive or the auction system. This product is sold on an agency basis with the rates of commission varying depending on how the product is sold and the nature of the relationship between the grower and SFM (contracted or uncontracted).

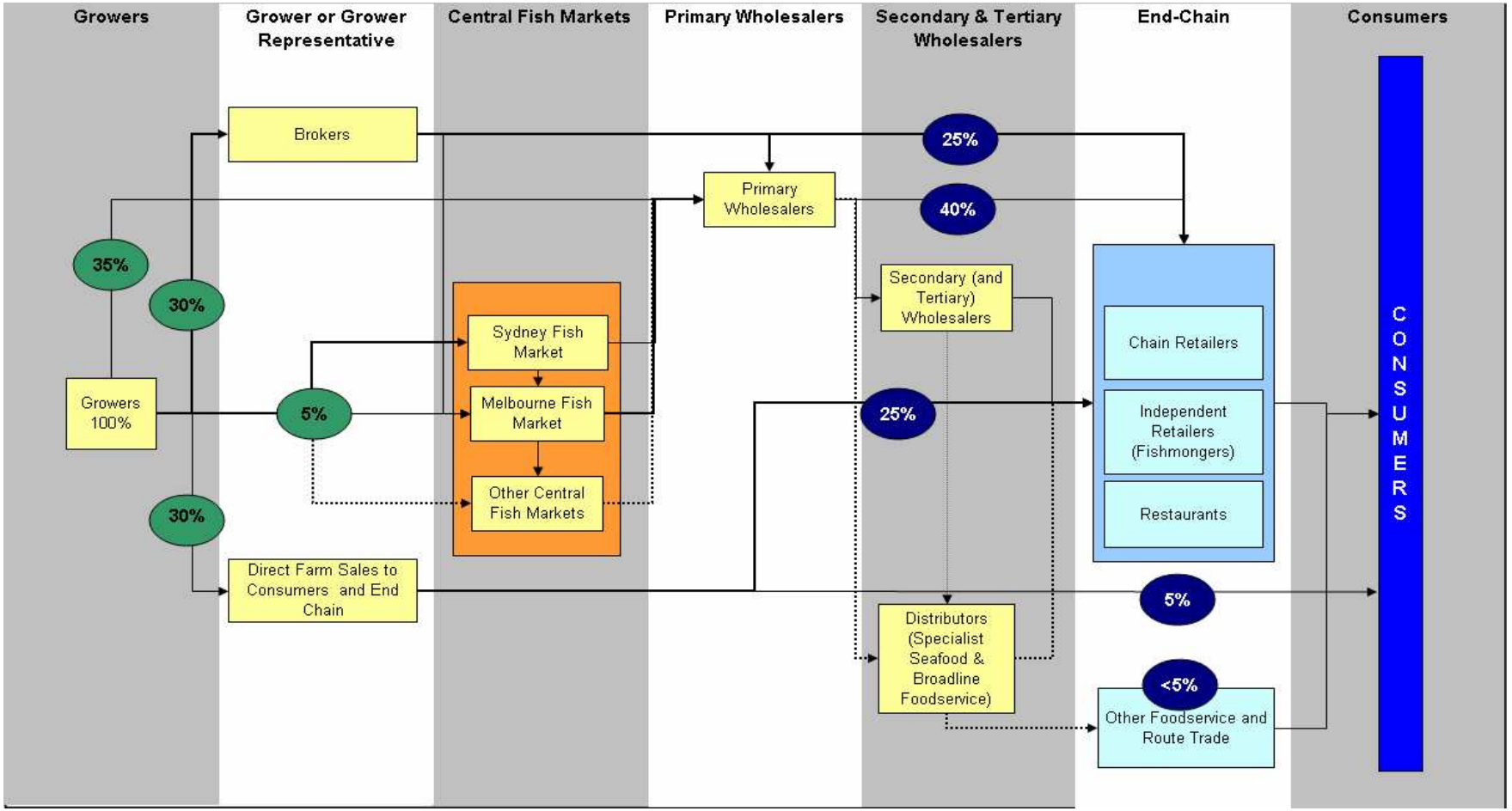
4. Farm gate sales. Particularly important for south-east Queensland producers, a number of growers sell their product direct to the public 'shed door'. This product may be fresh or frozen depending on the time of year and may also include soft and broken and / or green prawns.

Anecdotal evidence and other research projects conclude that the greatest volume of prawns are sold through Woolworths, with Coles selling significantly less volumes. Further, Sydney is the largest capital city consumer of prawns, followed by Brisbane then Melbourne. Melbourne generally does not regard aquaculture prawns highly due to their paler colour and more bland taste. Further, Melbourne is not a high per capita consumer of prawns presumably due to climate factors, although in our opinion we consider it to be a market with untapped potential. The Brisbane market, while reportedly having a high per capita consumption, has a ready supply of wild caught prawns as well as aquaculture prawns.

3.1.2 AUSTRALIAN AQUACULTURE PRAWN CHAIN

The Mid-Chain were not willing to provide information in relation to supply volumes moving through their businesses. Previous studies have provided estimations of the volumes and we have no reason to doubt that they are close to accurate. Our analysis has shown that the Australian Aquaculture Prawn Chain can be represented as shown in Figure 2. Based on ancedotal evidence and our own investigations, our estimates do provide indications of the relative volumes moving through the variety of supply chains pathways in this figure.

Figure 2: Australian Aquaculture Prawn Supply Chain



3.1.3 TRANSACTION TRANSPARENCY

The marketing of fresh prawns is very closely aligned to that of fruit and vegetables and the same issues associated with price transparency are frequently raised. The mid-chain (brokers and primary and secondary wholesalers) is often criticised that they do not provide any significant or in some cases no price transparency to their suppliers. Further, unless a grower is a dedicated supplier to a single end point customer, it is unlikely that a grower will have any knowledge of who it is that buys their product once it is supplied to their 'customer'. The impact of this is that some growers become suspicious that others in the chain are receiving payments greater than what has been disclosed. This results in an 'us versus them' mentality which results in the chain becoming inefficient as price and supply signals are manipulated.

The impact of this in the fruit and vegetable industry has been the introduction of the Horticultural Code of Conduct, which stipulates in writing the nature of the transaction and the level of disclosure that is required across the chain. The horticultural chain, particularly growers, will say the current legislation has been ineffectual in changing business practices, however with the recent review by the Australian Competition and Consumer Commission (ACCC) into Retail Grocery Prices, it is expected a more comprehensive, enforceable code will result. Currently, we understand there is no expectation that this Code will be expanded to include the seafood industry.

The impact of the introduction of the Code in horticulture has been that the mid-chain has become more aggressive in respect of poor quality suppliers by telling them their product is no longer required. This has then resulted in a number of growers either exiting the industry because they 'can't keep up' or that they have actually taken steps to become 'better' growers.

3.2 Key Findings – Post Farm Gate Consultation

The key observations in relation to the perception of post farm gate supply chain members who handle Australian farmed prawns are:

1. Inconsistency. The central theme of all contributors was that Australian aquaculture prawns are inconsistent. This inconsistency manifests itself in a number of forms including:

    a. Salt taste inconsistency: Contributors suggested that across brands, within boxes of the same pallet and even within the same box, aquaculture prawns are generally regarded as having the greatest level of inconsistency in salt taste. This results in consumers having a variable level of eating satisfaction, with this level of dissatisfaction being expressed at the checkout with some consumers opting to consume other prawn types or worse still no prawns at all. This issue was widely regarded (in combination with frozen prawn performance) as the single greatest detrimental factor influencing the industry.

    b. Frozen prawns inconsistency: A number of contributors commented that again across brands, within boxes of the same pallet and even within the same box, that when defrosted prawns frequently had a variable appearance in terms of dullness / brightness of the prawn, shell hardness and colour. While we are not food technologists, we believe some of the contributing factors may relate to factors such as uniformity of cooking, uniformity of cooling and freezing, handling from harvest to processing, life cycle of the batch, poor grading and even possibly genetic variation. That said, we don't think it is appropriate to place all the

blame at the growers' feet. When questioned the majority of businesses that were involved in defrosting and then offering for sale prawns did not know the correct method to defrost prawns or how to look after prawns when defrosted.

c. Size inconsistency: Some contributors offered that certain growers were 'notorious' for being suppliers of prawns that were incorrectly or inconsistently sized. Our observations at a farm level generally did not support this view with the majority of growers appearing to pay careful attention to size grading , however we obviously did not see all farming operations. It is an issue that may be addressed somewhat by providing sampling reports of consignments sent to purchasers. Our discussions with growers indicated that they did not advise customers by way of pre-consignment reports / assessments of samples taken and reported upon. Further, no growers provided digital images of prawns that were being supplied prior to dispatch or any other information apart from colour, size, pack weights and sometimes only vague references regarding the other quality attributes of the product.

d. Taste inconsistency (other than salt): Some contributors commented that some growers were generally regarded as supplying prawns that had a degree of taste variability which was other than salt. The most general complaint was that prawns tasted muddy or earthy. Again, while we are not food technologists, this may be due to prawns that are drain harvested in 'muddy' ponds or incorrectly purged prior to harvest.

e. Pack weight inconsistency: Contributors identified that a number of growers are reknown for overpacking cartons, which 'curiously' the wholesalers are not concerned about. Further, some wholesalers identified that some growers are well known for being suppliers of product that consistenty weigh less than the target weight. As a result these growers frequently have their products 'discounted' by wholesalers and 'in-the-know' retailers. Factors identified that contribute to pack weight inconsistency include prawns are not being properly drained prior to packing (fresh and frozen product), growers not uniformly glazing their product, and growers not making sufficient allowance for weight loss during transit.

f. Colour inconsistency: Regarded as an important issue by post-farm gate players. A number of contributors again commented that across brands, within boxes of the same pallet and within the same box, prawns frequently had a variable colour. Factors which may be contributing to this variation include lack of consistency in cook timings, poor cook practices (infrequent exchange of cooking water), and production practices (stressed versus healthly prawns, use of chemicals to enhance colour). The greatest single factor identified by CDIPM is the wide variation in cooking strategies (eg fresh, brine, fresh + salt) which is in use in the industry.

An example of the impacts of having inconsistent product was described by one Sydney based wholesaler.

"I would make rather pay a premium of $0.50 to $2.00 per kilogram for prawns that I know are consistent and that I can supply to my customers with confidence that I know that I am not going to get a phone call to say that these prawns are not what I asked for and / or are rubbish. If I have a 100% confidence that the product is consistent I can then be assured that my customer is not 'trying to put one over me'. If I am not a 100% confident I have to be prepared to accept a discount on the prawns, thus in many instances losing all of my margin. If I don't do this I run the risk of losing that customer as the wholesaling sector in particular is

highly competitive and I can't afford to lose any customers. Further if I am confident in the product I don't have to spend the money on having a worker opening the lid of every single box to make sure that it is what I ordered."

2. Appearance of Frozen Product After Thawing: Contributors suggested that a number of growers' product performed poorly when defrosted. In some instances they pointed out that the product wasn't inconsistent, rather it was that it was consistently poor. Suggestions ventured why this may be occurring include:

    a. Product is frozen too long before being used.

    b. The product takes too long to freeze resulting in larger ice crystals forming in the product which when defrosted make it soft to touch.

    c. Blast freezers are not maintaining the product at a low enough temperature.

    d. The supply chain post-freezing results in the product being partially or fully defrosted in a sub-optimal manner.

    e. The product is poorly defrosted and subsequently stored.

3. Incorrectly Cooled Fresh Product: A frequent complaint was that product arrived from some growers with elevated temperatures resulting in a poor appearance and shortened shelf life. The two principal factors identified that contribute to this is incorrect volumes of ice or other coolant being added and poor handling along the supply chain, including by wholesalers and retailers. The use of temperature recorders is wide in other temperature dependent food industries eg. meat, fruit and vegetables, however they do not appear to be in wide use in the seafood industry and most particularly in the prawn industry. Our experience would suggest that a study that tracked the movement of multiple cartons of prawns across a wide variety of channels would beneficially identify the major 'bottlenecks' in ensuring prawns are handled at the correct temperature.

4. Poor Communication / Business Practices: Some observers commented that some growers lacked professionalism in the way they conducted business with other members of the chain. This is a difficult area to provide definitive comment on; as our experiences in the fruit and vegetable industry suggest a valid argument may exist that post-farm gate participants may be equally guilty of being poor communicators and business people.

    Further, poor communication of product volumes, qualities and delivery volumes were all blamed for contributing to price volatility in the industry. Our experience suggests that there is often a fine balance in terms of what is the best strategy in terms of communication of such information.

Section 6 will discuss in detail CDIPM's recommendations for how a number of these issues may be addressed by growers and research agencies.

4. Software Development

4.1 Software Development

Microsoft Access ("MS Access") was the software platform chosen for this project.

MS Access allows you to build friction-free functioning applications that can grow to be quite complicated and feature-rich.

Further, MS Access is easily available and easily used by end users who are already familiar with the MS Office applications, having the same look-and-feel as MS Word and MS Excel.

For complicated data management tasks, MS Access provides database, form interfaces and reports. It allows for customisable interfaces (such as the data entry forms) allowing users to be easily trained to use the interface. This program has the ability to be used for a virtually endless number of years, for virtually any number of growers.

MS Access also allows for data to be effeciently managed in a database, as opposed to the spreadsheeting tool MS Excel. This allows for good design principles, which in turn allows the program to be adapted quickly and often, as was the case in this project as the specifications were being created and enhanced throughout.

Further, compared to other database products it is easy to program in, has good vendor support through Microsoft, and is affordable.

In respect of the ongoing discussion of the software program for the purposes of this report, it will be referred to as "PrawnBM".

4.2 Key Features of PrawnBM

4.2.1 KEY FEATURES

PrawnBM in summary has the ability to deliver the following to individual growers and industry:

Individual Growers

1. A detailed record for each year of the production, processing and marketing strategies, production and financial data for their individual business.

2. A tool that allows individual growers to compare qualitatively their own individual production, processing and marketing practices with that of a select or whole group of other farms across one or multiple years.

3. A tool that allows individual growers to compare quantitatively their own business Key Performance Indicators (KPI's) with that of a select or whole group of other farmers across one or multiple years.

Growers will then have the ability to identify strategies through the qualitative data comparisons that they may be able to introduce to their own farming operations to improve their business profitability. The quantitative or KPI benchmarks will then enable a grower to see how their current or altered business practices can improve their bottom line.

Industry

1. Allows industry to understand the industry's standard or average costs of production, production and employment data.

2. Allows industry to understand the variations in the key performance indicators, and the range of variation in performance that the industry is achieving.

3. Through understanding the wide variety of production, processing and marketing practices in use by farms, identify the critical issues / factors that need to be addressed to improve the performance of an individual grower or the industry as a whole.

4. Identification of research and development priorities for whole of industry projects.

5. Through ongoing data collection and maintenance, benchmarking will be able to test the impacts or effects that certain R&D or other activities have on the performance of individual businesses and the industry as a whole.

4.2.2 PRAWNBM 'FRONT END'

The front end of the program currently appears as presented in Figure 3 and Figure 4.

Figure 3: PrawnBM Front End – Page 1.

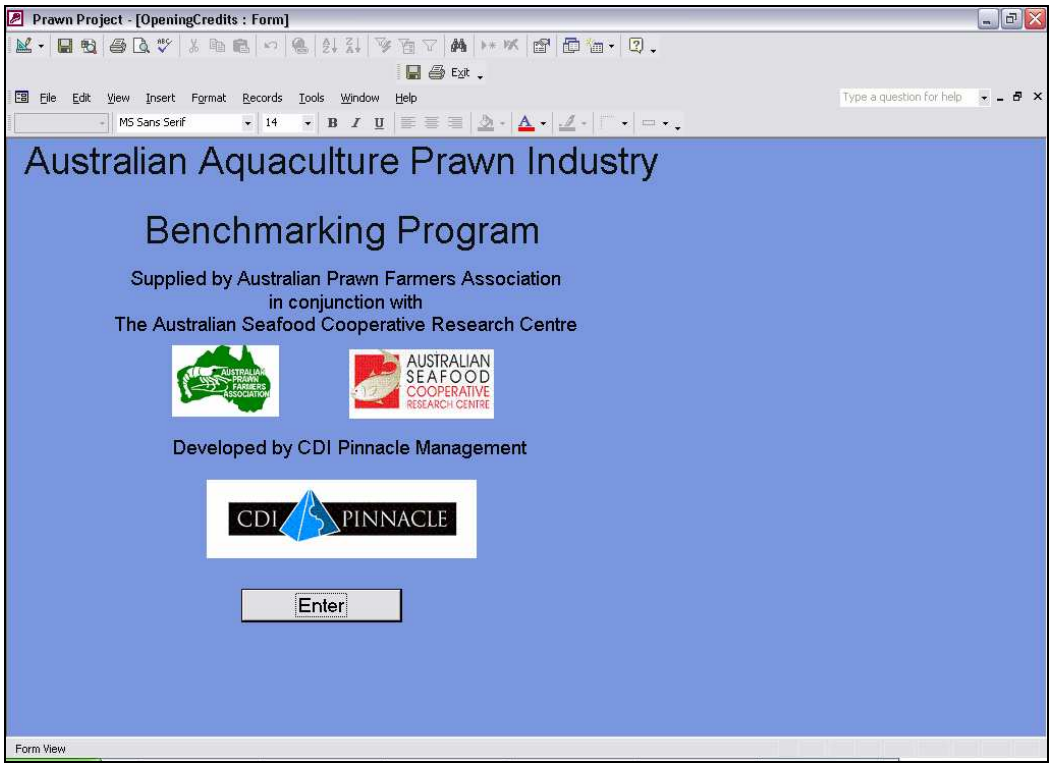
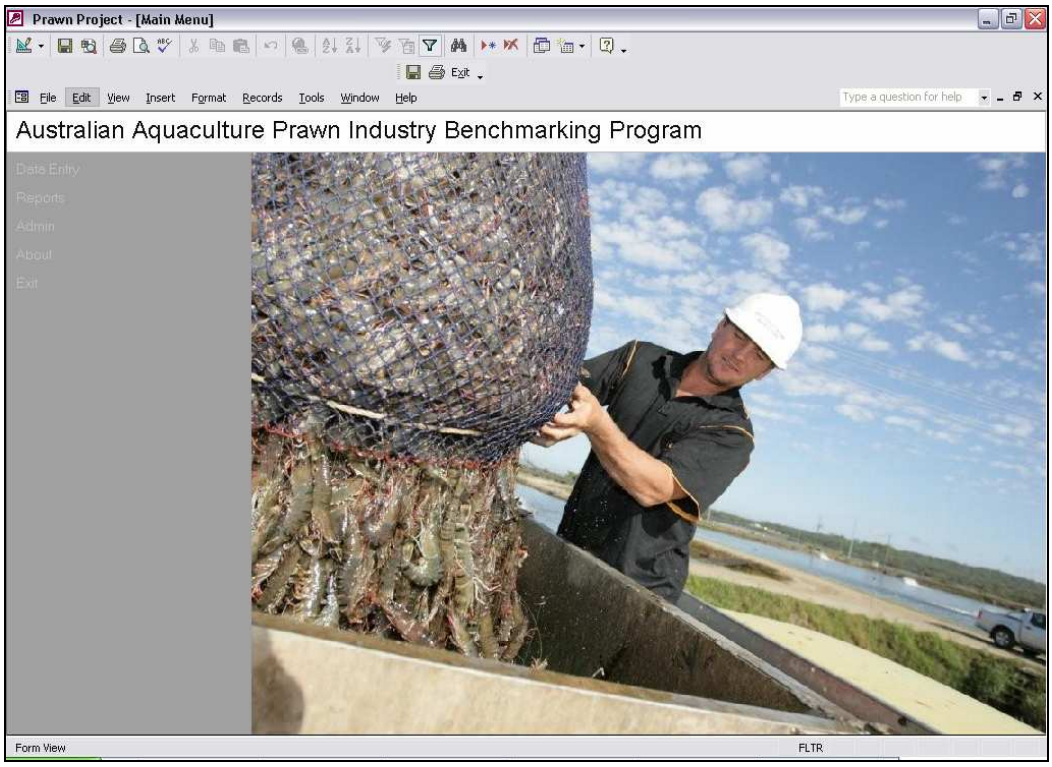


Figure 4: PrawnBM Front End – Page 2.



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The PrawnBM front end comprises four separate sections, these being:

1. Data Entry – Menu item where all grower and other data is entered.

2. Reports – Menu item where all reports that are automatically generated as a result of the data entry are able to be accessed.

3. Admin – Program management menu where the framework of certain aspects of the program can be managed.

4. About - System details of the program, not for modification by the data manager.

Information relating to items (1) and (2) is discussed in Section 4.2.3 to Section 4.2.6.

4.2.3 DATA ENTRY

The data entry section of PrawnBM comprises a number of menus, namely grower details, employment, production, processing and marketing, as well as a final section Profit & Loss which is used for financial data collection. The production, processing and marketing menus then have a series of sub-menus that relate to the process flow associated with growing, packing and marketing of prawns. A flow schematic of the data entry section of PrawnBM is presented in Figure 5.

Figure 5: Flow Schematic PrawnBM Data Entry Section.

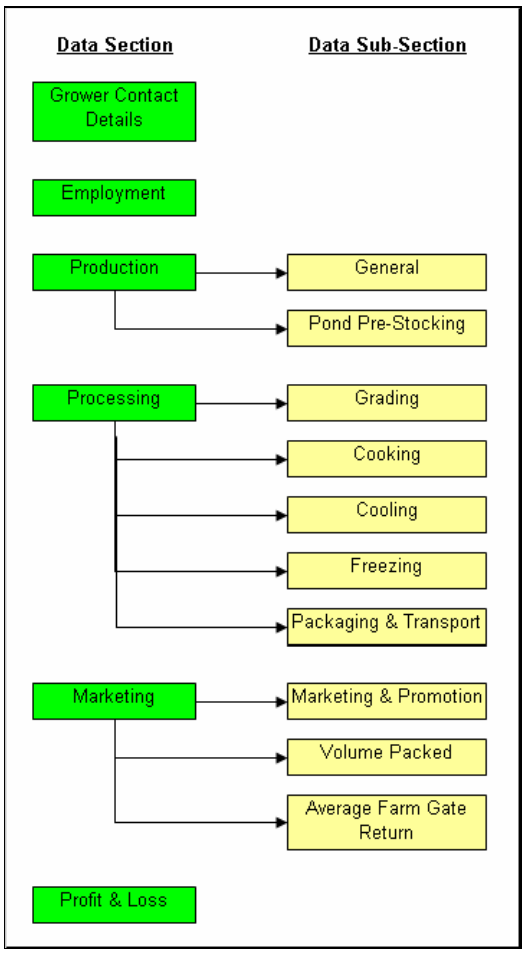
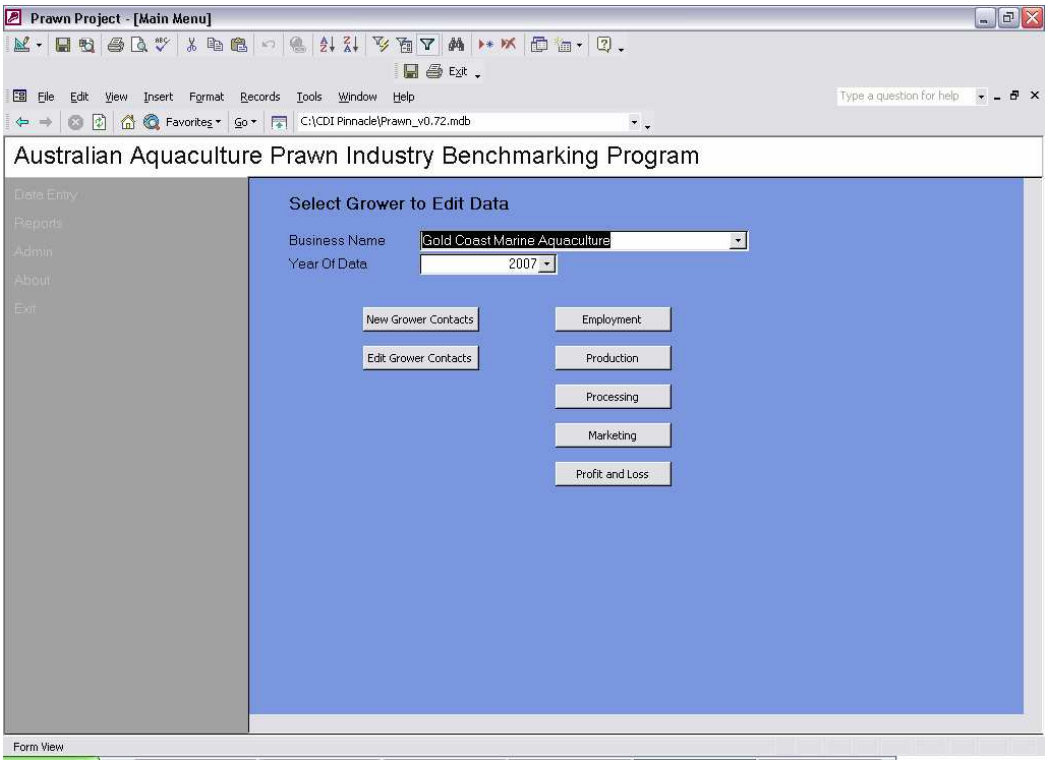


Figure 6 is a screen capture of the PrawnBM data entry section of the program.

Figure 6: Screen Capture of Data Entry Section of PrawnBM.

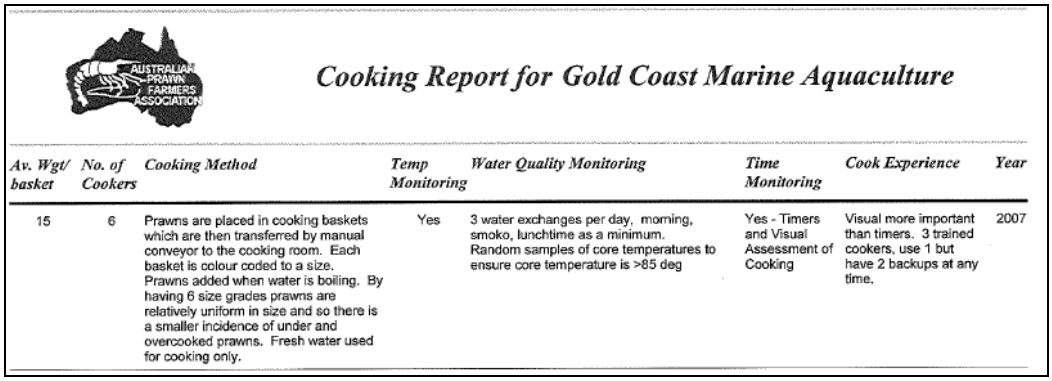


4.2.4 REPORTING – GROWER REPORTS (SINGLE AND MULTIPLE)

The reporting function has been divided into three sections, namely, Grower Reports which are the subject of discussion in this section and two others, KPI Reports (see Section 4.2.5) and KPI Charts (see Section 4.2.6).

Grower reports can be accessed for a single grower, which includes the name of that company (see Figure 7), or for multiple growers relating to the same report type (see Figure 8). For multiple grower reports the grower ID number is displayed and not the name of the company.

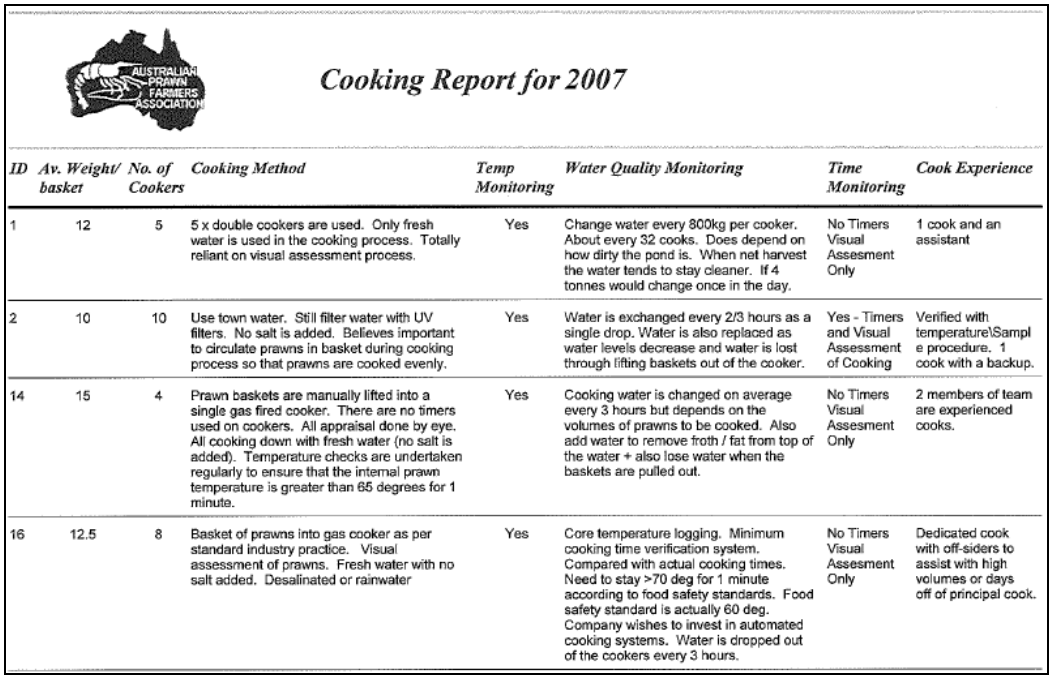
Figure 7: Example of Single Grower Report.



Cooking Report for Gold Coast Marine Aquaculture

Av. Wgt/ basket	No. of Cookers	Cooking Method	Temp Monitoring	Water Quality Monitoring	Time Monitoring	Cook Experience	Year
15	6	Prawns are placed in cooking baskets which are then transferred by manual conveyor to the cooking room. Each basket is colour coded to a size. Prawns added when water is boiling. By having 6 size grades prawns are relatively uniform in size and so there is a smaller incidence of under and overcooked prawns. Fresh water used for cooking only.	Yes	3 water exchanges per day, morning, smoko, lunchtime as a minimum. Random samples of core temperatures to ensure core temperature is >65 deg	Yes - Timers and Visual Assessment of Cooking	Visual more important than timers. 3 trained cookers, use 1 but have 2 backups at any time.	2007

Figure 8: Example of Multiple Grower Report.



Cooking Report for 2007

ID	Av. Weight/ basket	No. of Cookers	Cooking Method	Temp Monitoring	Water Quality Monitoring	Time Monitoring	Cook Experience
1	12	5	5 x double cookers are used. Only fresh water is used in the cooking process. Totally reliant on visual assessment process.	Yes	Change water every 800kg per cooker. About every 32 cooks. Does depend on how dirty the pond is. When net harvest the water tends to stay cleaner. If 4 tonnes would change once in the day.	No Timers Visual Assesment Only	1 cook and an assistant
2	10	10	Use town water. Still filter water with UV filters. No salt is added. Believes important to circulate prawns in basket during cooking process so that prawns are cooked evenly.	Yes	Water is exchanged every 2/3 hours as a single drop. Water is also replaced as water levels decrease and water is lost through lifting baskets out of the cooker.	Yes - Timers and Visual Assessment of Cooking	Verified with temperature\Sample procedure. 1 cook with a backup.
14	15	4	Prawn baskets are manually lifted into a single gas fired cooker. There are no timers used on cookers. All appraisal done by eye. All cooking down with fresh water (no salt is added). Temperature checks are undertaken regularly to ensure that the internal prawn temperature is greater than 65 degrees for 1 minute.	Yes	Cooking water is changed on average every 3 hours but depends on the volumes of prawns to be cooked. Also add water to remove froth / fat from top of the water + also lose water when the baskets are pulled out.	No Timers Visual Assesment Only	2 members of team are experienced cooks.
16	12.5	8	Basket of prawns into gas cooker as per standard industry practice. Visual assessment of prawns. Fresh water with no salt added. Desalinated or rainwater	Yes	Core temperature logging. Minimum cooking time verification system. Compared with actual cooking times. Need to stay >70 deg for 1 minute according to food safety standards. Food safety standard is actually 60 deg. Company wishes to invest in automated cooking systems. Water is dropped out of the cookers every 3 hours.	No Timers Visual Assesment Only	Dedicated cook with off-siders to assist with high volumes or days off of principal cook.

There are 26 individual grower reports which a grower can access in relation to his business. The names of each of these reports and the report section in which they are contained is presented at Figure 9.

Figure 9: **Flow Schematic PrawnBM Grower Reports Section.**

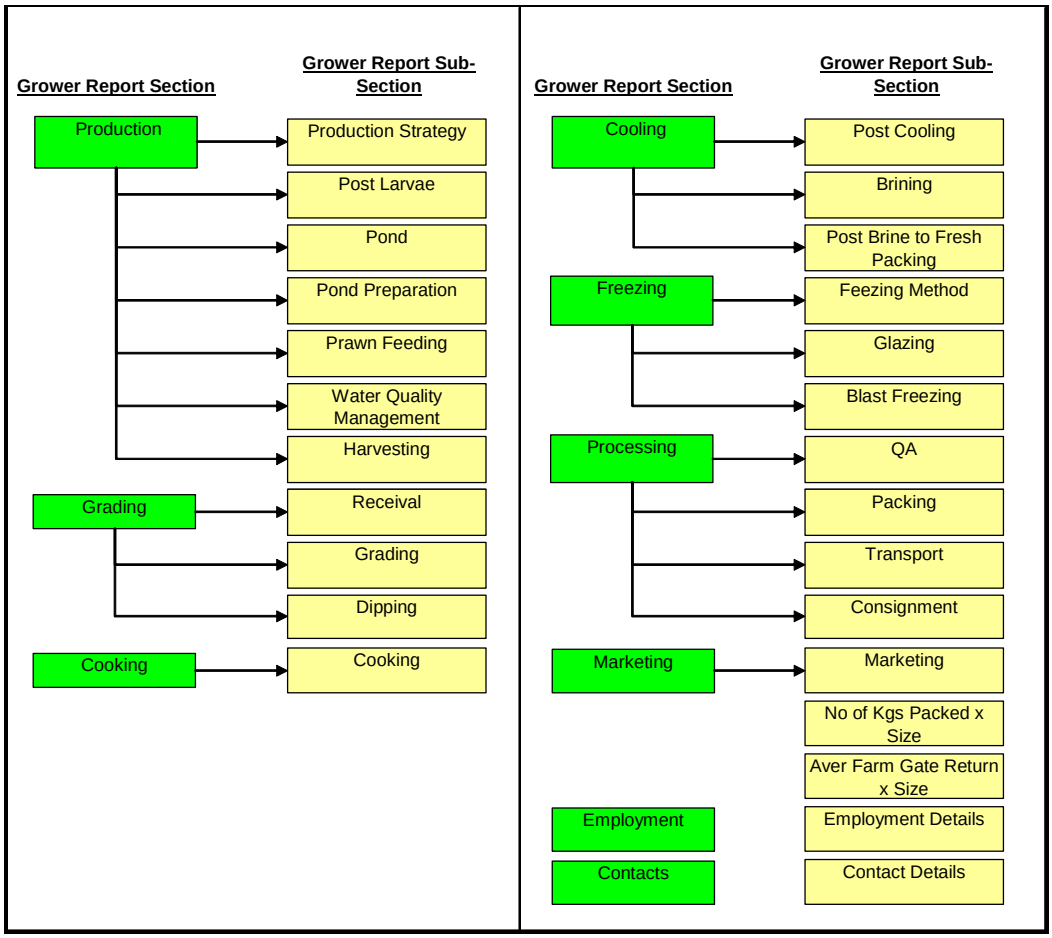
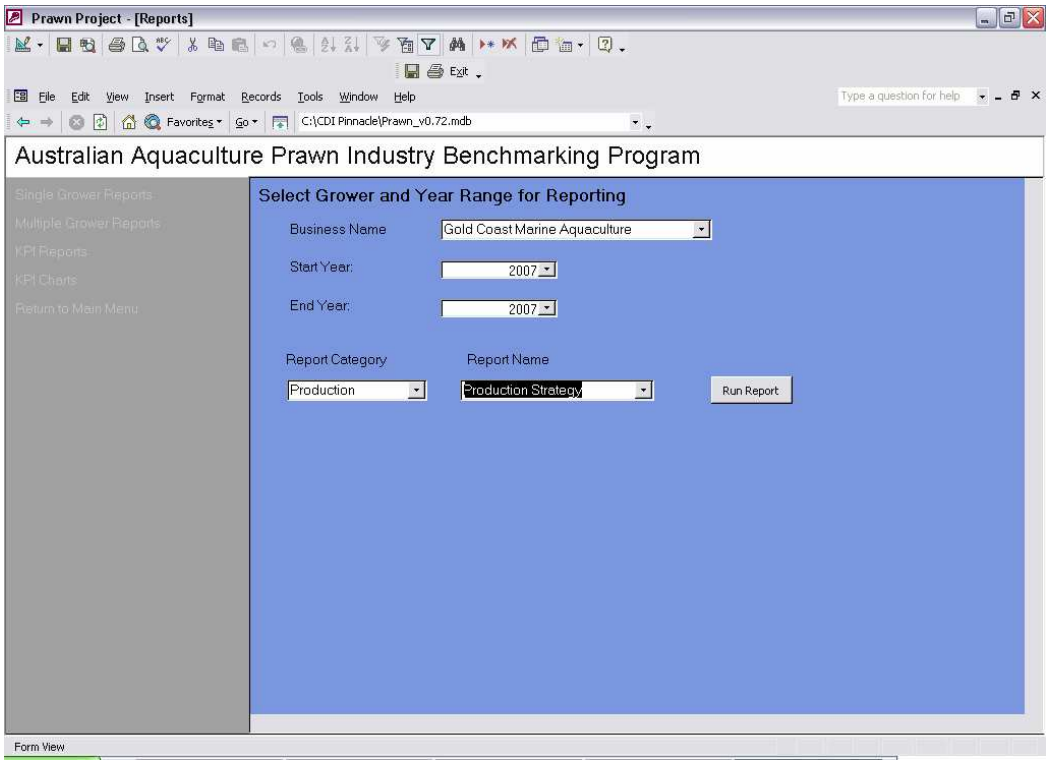


Figure 10 is a screen capture of the PrawnBM Grower Reports section of the program.

Figure 10: Screen Capture of PrawnBM Single Grower Reports Section.



The multiple grower reports section has the ability to select one, all or any combination in between of growers to be included in the report.

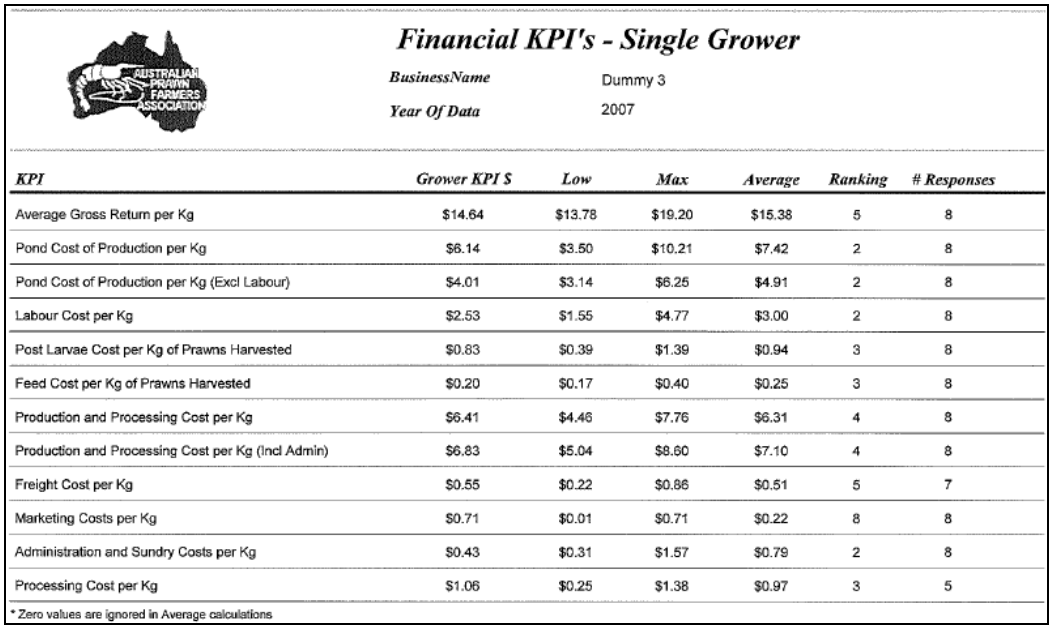
4.2.5 REPORTING – KPI REPORTS

The KPI Reports section of PrawnBM permits the user to seek three types of reports on an individual farm or a selection of farms, across single or multiple years. These KPI reports are titled Financial, Management and Operational.

For each grower KPI report, the KPI figure is provided, the minimum and maximum value for that KPI, the average for that KPI and the rank of that grower (1= the most desirable) in comparison to all the growers that were selected.

Figure 11 shows a view of a Financial KPI report in addition to a listing of all the KPI's that are measured in that category.

Figure 11: Example of Single Grower Financial KPI Report.



Financial KPI's - Single Grower

BusinessName Dummy 3

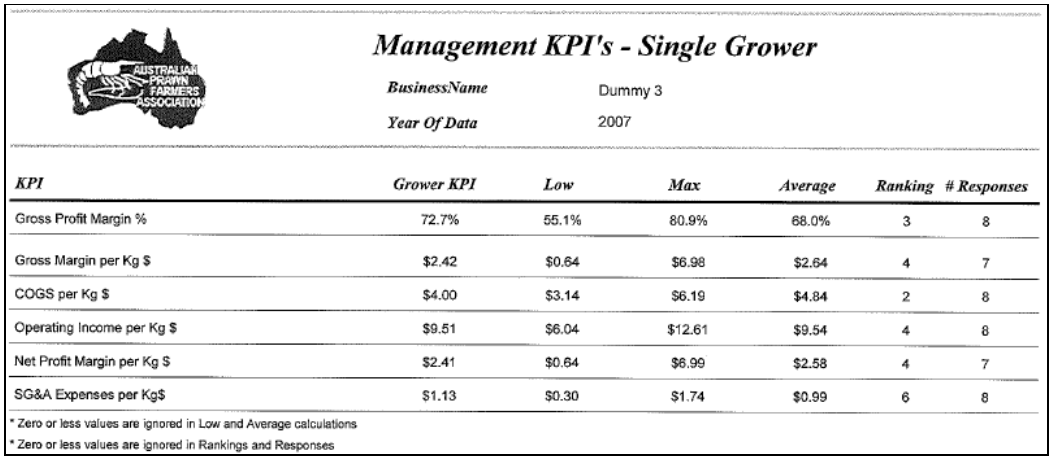
Year Of Data 2007

KPI	*Grower KPI $*	*Low*	*Max*	*Average*	*Ranking*	*# Responses*
Average Gross Return per Kg	$14.64	$13.78	$19.20	$15.38	5	8
Pond Cost of Production per Kg	$6.14	$3.50	$10.21	$7.42	2	8
Pond Cost of Production per Kg (Excl Labour)	$4.01	$3.14	$6.25	$4.91	2	8
Labour Cost per Kg	$2.53	$1.55	$4.77	$3.00	2	8
Post Larvae Cost per Kg of Prawns Harvested	$0.83	$0.39	$1.39	$0.94	3	8
Feed Cost per Kg of Prawns Harvested	$0.20	$0.17	$0.40	$0.25	3	8
Production and Processing Cost per Kg	$6.41	$4.46	$7.76	$6.31	4	8
Production and Processing Cost per Kg (Incl Admin)	$6.83	$5.04	$8.60	$7.10	4	8
Freight Cost per Kg	$0.55	$0.22	$0.86	$0.51	5	7
Marketing Costs per Kg	$0.71	$0.01	$0.71	$0.22	8	8
Administration and Sundry Costs per Kg	$0.43	$0.31	$1.57	$0.79	2	8
Processing Cost per Kg	$1.06	$0.25	$1.38	$0.97	3	5

* Zero values are ignored in Average calculations

Figure 12 shows a view of a Management KPI report in addition to a listing of all the KPI's that are measured in that category.

Figure 12: Example of Single Grower Management KPI Report.



Management KPI's - Single Grower

BusinessName Dummy 3

Year Of Data 2007

KPI	*Grower KPI*	*Low*	*Max*	*Average*	*Ranking*	*# Responses*
Gross Profit Margin %	72.7%	55.1%	80.9%	68.0%	3	8
Gross Margin per Kg $	$2.42	$0.64	$6.98	$2.64	4	7
COGS per Kg $	$4.00	$3.14	$6.19	$4.84	2	8
Operating Income per Kg $	$9.51	$6.04	$12.61	$9.54	4	8
Net Profit Margin per Kg $	$2.41	$0.64	$6.99	$2.58	4	7
SG&A Expenses per Kg$	$1.13	$0.30	$1.74	$0.99	6	8

* Zero or less values are ignored in Low and Average calculations
* Zero or less values are ignored in Rankings and Responses

Figure 13 shows a view of a Operational KPI report in addition to a listing of all the KPI's that are measured in that category.

Figure 13: Example of Single Grower Operational KPI Report.

Operational KPI's - Single Grower

BusinessName Dummy 3

Year Of Data 2007

KPI	*Grower KPI*	*Low*	*Max*	*Average*	*Ranking*	*# Responses*
Average Prawn Size (g)	23.29	18.33	30.26	24.80	9	13
% Reject (%)	4.25	0.25	15.00	3.29	10	14
Food Conversion Ratio	1.68	1.60	2.65	1.97	3	12
Survival Rate (%)	72.00	0.38	72.00	5.37	1	15
Yield Per Hectare	5.77	2.46	8.93	5.30	6	16

* Zero or less values are ignored in Low and Average calculations
* Zero or less values are ignored in Ranking and Responses

4.2.6 REPORTING - KPI CHARTS

PrawnBM is also able to generate a graphical representation of any of the KPI Reports that are discussed in Section 4.2.5. Examples of these charts are presented in Figure 14, Figure 15, Figure 16, Figure 17 and Figure 18.

Figure 14: Graph of Yield Per Hectare for Australian Prawn Aquaculture Businesses, F2007.

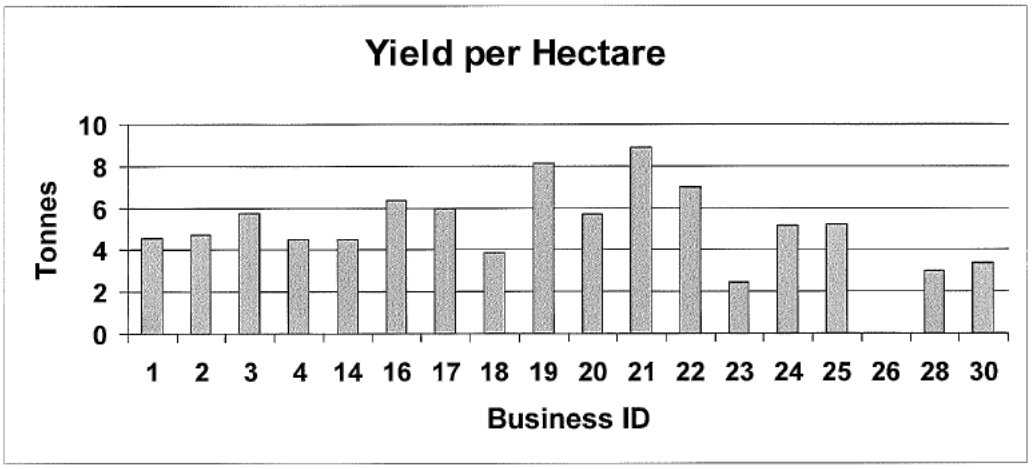


Figure 15: Graph of Average Gross Return Per Kilogram for Australian Aquaculture Prawn Businesses, F2007.

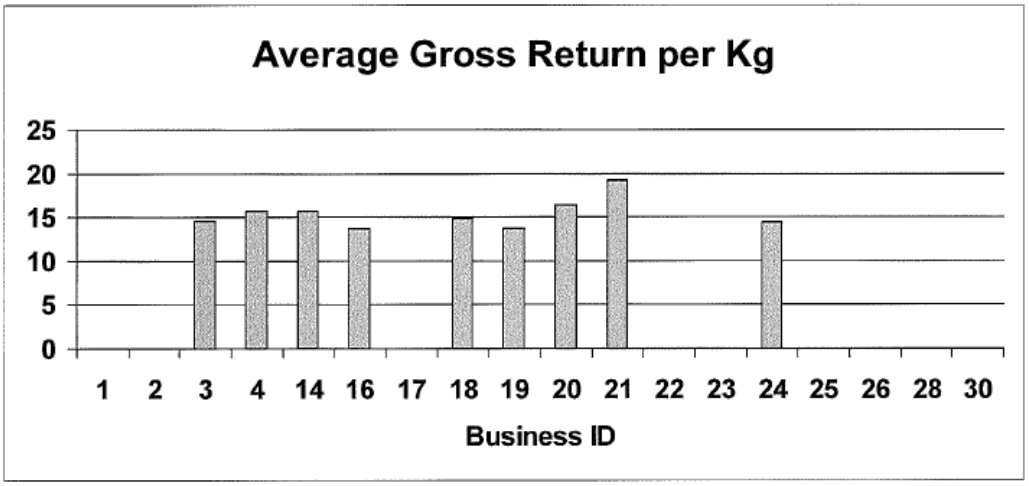


Figure 16: Graph of Post Larvae Cost Per Kilogram of Prawns Harvested for Australian Aquaculture Prawn Businesses, F2007.

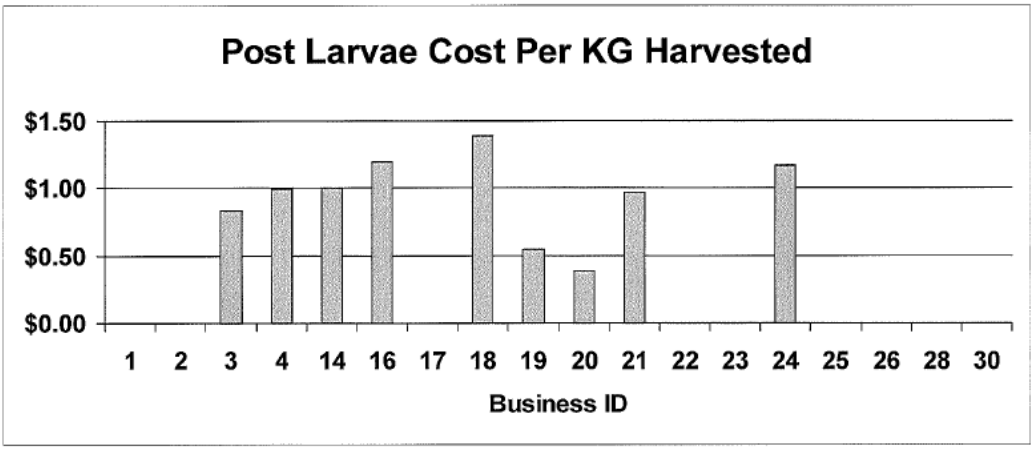


Figure 17: Graph of Gross Margin Per Kilogram of Prawns Harvested for Australian Aquaculture Prawn Businesses, F2007.

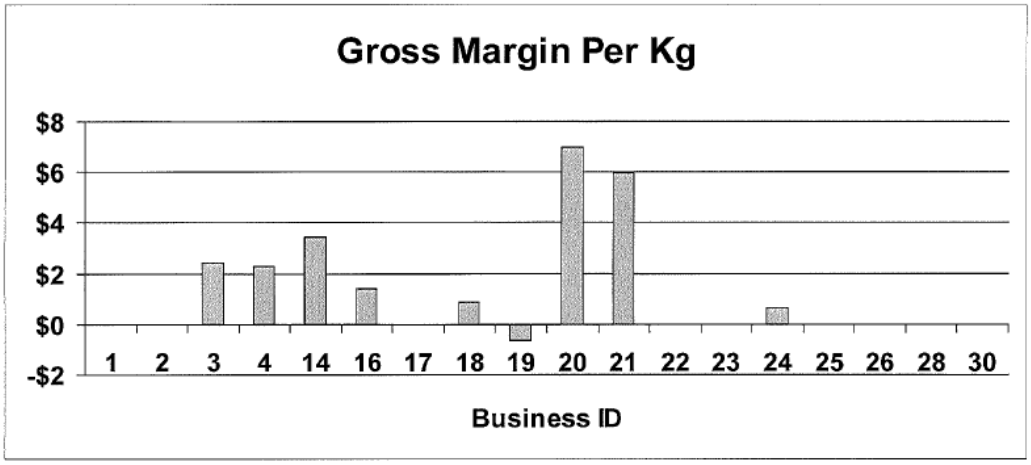
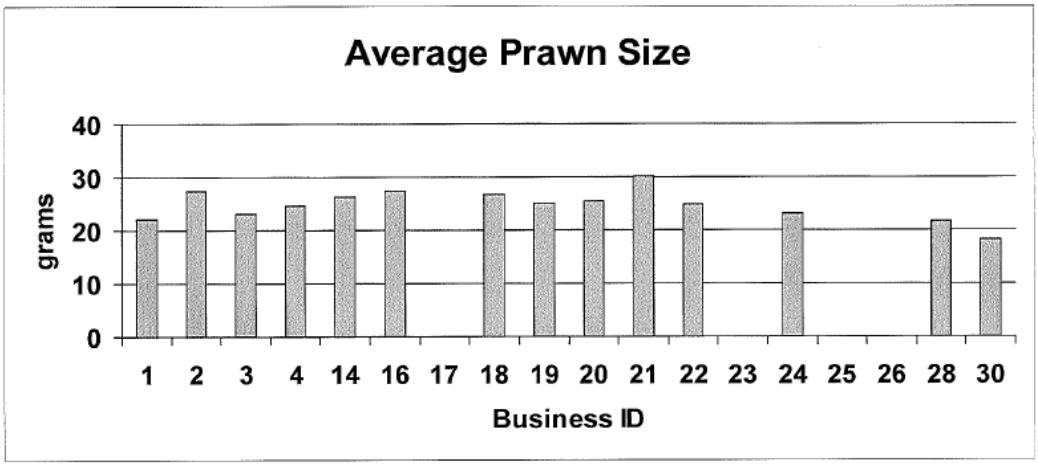


Figure 18: Graph of Average Prawn Size (Grams per Prawn) for Australian Aquaculture Prawn Businesses, F2007.



4.3 Software Installation & Training

The software system will be installed at the APFA head office following signoff from the AFPA Executive Committee. The installaton of passwords and other security will be completed at that time.

A Systems Manual has also been developed and will be supplied with the software.

5. Benchmarking Results

5.1 Costs of Production

5.1.1 MAJOR COST CENTRES

From the data supplied it is possible to calculate the average costs of production by major costing category.

The major cost centres and the cost that they represent as a percentage of the total costs of operation for the farms who supplied data for F2007 is represented in Table 2.

Table 2: % Costs of Operation of an Australian Aquaculture Prawn Farm, F2007.

Cost Centre	% of Total Costs
Feed	30.3%
Wages & On Costs	22.7%
FORM (Fuel & Oil, Repairs & Maintenance)	8.3%
Electricity & Gas	8.0%
Finance (including D&A)	7.4%
PL Purchase	6.6%
Processing	5.4%
Administration	4.7%
Freight	3.2%
Chemicals & Water	1.4%
Other	1.9%
Total	**100.0%**

5.1.2 IMPLICATIONS OF COST CENTRE DATA

At the commencement of the project one of the 'calls' from some growers were for the project to identify strategies that could be introduced by industry and individual growers to reduce the average cost of the production of prawns. The focus by some growers were to see how freight and packaging costs per unit may be able to be reduced.

Our analysis shows that packaging and freight (on average) represents a comparatively small component of the costs of producing a kilogram of prawns. We acknowledge of course the proportionally greater freight charges of northern growers.

However, our recommendations would suggest that feed, labour, electricity and gas, purchase of PL's and repairs and maintenance are all more important 'inputs' to focus on reducing their costs as any percentage reduction in them will have a greater impact on the grower bottom line.

Further, any grower must not ignore that costs of production is literally only half of the equation when we are looking at grower profitability, with revenue the other side. Our observations, which will be discussed in greater detail in Section 5.2, suggest that their growers may be better served by focussing on production and quality enhancement strategies that increase yields and unit sale prices.

5.1.3 COST REDUCTION STRATEGIES

Our observations suggest that there are a number of potential initiatives that can be undertaken or at least investigated that may reduce the costs of doing business. These strategies are discussed in detail in Table 3.

Table 3: CDIPM Observations Relating to Major Cost Items of Aquaculture Prawn Farms.

Cost Item	Observations
Feed	1. Ridley and CP are the two major suppliers, with many growers using CP product in the earlier part of the season as they need to purchase in bulk and so towards the end of the season they 'switchover' to Ridley product which can be purchased in smaller lots, allowing 'growers' to operate hand to mouth. 2. There is no strong trend or perception that one supplier has a superior quality product, although Ridley is seen to be more pro-active and so provides a better standard of service. 3. Tradition plays a significant role in who a grower uses to supply feed. 4. There is no evidence of collective purchasing among growers and further limited evidence of hard bargaining among many growers with the exception of some of the larger growers. Growers do not appear to want to work together to purchase feed (or other inputs for that matter) as many see it as too hard to coordinate and may even indicate to their neighbours how well or bad their production is going based on the feed orders. 5. There are strategies in place by at least one feed supplier to work proactively with growers to focus on maximising the return per kg of prawns produced. While a strategy by the feed supplier to differentiate themselves from other suppliers, the final outcome of such R&D will per kg of prawns result in a better financial outcome.
Wages & On Costs	1. Per unit wage costs paid to workers are low compared even with some other agricultural industries. This applies to both tertiary and non-tertiary qualified workers. The industry is not perceived as a 'worker destination of choice' by manner and as a result in many areas struggles to attract good field and packaging workers as well a tertiary educated workers. 2. Many growers cite an inability to pay higher wages due to the poor industry returns. Our observations highlighted that the most profitable farms where those that had a 'better class' of worker whether tertiary or non-tertiary qualified. Suffice to say while labour competition remains high, a failure by some growers to pay higher wages to better workers will result in high staff turnovers, greater training costs (due to the need to employ new workers). Paying workers low hourly rates or salaries may in fact be giving a 'false economy' as the productivity per unit (hour or kg of prawns produced) may in fact be lower than that for better paid, more motivated workers. 3. In a ideal situation growers would be able to record times and costs worked by employees, managers and owners in order to convert this back to work hours and costs per unit. The labour cost KPI's calculated as part of this project while useful and indicative are not as precise a measure as what could be achieved by adopting a more detailed approach. 4.

Cost Item	Observations
Electricity & Gas	1. Growers traditionally have not focussed on strategies to reduce electricity and to a lesser extent gas costs. This is in part due to the narrow range of tariffs that were available and the monopoly nature of power supply. This traditional attitude is still apparent with the majority of growers who tend to accept the charges that they are asked to pay by electricity and gas companies. 2. There is no evidence of collective bargaining either from an industry or more smaller grower groups perspective in respect of electricity accounts. We believe that at least an investigation should be conducted that identifies the volume of electricity and gas that are used across a year on a month by month and 'time of the day' basis. These demands could then be tendered to a selection of electricity and gas suppliers to determine if there is any benefit in proceeding with a collective approach. 3. The introduction of energy saving technologies that permits the industry to boast 'green credentials' in addition to saving money on electricity (and gas) usage is apparently a focus on the APFA. Adoption by growers will require a clear definition of the costs and returns associated with any introduction of new technologies. Further, it will be up to a select group of growers to investigate the technologies that are available to the industry and 'report back' to the rest of the industry.
PL Purchases	PL Purchasing 1. The purchasing of PL's by growers who do not own their own hatcheries is an interesting mix of tradition, sometimes a 'hand to mouth' approach and price. 2. These approaches are largely caused by the fact that hatcheries which generally rely on 'wild caught' breeding material are notoriously unreliable in being able to guarantee PL supply to customers due to the incidence of disease and other production factors. 3. Most growers have relationships with one or more suppliers, so as to reduce the likeleihood of being 'left out' if a hatchery fails to produce enough PL's. 4. PL quality was cited by virtually all growers as a major factor that influences crop yields. Other growers did however suggest that some growers may often blame 'PL' quality for poor crop performance. This study was unable to sort out the 'myth from the fact' in this regard. 5. What is apparent however with a number of hatcheries is that little attention is paid to the use of quantitative assessment / sampling procedures to monitor PL growth prior to being sold. Further, only a few hatcheries appear to reject significant quantities of PL'S based on poor performance characteristics. 6. Our observations would suggest that the development of PL grade standards (for example growth rates, existence or absence of certain quality characteristics) could be linked to prices paid (better standard equals higher price). We would suggest this initially as a topic for further conversation to determine the validity of the observation / comment. 7. Our observations would suggest that there are limited opportunities for growers to reduce the price that they pay for PL's. It is unlikely that stand alone hatcheries and grower-hatcheries will rationalise significantly due to the latters desire to achieve supply security. Further, growers are unlikely to entrust generally their supply programs with a single supplier which if they did would give them some levels of volume purchasing power. Further, the technologies in use and the volumes of

Cost Item	Observations
	material produced will not justify any significant investment of capital that will reduce hatchery production costs. Quality of Breeding Material. 1. Growers firmly believe that variable (or poor) quality PL's is largely due to the quality of the breeding material that is used to produce them. 2. Our observations suggest that many hatcheries source breeding stock sight unseen and due to the limited supply and windows are effectively 'forced' to take what they are supplied with. Given that PL quality is a foundation of achieving good yields, we believe that many hatcheries need to pay greater attention to the quality of the PL's that they are receiving. This could even involve the development of quality assessment descriptors for breeding material which could be provided to hatcheries. Pricing of breeding material may then be able to be reflective of breeding material quality. We would suggest this initially as a topic for further conversation to determine the validity of the observation / comment. Security of Breeding Material Supply 1. The majority of breeding stocks are sourced from two fishermen in North Queensland. Many growers appear concerned that these fishermen will continue to supply catch and supply breeding stock. While growers are concerned that there does not appear to be any collective action being undertaken to ensure the long term security of breeding material supply. 2. There has been 'discussion' regarding sourcing stock from alternative States. There would appear to be a strong case to suggest that the major hatchery owners should develop a coordinated approach to securing access long term to high quality breeding material. If cross-border negotiations are required because of bio-security matters, the APFA would by necessity be required to be involved. Domesticated Stock 1. Our observations would be to suggest that the performance of the hatchery run domesticated breeding programs, while promising in some instances, would appear to have a long way to go before it may be possible for those intellectual property holders to supply other growers. Therefore growers should address the security of breeding material as discussed above on the basis that the domesticated breeding stock programs will not be the answer in at least the short and medium terms.
Repairs & Maintenance(R&M)	1. As will be discussed in Section 5.2 in respect of KPI's, we believe it is possible that items identified as R&M may be capital expenditure and so may be providing skewed results in respect of true R&M costs. 2. R&M costs are reflective (of course) of the age of the equipment and the history associated with its maintenance. Our observations confirm that there is considerable variability in this regard. Certainly we identified that the better farms in terms of financial performance were generally neater in appearance with the equipment having a better standard of maintenance. 3. The approach and dedication to farm maintenance is very much an individual's choice. Our belief is that growers will only change their approach to R&M if it is

Cost Item	Observations
	demonstrated to them that better maintained farms produce better results. This linkage is discussed further in Section 5.2.
Fuel & Oil	1. Fuel & Oil (F&O) comprises a comparatively small percentage of the cost base of growers except where they rely heavily on the use of generators. Due to the comparatively small percentage cost of fuel and limited applicability to the wide range of growers as a major cost item, CDIPM makes no recommendations in relation to reducing costs in this area.
Freight	1. Two companies dominate freight handling for prawns, Charter and to a lesser extent JAT. 2. Due to very considerable variation in the size and location of farms it was not possible to determine whether or not individual farms were paying excessive freight rates. 3. Freight and their costs are obviously more important for Northern Queensland producers as opposed to those in the south as a percentage of the total cost of operations. 4. Growers commented favourably towards the quality of service and comparative knowledge of how to handle prawns by both freight companies. There appears to be few viable options that growers would be willing to accept in respect of freight providers. Further, Charter is the dominate freight handler for other seafood products moved along the eastern seaboard, so looking at changing freight companies will we believe actually result in an increased freight cost. 5. A general industry tender is unlikely to be a successful approch towards attempting to reduce costs as it is apparent that larger growers do benefit from their volume that they offer and others benefit from their location.
Processing	1. Processing costs which principally comprises packaging forms a total of 5.4% of the total costs. There are two principal pack types, polystyrene for fresh product and cardboard for frozen product. 2. With respect of polysterene which is a very bulky product there are few suppliers that service any one particular region and in some cases only one. It is not economically viable to transport polysterene cartons very large distances as the freight component reduces any benefits that may be achieved by harder negotiating. Cardboard cartons are either imported by one marketing group at apparently quite low prices in comparison with domestically produced product. Further, the larger carton manufacturers (Visy and Amcor) would not be prepared to provide volume discounts except to the largest growers. 3. As a consequence CDIPM sees limited scope to achieve significant cost savings in packaging purchases from an industry viewpoint, particularly given that CDIPM see far greater potential to reduce per unit costs in other areas as discussed in this table.

5.2 Industry KPI's

As a result of the analysis conducted with the use of the PrawnBM the following KPI's were calculated. These KPI's include the low and maximum values for the KPI, the average and the total number of responses for that KPI. The KPI's are calculated for F2007.

5.2.1 FINANCIAL KPI'S

Table 4 presents the Financial KPI's for all respondent farms in F2007. It should be noted that the number of respondents were low in comparison to the other KPI categories as a number of growers did not supply financial information as requested.

Table 4: Australian Aquaculture Prawn Growers Financial KPI's, F2007.

KPI	Low	Max	Average	# Resp.
Average Gross Return per Kg	$13.78	$19.20	$15.49	7
Pond Cost of Production per Kg	$3.50	$10.21	$7.60	7
Pond Cost of Production per Kg (excl labour)	$3.14	$6.25	$5.04	7
Labour Cost per Kg	$1.55	$4.77	$3.07	7
Post Larvae Cost per Kg of Prawns Harvested	$0.39	$1.39	$0.95	7
Feed Cost per Kg of Prawns Harvested	$0.17	$0.40	$0.26	7
Production & Processing Cost per Kg	$5.04	$8.60	$7.14	7
Freight Cost per Kg	$0.22	$0.86	$0.51	6
Marketing Costs per Kg	$0.01	$0.34	$0.16	7
Administration & Sundry Costs per Kg	$0.31	$1.57	$0.84	7
Processing Cost per Kg	$0.25	$1.38	$0.94	4

5.2.2 MANAGEMENT KPI'S

Table 5 presents the Management KPI's for all respondent farms in F2007.

Table 5: Australian Aquaculture Prawn Growers Management KPI's, F2007.

KPI	Low	Max	Average	# Resp.
Gross Profit Margin %	55.1%	80.9%	68.0%	8
COGS per Kg	$3.14	$6.19	$4.84	8
Operating Income per Kg $	$6.04	$12.61	$9.54	8
Net Profit Margin per Kg $	$0.64	$6.99	$2.58	7
SG&A Expenses per Kg $	$0.30	$1.74	$0.99	8

5.2.3 OPERATIONAL KPI'S

Table 6 presents the Operationall KPI's for all respondent farms in F2007.

Table 6: Australian Aquaculture Prawn Growers Operational KPI's, F2007.

KPI	Low	Max	Average	# Resp.
Average Prawn Size (g)	18.33	30.26	24.80	13
% Reject (%)	0.25	15.0	3.29	14
Food Conversion Ratio	1.60	2.65	1.97	12
Survival Rate (%)	38%	72%	63%	15
Yield per Hectare	2.46	8.93	5.30	16

5.2.4 INTERNAL AND COMPETITIVE BENCHMARKING

The value of calculating numerical or quantitative benchmarks such as those demonstrated in Section 5.2.1 to 5.2.3 is that it allows:

1. Individual growers to assess objectively where their business operation is positioned against that of other growers at a single point in time (ie a year). This is referred to as competitive benchmarking.

2. Individual growers to assess objectively how the performance of their business operation moves or changes across multiple years. This is referred to as internal benchmarking.

Analyses such as these provide no real value to businesses unless those businesses then seek to investigate how it is that better performing businesses produce, process and market their prawns and then apply the lessons learnt to their own businesses. In industry parlance this is referred to as seeking continuous improvement in business practices.

In summary, the KPI benchmarks are only valuable in that they show a business where it is positioned in relation to other businesses. The qualitative information that has been compiled that relates to the production, processing and market practices, provides at least a snapshot of how better performing growers are operating their businesses. Any grower who wishes to seek to improve their business operations should undertake a detailed investigation of the Multiple Grower Reports that will be supplied to each grower.

5.3 Qualitative Benchmarks

5.3.1 GROWER RESPONSIBILITY FOR ACTION

As a result of the detailed on-farm discussions held with growers it is obvious there is a wide range of strategies / methods employed by growers to grow, package and market their prawns. The impacts of these variations is plain to see when you then analyse KPI's generated.

This report does not seek to go into detailed discussion about how Farm X is doing better than Farm Y because of these factors. CDIPM are not technicans and it is for those people experienced in the industry, the growers, to assess how Farm X, which based on the quantitative benchmarks, is a better performing farm because it is

growing, packaging or marketing their prawns in this fashion and how those business practices may be applicable to the operation of Farm Y.

5.3.2 SPECIFIC BUSINESS IMPROVEMENT ACTIVITIES

During the compilation of data for this project, CDIPM considered it critical to observe first hand wherever possible the chain of activities from the pond to processing that were undertaken by individual growers. As a result of this activity it became obvious that virtually every grower had a little 'secret' that they used that gave their product or operation an edge over growers.

For example, one grower instead of tipping all of their ice into the top of the box to cool fresh prawns, they also included a layer of ice at the bottom of the box. The reason behind this was that by putting ice into the bottom of the box it is cooled and so the prawns do not heat up when they make contact with it. Further, the ice layer separates the prawn from the water which results from the defrosted ice reducing the incidence of soft prawns with lower salt content levels.

CDIPM are not positioned to comment whether or not the 'benefit' from an activity such as this is real, or that the added benefits resulting are greater than the costs involved in making it occur.

This study has identified numerous examples of these 'secrets' which may warrant further investigation or testing by individual farmers or groups of farmers to test their veracity. CDIPM has documented each of these activities in the quantitative data component of the software. This information will be made available to individual farmers via a "Multiple Grower Benchmarking Report".

5.4 Recommended Future Focus Areas

Based on:

- results from the Post Farm Gate Supply Chain meetings and the issues that we raised by those individuals;
- observations by CDIPM during the course of on-farm interviews; and,
- subsequent interrogation of the qualitative and quantiative data,

there are a number of activities which in the opinion of CDIPM warrant investigation or action. We believe a number of these activities should receive attention.

A list and discussion of these recommended "Special Areas of Focus" is provided in Table 7.

Table 7: 'Special Areas of Focus' for Future Research and Industry Activity.

Item	Discussion
1. Establish Standard Operating Procedures (SOP) for Prawn Brining	At the farm level there is an enormous variation in the methodology associated with the brining of prawns. These variations extend to salt concentrations, equipment used to brine, and brining times. Further, there are a minimal number of farms who are able to accurately assess salt concentration. CDIPM believes the variation of practices is tied to the lack of objective information about what it is that the 'average' consumer prefers in terms of 'prawn saltiness'. There have been numerous taste studies conducted that indicate consumers "prefer that prawn over that prawn' but there has been no empirical research conducted that links the preferences of the average consumer in terms of salt content to the development of a SOP for the brining of prawns. By developing a SOP the industry then has, if widely adopted, a greater chance of providing a higher level of product consistency so 'desired' by the mid- and end-chain participants.
2. Establish of Standard Operating (SOP) for Prawn Freezing	Again, at the farm level there is a wide variation in the IQF and Blast Freezing technologies used to freeze prawns. We understand the objective in freezing prawns is to achieve a target core temperature of the prawn in as quick a timeframe as possible. The wide variation in prawn appearance and test following thawing is believed by many to be due to the time to achieve the core temperature and its maintenance. CDIPM recommends that research should be conducted to firstly agree on the time / temperature SOP that should be sought for prawn freezing. Secondly, we then recommending an audit be undertaken of participant farms to evaluate performance of the farms freezing practices against that of the SOP so as to confirm achievement of best practice or deficiencies on same.
3. Prawn Cooling Post Cooking	Directly linked to (2) above CDIPM's observations were that there was an enormous variation in techniques used to cool prawns post-cooking. The variations extended from cooling troughs that had were recirculating (not-to-waste), ambient and small in size (limited cooling capacity) which were then placed directly into brining eskies to dual cooling processes that had the ability (according to the grower) to get the core temperature of the prawn down to 4 degrees inside of 10 minutes from cooking. If (2) is pursued we would be recommending that the cool chain audit extend back to at least the post-cooking cooling.
4. Fresh Prawn Cool Chain Assessments & SOP Development	Growers use a wide variation of volumes and forms of cooling agents (ice, gel paks) in fresh prawns at packout. For instance, some growers are using up to 3kg of ice per 18kg box whereas others are using as little as 0.5kg. This variation may be a significant contributor to why prawn quality is so variable. CDIPM believes the industry may benefit by undertaking a series of trials to identify a SOP associated with prawn cooling. It is suggested multiple sites (eg. North Qld and South Qld) should be tested due to the higher average temperatures and longer transport times involved in moving

Item	Discussion
	North Queensland products. CDIPM would be suggesting that this project should be linked with Item (7) and involve the use of temperature monitoring devices.
5. Prawn Cooking	The vast majority of the industry still uses traditional methods i.e. visual assessment, for the cooking of prawns. This is due primarily to the significant variation in prawn sizes that occur from batch to batch, variations in temperature of water used to cook with, and type of water used (salt, fresh or brine) etc. Variations in the medium used to cook prawns (salt, fresh or brine) will be significant contributors to variations in the salt content of prawns at eating. Prawn cooking (not unlike brining) according to some growers is a bit of a 'mystic art'. Until growers move away from this approach and work towards developing a SOP for the cooking of prawns which is directly linked to consumer preferences and brining it is likely that the variations in prawn quality will continue.
6. Water Quality Measurement / Assessment Systems	Considerable variation exists between how farms assess the water quality of their ponds during the growth cycle of prawns. Our observations of individual farms indicate that the best performing farms in terms of tonnage per hectare rely on both visual and scientific assessment of water quality. A number of the more 'traditional' growers expressed a belief that the use of water assessment technologies is 'mumbo jumbo' and adds little as they are the ones that are skilled in assessing water quality. CDIPM believes it is impossible to not have one without the other (its no different to other farming methods). We would therefore be recommending that in order to achieve best practice farmers who have a low level of adoption of objective water assessment technologies should be seeking advice / input from farmers who are already using them.
7. Fresh & Frozen Pack Assessments	Outturn reports are in wide use in other segments of the food industry. Growers, either individually or collectively, return a party to independently assess the quality of prawns based on a series of performance characteristics. The use of outturn reports do not appear to be in wide use in the prawn industry.
8. Labour	1. The prawn production sector appears to have limited depth in the quality of pond, processing, and farm managers. This is evidenced by the fact that 'good' managers appear to have worked on at least one farm over their life time as they are 'poached' or leave 'bad employers'. Further, there appear to be few younger, tertiary qualified and / or motivated workers coming into the industry. When these workers do enter the industry there appears to be very limited mentoring support of older growers or collaborations between these younger members in terms of exchanging information. A failure to address this issue will result in a continued limited level of access to good people. This will become even more critical as many of the 'founding fathers' of the industry from 20 years ago, retire and leave the industry. 2. The APFA should investigate whether or not there are opportunities through the recently introduced Pacific Islander guest worker program to access farm workers particularly during the high demand harvest periods. It is unlikely that the supply of labour, available to the prawn industry from within Australia, is going to increase due to the very high demand for primary production workers.

Item	Discussion
	3. Both the harvesting and processing of prawns as a labour intensive industry would benefit from strategies that reduce labour input. Many of these strategies will need to be 'home grown' as the majority of the significant prawn producers in the world are not currently faced with labour supply and / or cost pressures. In relation to harvesting there has been at least one development that has signficiantly reduced the per unit cost of labour. The issue for smaller farmers will be their ability to justify the significant capital cost of initial purchases. At processing the majority of the operations remain highly labour intensive. Further, the majority of processing sheds are inefficient in design with many of them having been developed in stages. Whilst the majority of growers would choose to invest in additional processing technologies that would save labour, there is uncertainty by growers of the cost benefit of the investment required. This should be a focus of research efforts.
9. Market Research & Development	With the exception of a number of the larger growers, it is apparent there is limited investment by the growing sector in understanding the supply chain beyond which they operate. Growers appear to have a limited understanding beyond 'transactional negotiations' that occur on the issues / factors that drive the remainder of the supply chain. A number of other fishing industry sectors have benefitted from investing in activities such as 'Walking the Chain' that allows them to better understand the supply chain of which they are a part.
10. New Product Offerings	The vast majority of Australian prawns are sold cooked fresh or frozen. As a consequence there is limited value adding. To date there has been limited concerted effort by the industry to identify new product formats and value adding strategies that allow it to differentiate itself between Australian aquaculture and other prawns. A group of growers working together exploring new opportunities which if successful may segment the supply of prawns into different markets would be of considerable benefit to the industry over time.

6. Central Recommendation – Grower Driven R&D Activity

6.1 Factors Influencing R&D Activity

CDIPM conclusions are that there are significant opportunities to improve the individual business performance of growers as well as the perception of the quality of the product that is offered by the industry to consumers. These conclusions are based on:

1. The very wide variability in quantitative KPI's demonstrated by individual businesses resulting from PrawnBM. There are businesses within the prawn industry who are making strong profits with others performing very poorly.

2. The wide variability in production and processing techniques in use by growers as demonstrated through the qualitative production, processing and marketing benchmarks developed.

3. The contention by the post farm gate sectors of the chain that elements of the growing sector provide product that has a very high degree of inconsistency associated with it and that this results in poor consumer acceptance of farmed prawns and prawns generally.

While acknowledging the enormous opportunity that exists for improved business and industry performance, the next critical step is to identify how these are opportunities are then going to be progressed into reality. There are a number of realities that must be considered / acknowledged:

- The industry has a limited R&D budget available to it, particularly given that significant amounts of it we understand are committed to pre-existing projects.

- The process associated with gaining external funding for projects is extensive and time consuming, particularly given that CDIPM's recommendations are that there are many areas, some quite small, that are worthy of investigation.

- Traditional R&D approaches that involve the use of external service providers may not deliver the best outcomes in some instances.

- There are limited external resources available to growers currently beyond that of the current Executive Officer and a part-time Industry Development Officer whose role is yet to be fully described.

- Growers, particularly family owned and operated businesses, are busy individuals and who in many cases have a limited degree of motivation to work with others.

- The industry is faced with significant issues associated with the motivation and training of 'young up and comers'.

6.2 'Next-G' Project Management Group

6.2.1 BENEFITS OF GROWER MANAGED R&D ACTIVITY

CDIPM believes discussions have been undertaken by the APFA and certain members of the Seafood CRC with a view to forming a group of prawn growers and / or operations managers to drive the instigation, project management and some courses operation of projects that will improve the economic performance and industry sustainability of the aquaculture prawn industry by assisting growers to adopt continuous improvement strategies that drive them towards the achievement of business (and industry) best practice.

We understand this proposed group have been tentatively identifed as the Next "G" (G=generation) Group.

CDIPM believe that there would be numerous benefits associated with the formation of a commercially driven group such as "Next G" to drive the development and management of projects / addressing those discussed in Section 3.2, Section 5.1.3 and Section 5.4. These benefits may include:

1. The achievement of commercially relevant project outcomes for growers.

2. Better prioritisation of grower requirements in relation to R&D. That is, research gets done that is of the most importance to growers.

3. The ability to address smaller projects that other agencies may not be willing to get involved in.

4. Hopefully, the fostering of a greater 'spirit' of industry cohesion by allowing growers to work and interact together on a more regular basis.

5. Through working together and participation in research projects, it is expected that growers will exchange greater levels of information among themselves, thus allowing these parties to 'learn the lessons of others' rather than 'learning by making mistakes'.

6.2.2 MANAGEMENT OF 'NEXT-G' MODEL

The development of the Next G initiative is a significant platform in driving the aquaculture prawn industry towards best practice. Our experience in other sectors of the food industry, notably horticulture, show that when similar initiatives such as this are instigated by the production sector, that an inner core of growers are the ones who are largely responsible for driving the activities, in the absence of a dedicated program manager. Over time without support, the 'core' gets tired and the initiative begins to fail. Again our experience shows that the best outcomes are achieved where an independent third party (non-grower) is involved that has the responsibility of the

management or coordination of many of the activities and the communication of outcomes to others. This 'resource' may be a dedicated Industry Development Officer or may be an externally engaged consultant. There are good examples in other food industries of both approaches being successful.

6.2.3 PROPOSED FUNDING MODEL

CDIPM understands that the R&D funding budget of APFA will not be able to entirely fund the operation of the Next G group and the projects that it undertakes. Further, given the significant number of discrete projects that may be undertaken by the group in a normal situation, each 'project' would be the subject of a separate funding application. We would strongly recommend that the APFA and the Seafood CRC need to explore strategies associated with generating a funding model that will be allowed to use the funds supplied for projects that have an overarching theme of developing or seeking to achieve industry and business business practice which will allow for growers to improve their economic performance and sustainability.

6.3 Ongoing Management of Benchmarking Program

This project and the development of PrawnBM will conclude with the presentation and acceptance of this final report and installation of the PrawnBM software and initially training of the same.

CDIPM are also prepared to mentor or work with a group such as Next G if it is formed in order to provide a first hand understanding of the project report and to promote a greater level of understanding of the principles of benchmarking.

CDIPM understands that the APFA has secured funding for the grower recruitment, data collection, data entry and report generation for a period of two years. CDIPM cannot stress enough that the benefit of benchmarking programs such as these are not immediate but rather are generated over multiple years of data collection, interpretation and then action.

Therefore, CDIPM strongly recommends that the APFA and its members ensure that the financing of the management of PrawnBM occurs for a minimum of three years in order to allow the demonstration of the beneficial results from benchmarking that will (and hopefully as a result of this project do) flow to growers.