

Case summaries of grape vine producers:

Supplement to the report on flexibility and adaptability of farm systems in the Mildura Old Irrigation Area

A report for *Rural and Resources Policy*



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Contents

| | |
|-----------------------|-----------|
| Introduction | 1 |
| <hr/> | |
| Case summaries | 1 |
| <hr/> | |
| Albert | 1 |
| Bernie | 2 |
| Corinna | 3 |
| Elaine | 4 |
| Frank | 5 |
| Gary | 6 |
| Harry | 8 |
| Isaac | 9 |
| Jack | 10 |
| Kevin | 11 |
| Lennie | 12 |
| Mark | 13 |
| Nick | 14 |
| Oliver | 15 |
| Patty | 17 |
| Quinn | 18 |
| Rob | 20 |
| Samantha | 22 |
| Tony | 23 |
| Umberto | 24 |
| Victor | 25 |
| Will | 27 |
| References | 29 |
| <hr/> | |

Introduction

This document is a collection of case summaries based on interviews conducted in September/October 2011 as a part of research to characterise the tactical and strategic flexibility of farm production systems (Kaine *et al.* 2010; Cowan *et al.* 2013) in the Mildura Old Irrigation Area in relation to variability in critical inputs, and variability in output prices. This document is intended to be a supplement to the final report. (Cowan *et al.* 2014). For a copy of the final report please contact the corresponding author, Lisa Cowan at: lisa.cowan@dpi.vic.gov.au.

These case summaries describe the individual experiences of 22 out of 23 individual producers who were interviewed as a part of this research¹. Following each summary is a description of farm flexibility and options for the future for each case. Further information on this analysis, including the farm flexibility framework can be found in the project's final report.

Some elements of the case summaries such as names, genders and the nature of relationships between individuals in the case summaries (eg. mother/daughter, brothers etc.) have been changed or removed to protect the anonymity of individuals. Additionally, the level of detail in the information provided by each producer may differ based on their comfort level with sharing personal and business information.

Case summaries

Albert

Albert has a 150 acre mixed DVF and WG business, with 115 acres currently in production. Albert's WG enterprise is fully mechanised and his DVF enterprise is almost fully mechanised. He runs the farm with two full-time employees.

Albert has used sprinklers to irrigate his vines since before the drought. He found that when he got at least 75% of his allocation he could cope, but that when he received less he couldn't. Also, Albert noted the importance of having irrigation water early in the season so that he could manage his crop through until Christmas.

During the first year of low allocation (2008), Albert sacrificed 25 acres of vines to make sure he had enough water to get through the season. During that same year he also tried watering his new vines less and using regulated deficit irrigation with all of his vines. He found that it was better to buy water because under-watering leads to no output, which is a waste of water.

Last year's extreme rain added to his problems by increasing his cost for chemical sprays and limiting his productivity.

To spread the risk throughout the season from things he cannot control (e.g., weather, drought, flood and low product prices) Albert has been planting varieties in the last few years that ripen at different times of the year. He said he has started doing this more because such varieties have only recently become available. These new vines are just starting to come into full production, so he is hopeful that he will start to see the benefits of these new varieties soon.

Albert's business was affected by low water allocations during the drought, followed by last season's extreme rain events. The low price he has been getting for his WG hasn't helped his circumstances. While his wife has been helping to support the family by working off-farm for a number of years, this has become especially important over the last few years. As well, he has used all of his cash reserves and savings to keep going.

Albert's WG contract ends in a couple of years. Unless the price improves for WG he plans on converting all of his wine grapes to DVF. He already has the machinery for DVF and he can top work his WG root stock to DVF varieties that will work on the same row width. He will have to do a bit of extra trellising but can get the vines back into production within 18 months.

Albert plans on working for another 10 years and he has some confidence in the DVF industry. The increased competition among the processors in the region and the demand in the international market (which could double current local demand) have led to this confidence.

¹ One case summary is not included here as anonymity could not be achieved without removing important elements of the case, thereby reducing the individual's experience to generic triviality.

Albert: Description of farm flexibility and options for the future

Albert has a rigid system over all. There is no flexibility to change output mix within his current business strategy, and hence no strategic flexibility. As well, he has few tactical options available to him to manage much of the variability he encounters.

Albert manages low product prices by planting varieties that ripen at different times of the year, to spread price risk. Current WG prices are so low that he is considering adapting his farm system to move towards an all DVF business. Hence, the only real way that Albert can manage prices is through changing enterprises, at a cost. Albert is rigid in relation to low output prices.

Having a higher water allocation than he uses in a typical year gives him a little tactical flexibility with his irrigation allocation.

However, successive years of having to use tactics have diminished his current flexibility. For example, by reducing his area of productive land by 25 acres he has less capacity to manage variability in the future because he will need a higher output from his vines simply to achieve profitability. As well, his loss of accessible capital has reduced his capacity to access temporary water to manage a low water allocation, and chemicals needed to manage the increased disease pressure due to any extreme rain events. Add to these factors current conditions of poor profitability and Albert's tactical flexibility is low and declining.

Albert's long-term business plan can be described broadly as *maintaining*. While he is considering making changes to his farm, such as moving to an all DVF enterprise, he is doing so to maintain profitability rather than to increase the size of his business.

Bernie

Bernie is a WG producer on a 50 acre property with 180 ML water entitlement. He currently has 46 acres in production. The property was converted to WG from DVF in 1993. Things were going badly for the DVF industry at the time and WG were looking profitable. Bernie and his wife run the farm themselves because employing people, other than for picking, 'takes away any profit'. Bernie said that the wineries are telling him he needs 100 acres; but, if he goes to 100 acres, he will have to hire an additional permanent person to help.

Bernie has an even mix of chardonnay, shiraz and merlot. He had some good years with WG up until 2006, when his winery contract was cancelled, and thinks he has fared better than those who got into WG later. He has always made a profit out of his farm except for two years. 'The good years' enabled him to pay off debt and establish his family's current lifestyle.

Bernie is not making enough profit, however, out of the farm alone. Bernie uses his farm machinery to do contract work for other producers in the area. Some years they are 'living off the contract work, not the grapes'. Last year all of Bernie's profit came from this off-farm income.

Bernie converted the irrigation system from furrow to drip in 1992, so he didn't really have any problems in the early years of the drought. Though he was not getting a full allocation, he was getting enough with the drippers. As the drought continued Bernie grew a cover crop over the winter that he could use as mulch on the banks during the next summer. He bought temporary water at \$1000/ML, which meant he had higher-than-normal costs. He also watered less. Bernie's farm had some vine deaths and generally the vines suffered so the crops weren't great. This indicates that the tactics Bernie used to manage a reduced water allocation were not sufficient to prevent damage to his crops.

Bernie's low profitability during the drought was compounded by last year's extreme rains. Half of his crop rotted on the vine and the price that he got for what was left was so low that he didn't make back his costs: production costs for him were \$300/tonne and sales revenue was \$250/tonne.

The major problem Bernie had with last year's wet weather was increased disease pressure which required chemical spray control. He couldn't get some of the chemicals he needed and other chemicals were really expensive. There was a chemical that he knew would work, but it was not allowed because it prolongs the processing time for the winery.

Bernie thinks it will be wet again this coming season and has prepared for it. He has started clearing the banks to reduce moisture retention and allow the ground to warm up in direct sunlight. He has also stocked up on some of the chemicals that were unavailable last year.

The low prices for WG that Bernie has been getting over the last few years, and last season's poor crop, have left him feeling 'stuck'. He has used up all of his reserves and currently has no savings. However, Bernie has to keep going even though he is running at a loss. He cannot afford to stop because water access fees have to be paid whether he uses water or not. He cannot afford to make output changes to his farm as that would mean three years out of production on top of the cost to convert. As well, Bernie doesn't have the confidence to change to another enterprise as every industry is going through the same thing.

Other than farming, Bernie said that he is not qualified to do anything else. He could do more contracting to other producers, but then he would have to change everything else, including farming. Bernie and his family have talked about the possibility of getting out of farming but they cannot subdivide, which means they would have to leave their house if they don't grow grapes. Leaving would mean losing a \$600,000–\$1,000,000 investment.

Bernie: Description of farm flexibility and options for the future

Bernie has a rigid system overall. There is no flexibility to change output mix within his current business strategy, and hence no strategic flexibility. He has few tactical options available for managing much of the variability affecting his farm.

Bernie described his business's highly profitable years as ending when his contract was cancelled. He still does not have a contract. The low prices he has been getting for his fruit have been detrimental for his business. Bernie is rigid in relation to output prices.

The tactics he used to manage low water allocations during the drought were inadequate and costly to him, in loss of vines, productivity and reduced financial reserves. Coming out of the drought, the rain events that led to rotting of half of his crop have embedded him in his current circumstances. Overarching all of this, the major source of variability with which Bernie has had to cope since 2006 is a decline in the price he gets for his WG.

Bernie's long-term business plan can be described broadly as *maintaining*. He does not want to increase the size of his farm business, as this would require hiring additional labour. Unfortunately, Bernie does not see a way out of his current circumstances, in which the business is in a decline. What he is doing is hoping for some profitability to come out of good yields at a better price. In his current frame of mind, however, if this happens he is likely to put that money away as reserves for his family rather than investing it in redevelopment of the farm, given that he cannot identify a profitable way forward for his farm beyond his hope for better prices.

Corinna

Corinna has a 100 acre TG enterprise which she runs with her daughter. Farm income is supplemented by her husband's work two to three days a week off-farm. She produces a number of different TG varieties (Flame Seedless, Menindee Seedless, Thompson Seedless, Crimson Seedless, Autumn Royal, Red Globe and Camera) to ensure that she has fruit being harvested throughout the season for continuity of supply to the export market. Besides keeping her in the export market, having varieties that ripen throughout the season also helps her to spread any production risk. Corinna factors into her budget losing one variety per year through bad weather, which can negatively affect both fruit quantity and quality.

While Corinna may get a good price for her TG, the production costs are also high. Each TG variety has to be managed differently, with different spray programs. As well, TG are all hand-picked and trimmed for quality, which means it is very labour intensive. This means that seasonal labour is the biggest cost for Corinna on her farm: for 9-10 months of the year she has anywhere from 14-25 people working for her.

Another cost for Corinna is protection from rain. Each year during the growing season Corinna keeps the rain off of her vines with rolls of plastic that cost \$250/acre. These rolls of plastic are used over a three to four year period and help keep the fruit from splitting. Given the importance of quality to the export market, prevention of fruit splitting in this way is a crucial management practice.

Corinna said that water is not a huge cost to her, compared to her other costs. However, recent years of low water allocations really affected Corinna's business. In the first year with a zero allocation at the beginning of the season Corinna found it hard to decide what to do. If she were to take a part of the vineyard out of production and then rains came, or an allocation were given, it would be too late to reverse the decision. Instead, she decided to start her irrigation season late for all of her vines. Unfortunately, this meant that all of her vines were stressed and a lot of her fruit 'broke down'. Corinna believes that this problem was exacerbated by growth regulators used in TG production to put extra stress on the vines to encourage the desired fruit production.

During the drought, in addition to starting the irrigation season later, Corinna bought temporary water. This was very expensive as it was early in the season when demand was high for temporary water.

After this first year of serious drought, Corinna realised that her approach wasn't sustainable. She decided to adapt her irrigation infrastructure with computer-operated drip irrigation and soil moisture monitoring equipment, at a cost of \$250,000.

Corinna finished upgrading her irrigation system last year, and then faced massive flooding on her property, which destroyed 75% of her crop. The plastic rolls that Corinna regularly uses to prevent fruit split were not sufficient to manage the damage caused by weeks of flooding rain. Corinna viewed flooding as a natural event, and therefore a normal part of farming. She was angered, however, by the compounding affects of the flooding on top of the low water allocations. This is because she associated the years of low allocation with political decisions.

Corinna is very discouraged by her recent losses and frustrations associated with a range of recent state and federal government decisions. To keep the farm going she has had to put \$200,000 of savings back into the farm. She plans on continuing in farming, however, because her daughter is keen to continue. If it weren't for her daughter, she would consider selling the farm. As well, Corinna is nearing retirement and doesn't see anything else she could do in the meantime.

Corinna: Description of farm flexibility and options for the future

Corinna has a rigid system overall. There is no flexibility to change output mix within her current business strategy, and hence no strategic flexibility. She has few tactical options available for managing much of the variability affecting her farm.

Corinna's initial tactical decisions for managing a low water allocation (delaying the beginning of the irrigation season and purchasing temporary water) were costly to her output. She has since adapted her system to a highly efficient drip irrigation system that has increased her capacity to manage a variable water supply. Unfortunately, in making this adaptation, Corinna depleted her financial reserves somewhat.

While Corinna has a tactic for managing rain (covering the vines with plastic) this tactic was not sufficient to manage last year's rain and associated flooding. The damage from the flooding has caused the farm to run at a major deficit for the year, and used the last \$200,000 of easily accessible savings.

Corinna exports her fruit. The Australian dollar is putting downwards pressure on the prices she can get for her fruit. If competition and the rising Australian dollar continue to diminish export prices, Corinna's capacity to build up reserves, to cope with years that have negative financial impacts in excess of her budgeted 'one variety lost' approach, will be diminished. Corinna's farm business is rigid in relation to output prices.

Corinna's long-term business plan can be described broadly as *maintaining*. While she is intent on keeping the business going, this is so her daughter can run the business into the future. She is still reeling from having poured \$200,000 of her savings back into the farm when she is so near retiring. She does not have any plans to make changes to the business while she is still managing it.

Elaine

Elaine runs a 20 acre TG business. It is a family business and she will need to buy out other family members into the future. She has been investing heavily in infrastructure upgrades on the property as well as converting the business from DVF to TG. Since Elaine took over the farm in the late 1990s she has progressively changed the farm from DVF to TG. She made the changes over a long period of time, as she could afford to do so. She currently shares large equipment costs with her brother, who has an adjacent property.

She chose to convert to TG because she wanted more control over the marketing. Given there are a number of options for marketing TG, compared to DVF, she thinks she has more control with TG. She has put in an earlier and later maturing variety, so that they are harvested and marketed at different times. She markets one of these grapes for the domestic market and the other for export.

Elaine works full time, which subsidises the farm. She would love to be able to live on the farm and only have to work off-farm part time because she loves the lifestyle. However, she just can't afford to do it and thinks the most she can hope for is that the farm will be a good second source of income.

Quality is important for Elaine as TG are grown for size and colour. Ensuring the vines have access to adequate water is an important factor in maintaining quality. This is because a lack of water can lead to the production of smaller-sized, brown-stemmed fruit that are more prone to disease and harder to market. As well, a lack of water affects the yields the following year, as this year's growth is where next year's flowers come from.

The whole property was flood irrigated when Elaine took over the business. She has converted half to drip irrigation and plans to keep going with the other half. However, due to tight finances she thinks it will be another five years before she will be able to do this.

Elaine has an 80 ML water entitlement on her farm all of which she needs to water her farm. When she doesn't get her whole entitlement, she needs to buy water. During the first year of the drought she was hurt financially by having to buy water at \$1000/ML when a month later it was down to \$200/ML. Elaine was angered by the fact that this water market was 'orchestrated to create this situation', that her hip pocket was empty because of government policy. After that first year Elaine continued to bring extra water onto her property to fill the void but was able to borrow this water from relatives and friends rather than having to buy it on the temporary market.

Elaine sometimes struggles getting water when she wants it, which can be a challenge given she has to fit watering in around her off-farm work as well. She has the space for a dam and is thinking about putting one in so she has more control over irrigation timing.

Other than water, Elaine is also concerned about the affect weather, such as rain, can have on her business. She uses vine covers to mitigate the risk or damage from rain and she has hail and frost insurance.

Pest and disease control worry Elaine. She has a comprehensive spray program but doesn't feel really confident with it as she is not an entomologist nor an agronomist. Plus, she is not on the property all of the time. So she just does the best she can. This concern over her pest and disease management was exacerbated by extreme rain events last season. Due, in part, to increased disease pressure, she only harvested a little over one box per vine when in a normal year she would harvest two to two-and-a-half boxes per vine. This is a drop of over 50% in output.

This year the high Australian dollar worries her as she needs a good price for her fruit if she is going to be able to progress further with her plans. Elaine thinks that if she has some good years she will then be able to expand a bit more, which will make her more productive. However, Elaine also acknowledged that she still needs to finish upgrading the irrigation system, needs a bigger cool room, needs to get electricity to the shed and needs to put in measures to improve her ability to time irrigation a bit better, 'but it is all about money'.

Elaine: Description of farm flexibility and options for the future

Elaine has a rigid system over all. There is no flexibility to change the output mix within her current business strategy, and hence no strategic flexibility.

Elaine has few options with regard to managing a decreased water allocation. She needs her entire allocation if she is to water her whole farm, as less water will lead to lower quality fruit. Hence, Elaine has commenced upgrading her irrigation system. Unfortunately, Elaine cannot afford to upgrade the other half of her farm at this time. She has used considerable resources to buy temporary water. Whether or not Elaine will be able to borrow further water is unknown, but it relies on the goodwill of others. If Elaine has to continue to buy temporary water then she will continue to eat into her reserves that could otherwise be used to redevelop the farm as she plans. Elaine is rigid in relation to her irrigation allocation.

Elaine lacks confidence in the capacity of her tactics for managing pest and disease, but does not have the resources she feels are necessary to do it better. Given the increased incidence of disease associated with extreme rain, this puts Elaine in a vulnerable situation. While she has vine covers to manage rain, this tactic and her current spray program seem to not be effective as evident in her minimum of 50%+ drop in output last year. This makes Elaine rigid in relation to rainfall and its associated increased disease pressure.

Elaine's long-term business plan can be described broadly as *building*. She wants to increase the size of the business to increase productivity and profitability; enabling her to buy the farm from her parents and buy out her brother. While Elaine has plans for the future of her farm, these plans rely on the farm having sufficient profitability to enable her to invest back into the farm. However, Elaine's experience with low water allocation has lightened her pockets considerably and last season's low yields have not helped to replenish her reserves.

Elaine chose her enterprise type, in part, based on wanting more control over the marketing. She believes TG provide her with more marketing options (compared to DVF) domestically and internationally. Elaine is concerned, however, that the high Australian dollar will make it difficult for her to make a profit this year. Elaine is rigid in relation to her output price.

This all indicates that while Elaine is interested in 'growing the farm business' she may be constrained from doing so. If her parents exert pressure on her to buy the farm, things may begin to look grim for the future of Elaine's business.

Frank

Frank runs a 170 acre farm with 150 acres of WG. He has been on the property for 20 years. He added blocks as they became available and converted them to WG during the WG boom. He has a mix of varieties but hasn't swapped them around; he has 'stuck with the basics'.

When Frank started on the farm he had a fulltime job and the farm was a side business. At that time he had a full-time manager of the farm, as he made more income off-farm. His off-farm work paid for buying, and redeveloping, properties as he built up the farm business. Now he and his family rely solely on the farm, though the kids have moved on and are not keen to return to farming. Frank now runs the farm on his own with a part-time tractor driver and 'really good equipment'. He has another employee, who works probably seven months of the year. He has focused on being able to manage with as little labour as possible.

To manage the price Frank gets for his WG he has a contract with an international company to process half of his grapes into wine. Frank also makes a small amount of bulk wine 'speculatively' in hopes that someone will buy it. He doesn't do much of this as it can be risky. This processing approach works for him because he has a good relationship with a wine company. As well, Frank sells any unprocessed grapes to this winery. Even so, Frank is concerned about the glut of WG in the market as this affects the price he gets for his products, domestically and internationally.

Frank had a 650 ML water entitlement but sold 100 ML of his permanent water that he was not using. Originally he put in under-vine sprayers but converted later to drippers. He typically uses 300 ML a year to irrigate his farm. During one year of the drought he only received around 27% in allocation. Frank spent \$118,000 to buy 100 ML of temporary water to get him up towards the 300 ML he needed to irrigate that year. Frank said he could not see any option: he either bought it or wasted all of that investment. The only other thing he could have done was sacrifice a block, which he didn't want to do because it would affect production for at least a year, maybe longer.

Last year's extreme rainfall was a problem for Frank. With his WG he had problems with Botrytis, which reduced saleable output of a lot of the crop. He also had increased disease pressure from mildews. While he has a spray program, there were chemicals last year that just weren't available. In preparation for this next season, Frank has purchased some of these chemicals and put them in his shed, just in case he needs them.

Last year's rain also led to flooding, which affected Frank's 15 acre home block. The property was underwater so he couldn't get on to spray. This meant the pests and disease problems were 'pretty severe'.

Following last year's bad crop and irrigation expenses, Frank's debt load 'hasn't increased, but it certainly hasn't decreased either'. He is hoping this last year was just a bit of a stumbling block. He is not going to buy any more properties or make major changes, as he doesn't want to go into any more debt. His is not going to sell any more water. He just wants to stay where he is and 'keep plugging away until things improve'.

Frank: Description of farm flexibility and options for the future

Frank has a rigid system over all. There is no flexibility to change the output mix within his current business strategy, and hence no strategic flexibility.

Frank manages his output price by having a contract that ensures half of his fruit is sold and processed for the international market. His circumstances are helped by his good working relationship with the winery that processes the wine. Even so, Frank is aware that he has little control over the price he gets for his product and is concerned about the potential effect the current glut in the market will have on his price, domestically and internationally. Frank is rigid in relation to output prices.

Frank's irrigation set-up seems to work well as long as his allocation meets his minimum need of 300 ML. Once he gets below approximately a 55% allocation, Frank has to buy temporary water. When Frank sold some of his permanent water, he actually reduced his tactical flexibility in relation to water: previously, his allocation could get down to 46% before he would have to buy temporary water. This seemed to work for him, as he only had to buy temporary water during one year. Even so, if allocations were to remain below 55% then Frank may have to consider additional tactics, such as temporarily sacrificing a block, which reduces future tactical options further. Frank is rigid in relation to irrigation allocations, although somewhat less rigid than others in the sample.

Frank did not have the capacity to adequately manage the increased disease pressure from the flooding and extreme rain last season. This means Frank's farm is rigid to managing extreme rain. While there is little he can do to increase his flexibility with regard to flooding, he has been actively stockpiling the chemicals he was unable to access last year. This may increase his flexibility in relation to the increased disease pressure from rain.

Frank's long-term business plan can be described broadly as *maintaining*. His focus is on reducing debt and maintaining a profitable business. While Frank has no control over the Australian dollar and the low prices producers receive for their WG his marketing arrangements remove some risk of price competition.

Gary

Gary runs a 55 acre fully-mechanised DVF business, of which 25 acres are currently in production with sultanas, Sun Muscat and currants. Gary's plan has always been to farm full-time. The reality is that the household is supported by off-farm income. Gary's wife works off-farm and Gary works as a contractor for other farmers (though getting payment from struggling farmers has been an issue). Generally, the farm has just been paying for itself. Gary bought the last 16 acres two years ago to increase the farm's output. He wants to get to a point where he can hire a full-time manager and start stepping back a bit in a few years when he is getting closer to retirement.

The 30 acres currently not in production includes the 16 acres he bought two years ago as well as some patches of unproductive vines he has been redeveloping. He is redeveloping these acres over to Sun Muscat because they are highly productive and don't damage easily in the rain. He has chosen varieties based on what is most productive and rain tolerant; 'everything harvests in the same two months anyway'.

All of Gary's productive vines were converted to swing-arm trellis so that he could mechanically harvest. In doing so he had to purchase a dryer, wetter and harvester. Once he converted to mechanical harvesting labour costs dropped from \$20,000/year to \$1,000/year. The savings were used to pay for the machinery. Now he only uses extra labour with his redevelopment work.

Prices for DVF were fairly low for a long time but Gary had a contract with a guaranteed minimum price of \$1,500/tonne. Generally, he actually received about \$1,700/tonne. And when the spot price went down to \$1,200/tonne he was doing relatively well compared to those with no contract. He currently has a ten-year contract; it has worked for him because if the price goes up his price goes up as well, but his price only goes down to the guaranteed minimum level.

Gary has a 200 ML water entitlement and feels he has plenty of water. He converted the farm over to drip irrigation a while ago (pre-drought) to ensure he can utilise the water that is available. He thinks he needs at least 70% of his allocation in a season so that, when water is a bit more scarce, he can manage. During the drought, however, when allocations went well below this 70%, he bought some temporary water.

When there was a zero allocation at the beginning of the season he decided to buy water over time, as he needed it. This meant that he didn't end up spending much money on water as an allocation was announced and this allocation increased throughout the season. He also used a lot less water through the drought, but thinks he didn't get the crops that he should have because he was under-watering. His soil moisture monitors were a huge help during the drought, as he discovered that certain rootstock needed a lot more water than others.

Towards the end of the drought the lack of water started to take its toll on productivity, however, and his yields were down by 50%. This was followed by last season's flooding due to which productivity was down by 75%.

The extreme rain events made disease control very challenging. Gary ended up harvesting early. Disease got to some of his vines so quickly that he ended up taking a chainsaw to the vines to harvest the fruit as quickly as possible. Though he saved the fruit, those vines will be out of production for a year while he re-trellises these existing vines.

Gary said that, while the disease problems he had last year were caused by the rain, he thought it was exacerbated by lack of management on adjoining properties. Many properties have been abandoned and were not being managed, which increased the incidence of disease around his property that spread to his vines.

The flooding that was associated with the rain also affected Gary, but not directly on his property. He had new stock he was preparing to plant this year as a part of redevelopment; this was flooded and killed in the nursery. This means that he will have to start again, putting him a year behind and out of pocket for all of the investment he put into the original young vines.

Gary said that he has a 'fair-sized debt' from land acquisitions, redevelopment and running costs. With these last couple of bad years he was, unfortunately, only able to pay for the interest on his loan. While the prices for DVF have actually improved, the poor crops have put a big dent in cash flow. This is one of his major worries, as he needs enough cash to allow him to do the redevelopment necessary to get productivity up.

The plan was for Gary to pay someone to help him with redevelopment this year, but he couldn't afford to do this. Instead, Gary planted 2½ acres of capsicum on the land that needed to be redeveloped. He hopes that the capsicum crop will give him the ready cash he needs. He doesn't want to keep doing these kinds of crops because it is very labour intensive and takes him even further away from the redevelopment he needs to do.

Since Gary is trying to get bigger he will have to get a new harvester. He will start looking at purchasing one when he gets about 30 acres under production. Also, Gary did consider buying another piece of land this last year and selling some permanent water to pay for it, but changed his mind. For him, 'it is all about having the right size property to be able to sit back a bit more'.

Gary: Description of farm flexibility and options for the future

Gary has a rigid system overall. There is no flexibility to change the output mix within his current business strategy, and hence no strategic flexibility.

Gary's business is rigid in relation to output prices. He has a ten-year contract with a processor with a guaranteed minimum of \$1,500/tonne. This places a floor to the price he receives but gives him no flexibility to respond to changes in price through time, in any given year.

With regards to his irrigation allocations, Gary does have some capacity to manage a somewhat reduced allocation with the use of his drip irrigation system. In reality, below a 70% allocation, Gary's system began to struggle. He was able to purchase temporary water and water less. However, using these tactics led to decreased yields and a gradual loss of output and therefore profit. This loss in profit, combined with the increased cost of buying temporary water, further decreased his capacity to manage variation in irrigation allocations. Gary is rigid in relation to irrigation allocations.

Though Gary sprayed to manage increased disease pressure during last season's extreme rain, he still suffered a 75% drop in typical production, which indicates this tactic was not sufficient. As well, any exacerbation of the problem due to abandoned adjoining properties is outside his control. Gary is rigid in relation to rainfall.

For routine production, flooding is not a threat to Gary's farm. Apart from the exposure of vine nurseries, experienced floods are not a source of relevant variability for him.

The compounding affects of variability that Gary cannot absorb into his system continue to reduce his flexibility, putting his business at increasing risk. Less than half of Gary's farm is productive at the moment, and while Gary knows that he needs to redevelop to improve the situation he does not have the ready cash and labour needed to enable this. Gary desperately needs a good year so that he can begin to redevelop and, hopefully, build up some financial reserves, thereby making some tactics more readily available.

Gary's long-term business plan can be described broadly as *building*. He has been actively seeking to increase the size of his farm business so that he can afford to hire a full-time manager and retire. Unfortunately, his recent purchase of 16 acres as a part of this strategy has increased the risk to his business by increasing debt.

Harry

Harry has a 20 acre DVF business, with a 70 ML water right, that he bought in the mid 1980s. When Harry and his wife bought the farm they had to borrow 50% of the cost. The farm has paid for itself, for its redevelopment and for the house extension. In a good year, the farm will 'pay for the family, the house and still have money at the other end of it'.

In addition to running the farm, Harry has also done some contract work for WG producers, earning between \$11,000–\$18,000 in five weeks. This money allowed him to buy some new 'luxury equipment' round the block. Harry's wife also generally works off-farm part-time.

Over time Harry set up the farm so he could run it by himself, with a mechanised system and good grafted rootstock, with 50% sultanas and 50% Sun Muscat. This required some investment in the infrastructure and equipment to do this. He chose to put in some Sun Muscat because it is consistently productive each year, while sultanas tend to be biannual. As well, Sun Muscat is more rain tolerant. Harry has a contract for all of his fruit with a processor.

As Harry redeveloped the property he progressively put in low-level sprinklers. He uses a computer to monitor moisture as he thinks getting it right is important. Watering too much means the water just goes past the root zone and carries the fertilisers and chemicals with it. Under-watering leads to low production. As well, water is expensive to Harry; it represents 25% of his production costs, even more if he factors in the pumping costs.

Harry needs 100% of his allocation to run his farm business. During the first year of low allocation, when water was \$1000/ML, Harry decided to really look after the Sun Muscat and 'just keep the sultanas alive'. He focused on the Sun Muscat because they were newer vines and more consistent producers. By the second year of low allocation he had 'learned a bit' and bought some smaller parcels of water, especially for watering during crucial times of the season.

Last year's extreme rains hit Harry hard. Not only was his yield significantly below normal of poor quality fruit, but his chemical costs were up by 40%. Harry said it was hard to work out what to do, because 'you have to spray now for diseases that may come later'. But spraying costs money and benefits may not be seen until harvest, if at all. Last season there was an abundance of rain and disease that he wasn't prepared for.

While Harry did have some flooding, he was able to drive through it to access his vines to spray, so this was not a problem for him. He does think, however, that the abandoned blocks of vines adjoining his place may have increased his problem with disease and pests.

Because of the poor harvest last year, and increased chemical costs, Harry's wife had to double her hours at her job and her income is currently meeting all of the family costs. Harry has decided to hold off on some of the infrastructure upgrades he was thinking about, such as getting a new tractor.

Harry thinks that the prices he gets for his DVF are not great but he is sticking with DVF, given the investment he has put into the farm. He is not prepared to get any bigger as this would increase his workload. The area he has is manageable on his own, and at pruning time it is very labour intensive. He would need to go three to four times larger to get to a point where it would be worth it to then hire someone else.

Harry: Description of farm flexibility and options for the future

Harry has a rigid system over all. There is no flexibility to change the output mix within his current business strategy, and hence no strategic flexibility.

Harry is rigid in relation to output prices. He has a contract with one of the DVF processors, though he thinks that the price he gets is too low. The cost of changing enterprises to chase a better price is greater than the investment he has already sunk into the farm.

While Harry has under-vine sprinklers on his farm, he still requires 100% of his allocation to be able to water his vines sufficiently. This limited the options available to Harry during years of low water allocation. He ended up under-watering half of his farm to maintain productivity on the other half. He also bought smaller parcels of temporary water to focus watering during crucial times. Harry is rigid in relation to his irrigation allocation. His allocation only needs to drop slightly before it begins to translate into variability in his output. Harry's capacity to withstand this variability in output is due to his lack of farm debt. It is unknown if this would be sustainable over multiple years of low allocations.

Harry's farm is also rigid in relation to the increased disease pressure that came from extreme rainfall. Even though he spent 40% more to try and manage this, he still had his lowest yield ever.

Harry's long-term business plan can be described broadly as *maintaining*. He has no interest in changing his current system. Increasing farm size would increase his workload beyond a desired threshold for Harry. As well, he has invested considerable resources in setting up his DVF enterprise.

Harry's lack of debt helps him withstand the shocks of bad years, perhaps better than some of the other interviewees with high levels of farm debt. However, if the variability he has struggled with in the last few years continues or increases, he is likely to need to make some change to his system.

Isaac

Isaac has a 15 acre DVF farm that he bought in the mid 1990s. He converted it over time to a fully mechanised swing arm trellis system, ensuring his output was maintained or increasing as he progressed. He wanted to make over \$20,000 per year so that he could break even taking all expenses and depreciation into account. The business is now fully converted and he owns all of his own equipment. Isaac no longer has a mortgage on the farm.

Isaac grows currants and sultanas. The currants he grows because they are very high yielding. The sultanas are easy to grow and 'have been around forever'. He has no problems selling either.

When Isaac first bought the property, he and his wife both worked full-time off-farm. They had to, so they could afford to pay for the equipment they needed to get the farm up and running. Now Isaac is full-time on the farm and his wife works three days a week off-farm. Her work still supplements the family income. Isaac still does some contract work for other producers, but last year a lot of farms struggles so there wasn't much work for him so his contract income dropped from \$42,000 to \$2,000, but they still got by.

Isaac chose to farm for the lifestyle. 'Most people would love to be able to work hard for only seven months of the year.' The farm has always been productive; Isaac always gets paid something by the farm. Realistically, he doesn't want the block to be doing too well anyway; he wants there to always be things he can write off on depreciation in his tax.

Isaac has a 57 ML water entitlement. He needs an 85% allocation to water all of his vines. If he is unable to get this then it can affect his productivity. As well, Isaac said that any loss in productivity due to under watering extends into the next season because the vines set bud for fruit a year in advance.

During the first year of low allocation he decided to buy temporary water as he needed it. He wasn't able to buy all the water he needed, however, which led to a moderate drop in yield. Generally, he was more careful with his currants, which have more of a tendency to drop their flowers if not watered enough.

Isaac decided to upgrade his irrigation system to drippers from overhead sprays in the middle of these low allocation years. With the \$20,000 government grant he received, he ended up \$2,000 out of pocket. He has found that the vines grow better on drip. He is not sure yet what percentage of his entitlement he needs but thinks it will be less than 85%.

Last year's rain didn't affect Isaac as much as he thought it might have. He doesn't believe it is worth worrying about rain because 'you can't do anything about it'. All he could do last year was spray more often when rainfall is high. While Isaac's property had some flooding it drained within a couple of days. This meant that even though the disease pressure was higher, he was able to get back on and spray.

While his income was down last year (he only made \$35,000) he actually fared well compared to most. He had heard that some people lost their entire crop for the season. Essentially, Isaac was fairly happy with the outcome because he didn't have to eat into his savings, and he didn't have to over commit himself.

Isaac has had contracts in the past, but doesn't currently. Isaac thinks there is such demand for DVF right now that he is not worried about having a contract. He is concerned, however, that if there is another bad year or two, and other DVF farmers start going out of business, the region will lose the critical mass needed to sustain all of the three processors. While he can survive, processors are not going to stay afloat for one farmer.

Isaac is interested in buying another five acres to make his farm a bit bigger. The land would need to be near his current property. He thinks having 20 acres in total would be good as it could bring in nearly \$100,000 a year. Bigger than this and he would have to hire people to help or else he would be overworked and stressed.

Isaac: Description of farm flexibility and options for the future

Isaac has a rigid system over all. There is no flexibility to change the output mix within his current business strategy, and hence no strategic flexibility.

Isaac has needed 85% of his allocation to be able to irrigate sufficiently. During the drought he had to buy temporary water to replace water lost from a lower allocation. He bought this water as he needed it, so he did not get caught by the

elevated prices at the beginning of the season. Even so, he still ended up under-watering his vines and that translated into lower yields that year and the following year. Isaac's farm is rigid in relation to his irrigation allocation.

Isaac has changed his irrigation system to drippers. Isaac may have increased his tactical flexibility with this adaptation, though it has yet to be seen if this change means that his vines can manage with less water.

Isaac's only option for managing the increased disease pressure from extreme rain was to maintain and even increase his spray regime. While this was labour intensive Isaac was able to keep it up, even through the floodwaters. This was reflected in his yields. While he had a drop in output, he acknowledged that he survived fairly well. So while Isaac is rigid in relation to rainfall, there is a stark contrast between his experience and those who could not access their property due to floodwaters.

Isaac's low level of debt and supplementary off-farm income have increased his reserves, enabling him to manage these last few years of variable extremes. As well, Isaac indicated that, while he wants the farm to provide some profit, he is satisfied if profit is sufficient to break even after depreciation. Hence, the required profit necessary to make Isaac's business sustainable in his view may be less than for some other producers.

Isaac acknowledges that his vulnerability lies in the state of the region's DVF industry and what this means for his output prices. While he may feel confident in his business's capacity to survive another poor season, a loss of profit due to low output prices will eat away at the viability of his farm business. Isaac is rigid in relation to output prices.

Isaac's long-term business plan can be described broadly as *building*. He is interested in adding another five acres, which he believes would get him to a size that he can still manage on his own. It may be that once he achieves this aim of 5 more acres he will shift into a *maintaining* strategy.

Jack

Jack and a partner have a 170 acre WG business, with a 640 ML water entitlement. The business is made up of a number of separate soldier settlement blocks. Jack and his partner are both full-time on the farm. Jack bought the original block in the mid 1980s and has been adding blocks to it since then. He started converting the farm over to WG in 1993. The last piece of property was purchased seven years ago, with money borrowed to buy and redevelop the block.

Jack has invested a lot of money into redeveloping the blocks on his farm and he owns all of his own equipment. He used to have hired help but cannot afford to pay people now. He used to do contract work for other farmers as well, for extra income, however demand for that is gone.

Jack has had a difficult time over the past few years. During the first year of the drought he tried watering overnight, mulching and watering everything less. This had poor results with low cropping vines.

The second year Jack decided that he had to try something different. In that year any money he had left went into buying temporary water. He bought 315 ML to get through the season and bought 400ML to take as carryover for the next season. The costs associated with this meant that his total costs far outweighed the price he got for his grapes.

Unfortunately, the next season ended up having flooding rains and he didn't need the carryover water he paid for. As well, he ended up losing 30% of his crop because, due to floodwaters, he couldn't get on to his blocks for a month to spray for disease prevention. While he lost 30% of his crop overall, it was made worse by the fact that the grapes he lost the most of were his most profitable ones. He lost 50% of his profitable red grapes and only 10% of his less profitable whites. Also, he spent an extra \$20,000 on chemicals to spray in response to increased disease pressure.

Along with the few bad years, the drop in wine grape prices has pushed the farm's debt load up from 25% to 85% of equity. Jack currently gets paid \$150/tonne for fruit that costs \$300/tonne to grow.

Jack is frustrated because the government keeps changing the rules, making it harder for him and his business. He feels that he has no options available to him; he is stuck. He is not permitted to subdivide or put a house on his property. He has to pay a water access fee whether he uses the water or not.

He thinks he is better off growing WG and making a deficit of \$20,000 at the moment than to lose \$50,000 should he stop producing but have to pay the water access fee. All he can do is keep producing good fruit and hope the market gets better.

Redeveloping costs time and money. Jack thinks the other grape industries are also struggling so there 'is nothing worth changing into'. The TG industry is the only option really, and the industry is starting to worry about oversupply of TG. Besides, Jack couldn't run 170 acres of table grapes; it would be too much work.

He can do nothing to control the price he gets for his fruit and thinks that the district is in real trouble.

Jack: Description of farm flexibility and options for the future

Jack has a rigid system over all. There is no flexibility to change the output mix within his current business strategy, and hence no strategic flexibility.

Jack has little capacity to manage a low irrigation allocation. His efforts to mulch and water everything less had negative results on productivity. His tactic of purchasing temporary water in the second year may have enabled increased productivity but flood denied him this result. Jack is rigid in relation to his irrigation allocation.

In relation to flooding, Jack is also rigid. Access to his property was hampered when he needed to spray, with dire consequences for his fruit production. To make matters worse, the price he is currently getting for his grapes is half of what it costs him to produce them.

Jack's long-term business plan can be described broadly as *building*. He has been actively purchasing and redeveloping properties over a number of years. Jack is in real trouble, however. His lack of flexibility is evident in the dramatic increase in farm debt. There is no foreseeable short-term solution for Jack.

Even if Jack has consecutive good, productive years, this does not mean they will be profitable. The price he is getting for his grapes is well below his costs. This indicates that Jack is rigid in relation to output prices.

Kevin

Kevin has a 100 acre WG business. He bought his first block in 1993 and added two more over time. He bought the last block in 2003. Kevin likes the idea of the farm as an investment and has no interest in full-time farming. He runs the farm remotely. Kevin also has fulltime employment off-farm. He has some casual labour and contractors for more complex tasks (like spraying and pruning) but he makes the decisions, orders irrigation water, etc. Kevin believes that, in theory, it is the right business model for a property of this size, because he hasn't got all of the equipment sitting in a shed.

Kevin has a contract selling his grapes to a winery. This provides some certainty that his grapes have somewhere to go. He has always been able to sell his grapes, except for in 2005 when six acres of one variety had to be dumped because no one wanted them. Kevin's grapes are not attracting a good price, though, and he has found it challenging since about 2004.

Kevin has a 350 ML water entitlement. He tries to have as efficient a system as possible. The whole farm is on drip irrigation with a variable frequency drive, so he can fine-tune the pump if he wants to run two shifts rather than four. He typically uses 85% of his entitlement each year.

When he received a low allocation during the drought he ended up buying temporary water. He determined that this was worth doing because his vines were young and his grape varieties were in good demand. He bought water so that he had a month's water available all the time. In hindsight, that meant that he paid a lot at times and he could have saved some money if he had waited. Although, given Kevin has spent \$500,000 on water in the last few years, the possible savings look negligible to him. Kevin now aims to maintain a 25% buffer of carryover water to mitigate the risk of this happening again.

Last year, with the extreme rain events, his crop had to be downgraded in quality and was taken for concentrate at a 'pretty low price'. Revenue 'covered the harvest, it covered the freight and it made me a little money, if not a lot'. The yield last year was actually above average, as 'the growing conditions were great'. Kevin said his biggest problem with the weather last year was that it was good growing conditions so he had a hard time 'shutting down' the vines - 'when they should have been working on quality, the vines just kept growing instead.'

Kevin did lose some of his fruit to rot. However, Kevin has a pest and disease consultant who works with him and tells him what needs to be done. Kevin's main concern with pests and disease is abandoned adjoining properties. He is due west of a block that is a 'disease haven', which means all of the disease spores and weed seeds blow straight onto his property.

Just before the first year of a low water allocation Kevin had decided to sell one of his blocks to get rid of all of his debt. Unfortunately, the buyer got nervous and pulled out of the purchase because the low water allocation was announced. In recent times, Kevin has been consuming his equity. All of his farm management deposits are gone and his overdraft is 'through the roof'. He has been on interest-only payments on his loans for the last four to five years. Though his mortgage hasn't increased in real terms, the value of the asset is a lot less than it was. All of his 'rainy day' money is gone as well.

Kevin thinks that, if he doesn't have to buy water, he is at a stage where he won't have to continue to use his savings. Looking at last year's prices, things should be cash positive this year. But it won't give anything like a satisfactory return on an investment that was in the good times valued at \$2,000,000.

In the short-to-medium term Kevin plans to keep going, because the value of the land is nowhere near the value of the replacement cost. He is not interested in changing the farm to another enterprise; he is getting too close to retirement to go through all of that. He and his family do not 'rely on the farm to eat', so he is able to hold on a bit longer.

Kevin: Description of farm flexibility and options for the future

Kevin has a rigid system over all. There is no flexibility to change the output mix within his current business strategy, and hence no strategic flexibility.

Kevin has a contract with a winery to buy his grapes, which means he has certainty that his grapes will be sold. This does not imply control over the price he receives. Low prices have been challenging Kevin since 2004. Kevin is rigid in relation to output prices.

Kevin needs 85% of his water entitlement to sufficiently water his vines. Given the age and productive capability of his vines, the tactical option that he uses to manage a low allocation is to buy temporary water. This has eaten away at his reserves to the point where he currently has a reduced capacity to use this tactic effectively. He is rigid in relation to a reduced irrigation allocation.

Kevin is also rigid in relation to last year's extreme rain and flooding. While disease did affect his yield, he also struggled to get the quality he needed because of excessive vigour in the vines.

Kevin's long-term business plan can be described broadly as *maintaining*. He is interested in reducing his debt and plans to keep running his existing farm as he gets closer to retirement. Years of low prices are increasing the pressure that Kevin is facing by impeding his plans for debt reduction and reducing his farm's flexibility, especially in relation to a lower irrigation allocation.

Lennie

Lennie has a 50 acre DVF, WG and TG business. He purchased the initial block in 1980 and acquired more over the years. Twenty percent of his farm is WG, but these are currently not productive; he will be moving away from WG. The other 80% is split 50/50 between TG and DVF. Some of his DVF is hand picked; some is mechanically harvested. Lennie and his partner both work on the farm. His partner also works has a part-time off-farm job.

Lennie doesn't have a contract for his DVF, but never has a problem selling it. He sells his table grapes through the domestic market in Sydney and Melbourne. He feels that he has no control over the prices he gets for his fruit.

Lennie believes that the first four to five years of the drought were good for the farm, as hot weather is great for vines. It was the reduced irrigation allocations that affected the business. During the first year of reduced allocations, Lennie bought temporary water. While it was very expensive, he needs 100% of his water for his TG; 'size is everything with TG'. Lennie's farm was flood irrigated at that time and he realised that he couldn't afford to keep buying water at ten times its normal price. Three years ago Lennie put in drip irrigation across his farm at a cost of \$130,000. While this seems to have helped somewhat, he still ended up buying \$150,000 worth of water over three years.

Lennie never lost a crop during the drought in contrast to last season's flooding rains. He managed to save his crops throughout the growing season, where lots of people had lost them due to disease. But, because it hadn't really rained in such a long time, the drainage system wasn't up to the task; the water just sat there. After spending three times the usual amount on chemicals throughout the season he 'could only watch the floodwaters coming; there was nothing I could do'.

Last season Lennie lost his entire Thompson's Seedless crop worth \$200,000 and now he is worried. Overall, he only harvested 15% of his table grapes and 50% of his DVF and their quality was 'really bad'. As well, the costs of the DVF were high because he had to dry the fruit longer. His overall costs were twice the norm.

Lennie believes he 'has nothing left'. Four to five years ago the farm was worth 1.3 to 1.4 million dollars but now, with the land value dropping because of the unbundling of water, poor prices, and last season's crop, he is running out of options. He is currently pulling some WG vines out of a block that he had to sell the permanent water off to the government to pay some of his bills. That is the only saleable asset he has: his water. He would like to be able to sell some smaller parcels of land that he has had WG on for house and land blocks, but has been told he is not allowed to do this.

Lennie has been actively scaling down, trying to minimise spending. He can't see what else he can do; his business, his equipment and his knowledge are all geared up for vines. He is looking at putting more DVF into the areas where he has been pulling out WG. He is looking to simplify, and mechanised DVF may be the way. A processor has expressed interest in entering a contract with him if he decided to convert some WG to DVF.

Lennie: Description of farm flexibility and options for the future

Lennie has a rigid system over all. There is no flexibility to change the output mix within his current business strategy, and hence no strategic flexibility.

Lennie said that he does not have control over the price he gets for his fruit; hence he is rigid to output prices. Since the price for WG has gone down he has shifted out, focusing instead on more profitable DVF and TG. He does not use a contract to maintain a guaranteed DVF price. He sells his table grapes through the domestic market in Sydney and Melbourne.

Lennie is rigid in relation to his irrigation allocation. When he went into the first year of reduced irrigation allocations with flood irrigation he soon worked out that this was not going to be manageable, given the amount of water he needed and the cost of purchasing that temporary water. Unfortunately, the cost of upgrading his system was burdensome. Coupled with another year of having to purchase temporary water, this left him with a \$280,000 'hole in his pocket'. Amazingly, Lennie was able to harvest a full crop in both of those years, though he does not indicate that this has restored his finances. His move to drip irrigation may have increased his flexibility to some degree; this has yet to be seen.

The flooding rains that followed the drought had catastrophic results for Lennie, as he was in need of a good crop to begin moving forward financially. He is decidedly rigid in relation to flooding.

In the last few years Lennie has watched 30 years' worth of investment begin to disappear. Declining financial reserves means that Lennie sees his number of options for the future shrinking. Lennie's productive farm area has shrunk by 20%. Without making changes to his farm system, this means that in a typical year Lennie's profit is likely to have dropped by 20%. Less in reserve has also increased Lennie's vulnerability to future variable farm performance and profit. If Lennie actively invests in trying to increase his productive space by 20% this may decrease his reserves even further, making him more vulnerable.

Lennie's current long-term business plan can be described broadly as *winding back*. Interestingly, it appears that he may have been forced to shift from *maintaining* to *winding back* by recent circumstance.

He is actively trying to scale down, minimise spending and come up with ways to set up the farm that will be easier for him to run into the future. He has also been considering options for subdividing the property as a part of this strategy, to enable him access to funding needed to make the changes. Unfortunately, the options he is interested in pursuing are not allowed under existing planning laws. Hence, while Lennie is seeking to set himself up for a simplified future as he nears retirement, he is being hampered in this aim.

Mark

Mark has a 40 acre property on which he produces WG and a small amount of DVF. He took over his family's farm in the mid 1970s, redeveloping and adding new blocks over the years as he could afford to do so. The farm was DVF until the market for DVF went down and he converted over to WG.

Mark is full-time on the farm and his wife works off-farm part-time. Mark is able to run the farm on his own. He thinks he could probably get bigger, up to 100 acres, and run it on his own. He has got all of the big equipment required and gets 'mates rates' from a contract harvester.

Mark has a 120 ML water entitlement and he needs 75% of it in a typical year. When he originally redeveloped the property he had put in overhead sprays. Mark was fortunate in the first year of low water allocation because, when they unbundled water from the land, they also introduced carryover. Mark happened to have some carryover water that year. This helped him get by. As well, he started the season with his subsoil wet, and it was a lot easier to maintain that than to let it get dried out and 'have to play catch-up'. In that first drought year Mark did purchase some temporary water, though not a huge amount of it, and he managed to hold off and buy it at \$300-\$400/ML rather than \$1200/ML. Additionally, because the allocation was being announced piecemeal throughout the season, this meant he actually ended up having 20 to 30 ML left over as carryover from that year as well. Mark ended the first year of drought with a 10% drop in yield.

After that first low allocation year, he converted to drippers with the help of a \$20,000 water grant. The cost of the conversion was well above this and he ended up having to borrow \$60,000 to go towards it. In some way he feels that the grant was a burden rather than a help because the conversion cost so much more.

Generally, Mark was able to manage the extreme rain last year. He did have to manage disease a bit more but was able to do so. The quality of his fruit was good as well. He was even able to pick his grapes before the late-season disease hit the region. The problem he had with his crop was the low price he got for his fruit.

Other than this, he did lose some young DVF vines last year that ended up sitting under floodwaters. He has some interest from a processor, though, and will replant some sultanas there for DVF. It looks like last year he made \$15,000, which sounds like a trivial return but, compared to others, he thinks he fared pretty well.

Five years ago Mark was debt free, now he is back to \$100,000 in debt because of the upgraded irrigation system, temporary water that he had to buy and the drop in market prices. He thinks his business is viable 'in a sense'. But he doesn't feel like it is viable at times, because he is 'going backwards'.

He has a block of land that he has a building permit for, as a subdivision. He got it approved just before they changed the subdivision rules. He has left all of the abandoned vines on it on purpose: if he takes them off, the land value would increase and his rates would go up. He hopes to build on it before the permit runs out, but that takes money and he is not sure he wants to increase his debt level even more.

Mark is not encouraging his children to come back to the farm at this point. While it is 'every father's dream to pass the family farm on to one of the kids, it is really another form of child abuse, giving the farm to the kids'. They are not interested in coming back anyway.

Mark: Description of farm flexibility and options for the future

Mark has a rigid system over all. There is no flexibility to change the output mix within his current business strategy, and hence no strategic flexibility.

Mark had some capacity to manage a reduced water allocation through the use of carryover water, the purchase of temporary water and starting the year with wet subsoil. In the first year of a reduced allocation Mark had bought a little water and also had a drop in yield by 10%. This demonstrates that Mark was rigid in relation to his irrigation allocation, though not as rigid as some of the other interviewees.

Mark's upgraded irrigation system may increase his tactical flexibility in relation to his irrigation allocation. However, how it interacts with his tactic of starting the season with a moist subsurface is unknown. If he cannot get the moisture levels required to maintain this tactic, the new irrigation system removes a tactical option available to him.

In relation to extreme rainfall and its associated flooding, Mark's spray program seemed to manage sufficiently the increased disease pressure. As well, his grapes were able to be harvested before the late-season disease problems. However, this was related to the timing of when the late-season rain occurred rather than his tactical flexibility. His likely vulnerability to different rainfall distributions which increase disease pressure (for example the typical late-season rains beginning earlier) indicates that he is rigid to rainfall variation.

While Mark's farm generally coped well with the flooding, the capacity of his young vines to cope with flooding is decidedly rigid.

Mark, overall, can cope with some variability in rainfall and his irrigation allocation. The biggest issue for Mark is the price he is getting for his grapes. He believes he is viable, but is worried about his future options, as the price he is getting keeps dropping. Mark is rigid in relation to output prices.

Mark's current long-term business plan can be described broadly as *maintaining*. His predominant interest is in continuing to run a profitable business with little debt.

Nick

Nick has a 40 acre farm that he has been running for 30 years. He predominantly produces DVF and believes that he is better off concentrating on one thing and doing it well. He does have a few acres of WG, though he describes his core business as DVF.

When Nick bought the farm, he quit his full-time job. He has always maintained some off-farm income over the years, in a field related to vine industries. Nick's farm is fully mechanised so he can run it himself, though he does hire one person to help prune.

In his DVF, Nick likes to spread the risk from variable weather by planting different varieties. He produces mostly Sun Muscats and currants, and a small amount of sultanas. The currants need water early in the season and the sultanas actually do well in the dry as 'too much growth is as bad as too little for them'.

Nick has a 150 ML water entitlement, but probably only uses 80% to 90% of this in a typical year, or 7-8 ML/ha. Nick has had sprinklers on his property for a long time. His irrigation system has worked well for him, especially in the last 8-10 years when he has been able to order and get his water within three hours. He thinks that it probably helps that there is no competition for the water where he is on the channel system.

During the really low allocation years he ended up putting on 5 to 5½ ML/ha which was a lot less than is typical for him. He had to buy some temporary water to do this. Plus he had a DVF block that he was planning to redevelop, which he just took out of production.

During last season's extreme rainfall, Nick's farm got flooded three to four times, but it drained quickly. He was able to keep on top of the mildews, though it took a lot of his time to do it. He 'didn't really lose any fruit overall'. The rain did

bring some Botrytis and the quality of his sultanas was down, which he had to cut early and dehydrate for longer. However, his Sun Muscats and currants, which comprise the majority of his crop, were 'not bad'.

Nick did hold off this last season on redeveloping the block that he had sacrificed during the drought. He left the young vines in the nursery for an extra year.

Overall, Nick is 'plodding along alright'. He found it hard when he had to buy water during the drought and the prices were bad because there was only one DVF processor. However, things seem to be getting better now, for DVF at least, and, even through the hard times of the last few years, he has been able to move ahead a bit rather than eating away at his savings.

One of Nick's major concerns has been the state of the DVF industry over the years. The fact that there was only one processor in the region for a while contributed to the low prices that DVF producers were getting, which was unsustainable. He is feeling more optimistic now that there are three processors in the region, though he believes the region needs to get the quantities up to sustain the processors. Last year the region only produced 7000 tonnes, which is not enough.

Nick wonders what the next 10 years hold for him and his farm. He is not keen to redevelop because he would be beyond retirement before he would get his money back. As well, he has no prospect of being able to sell his farm if he wanted to, given the number of abandoned properties in the region at the moment.

Nick: Description of farm flexibility and options for the future

Nick has a rigid system overall. There is no flexibility to change the output mix within his current business strategy, and hence no strategic flexibility.

Nick believes that the major determinant of output price is competition. The recent increase to three processors in the region has increased prices, though he now worries what will happen if the industry does not increase to a size sufficient to sustain three processors. This indicates Nick is very aware of his farm's rigidity in relation to output prices.

Nick did have some capacity to manage a low irrigation allocation and came through the drought relatively unscathed. His tactics to reduce how much he irrigated, take a block out of production and purchase temporary water seemed to work for him at some manageable cost. So while he is rigid, he is less so than some of the other interviewees in relation to his irrigation allocation.

Nick was also able to manage the extreme rain and flooding that occurred last season. While he had some flooding, it drained fairly quickly and did not interfere with his spray management. The impact of late season disease was minimal as well. Only his sultanas seemed to suffer from Botrytis and he was able to harvest early to save them, even though that meant a drop in quality. It helped that sultanas do not make up a large proportion of his crop. It would seem that his strategic decision to have multiple varieties in order to spread the risk has been helpful here. Nick is rigid in relation to extreme rain and its associated flooding. However, due to the relatively small amount of sultanas compared to other varieties, the economic impact was small.

Nick's decision to hold off redeveloping a block that he had sacrificed during the drought worked for him. It has meant one extra year of lost production on that block; however, his young vines have survived.

Nick's current long-term business plan can be described broadly as *maintaining*. He is not interested in redeveloping or expanding his business beyond redeveloping the block that had been sacrificed. This is because he does not see how he could recover this investment before retiring.

Oliver

Oliver is a full-time farmer with a 200 acre DVF and WG business, though the blocks are not all connected. He has built the business up over the years from an original 20 acres that he bought decades ago. He believes that, for a farm to be profitable, it needs to be big enough to achieve critical mass. As he bought blocks of land, he redeveloped them and planted crops that appeared profitable. When he purchased blocks they were all sultana DVF. Currently, he has 20% Sun Muscat and Carina Currant DVF, with the rest in WG.

Oliver has re-trellised, planted new vines, put new irrigation systems in and made the blocks far more productive and a lot easier to manage and run. There are a couple of small blocks where he has not upgraded the irrigation systems because he couldn't justify the cost of doing so. Overall, Oliver's farm is 'pretty efficient'.

In general, Oliver is willing to put extra water on his vines for more output; this is because he has big vines with big trellises which can take the vigour. He doesn't believe there is a quality difference to keeping output up. It is easier for him to 'manage vigour down than to manage vigour up'. Some of his biggest losses are to hail and sunburn; 'if you start off with only half as much you end up with a quarter. So you've got to give yourself a reasonable opportunity'.

Oliver converted 150 acres of the farm over to drippers 12 years ago, for labour savings. Given he is basically a one-person operation, he does whatever he can to save time. This ended up being really important to him in the drought, as he wouldn't have made it through without the drippers.

Oliver got some advice with regard to the drought to 'not run on one strategy, but run on a number of strategies; so while no one strategy will be right, none will be dead wrong'. He bought some temporary water, bought 64 ML of permanent water (by purchasing a 7 hectare property) and watered everything less than usual. He ended up not putting enough on and paid the price in lost output. When this still was not enough, Oliver decided to sacrifice some of his sultanas. By the end of the drought he had 25 acres that weren't in production, which he had left unwatered.

With the extra costs associated with managing the drought, Oliver decided that the first thing to go was his integrated pest management consultant. It was 'an easy way to save \$12,000'.

Since the drought has broken, Oliver has been investing in changing over the sacrificed sultanas to Carina Currants, utilising the existing swing arm trellis. He chose Carinas because they fit his program better. They are more productive than sultanas, but at a different time of year, when Oliver is not so busy with WG.

Last year, with all the rain, and its associated disease, Oliver only harvested half of his crop. He was able to harvest the DVF, but the yield was 'pathetic'. What he was able to pick of the WG achieved a really poor price because it was all basically reject or salvage quality. For most of the fruit that should have been \$400 or \$500/tonne, he was getting \$110/tonne. He figures he lost about \$400,000 last year.

Managing disease was a huge cost to Oliver. He spent 10 times what he normally would on sprays. While he had a full typical year's worth of chemicals in the shed, this was not enough. He had to go out and buy three times this, and at a higher price. He also had a problem with Botrytis, which was unusual.

Twelve years ago Oliver was planning for his retirement. He decided then to buy a 70 acre block and redevelop it over time. The thought was that, with his combined property size, he should be able to retire now, twelve years later, debt free. This has not eventuated. He now has 200 acres and a huge debt.

For several years during the drought he was not able to pay any principal off his loan. He feels like the debt is getting out of control. Last year's \$400,000 loss and the low price he is getting for his WG have added to this. Additionally, Oliver is owed money for grapes in 2009 which he will never be paid because the winery that purchased them went bankrupt. He has had to sell some permanent water, just to cover some of his debt.

Oliver used to have six casual staff working for him; he now only has one person part-time. With the low prices he is getting and the problems in the last few years, he has had to drop this back. The award also changed, so any staff that work for him get paid more. He 'has never worked as hard' as he has in the last couple of years.

Oliver thinks that retirement looks pretty good, but he really has no prospect of that at the moment. Nobody wants to buy his place, so he is 'chained to the place and the bank' at the moment. The idea of selling gets very complicated anyway. It was easy for him to buy individual blocks of land, but now he has 15 titles and is overwhelmed with the idea of working out how to sell all of these.

When he realised things were going backwards during the drought he changed his strategy to try and get through with everything intact. His thinking was that, if he could keep the farm intact and productive, it would be easier to sell as a productive block. He thinks it would be easy for a TG producer, for example, to graft the rootstock and convert his WG to TG.

Oliver thinks the worst is over. He ended up replanting 25 acres towards the end of the drought, which was expensive. But these are starting to come into production. In some way, Oliver wishes he were younger, as now would be the time to expand, when land prices are so low.

Oliver: Description of farm flexibility and options for the future

Oliver has a rigid system overall. There is no flexibility to change the output mix within his current business strategy, and hence no strategic flexibility.

Oliver has been planting varieties that he sees are more likely to get a good price. He also has a contract for a majority of his fruit, though he says this is 'for the bank', not for an increased price. Oliver is rigid in relation to output prices.

Oliver's tactics for managing the low allocation associated with the drought were to buy temporary water and water everything a bit less. When this was not working he decided to sacrifice 25 acres of sultanas. Oliver is rigid in relation to his irrigation allocation.

Knowing that these tactics were not going to be enough, Oliver also purchased 64 ML of extra permanent water, adapting his system to increase his entitlement. Unfortunately, Oliver's tactical options and the adaptation to his farm came at a cost. His debt was increasing and he had 25 acres that he had to redevelop, with loss of production for 2-3

years and the resources required to replant vines. He has also had to sell some of his permanent water. This means that his tactical flexibility to manage future reduced allocations has decreased.

The pressure on the farm business was exacerbated by last season's extreme rains. He could only spray to keep disease at bay and harvest his DVF early. Unfortunately, these were not enough and he ended up with losses of \$400,000. Oliver is rigid in relation to extreme rainfall.

While Oliver has been redeveloping 25 acres over the last couple of years, putting in Carina Currants, he did not suffer any flooding that resulted in the loss of his new young vines; hence, his small glimmer of optimism regarding the future.

Oliver's current long-term business plan can be described broadly as *winding back*. His fundamental aim is to ensure the farm business is 'intact and productive' in the hope of selling it to another farmer. Over all, Oliver is not where he wants to be financially and can see no realistic options for changing his situation. His reserves have been significantly depleted and his debt increased. The price he is getting for his WG, which is 80% of his property, is so low that his debt is not likely to decrease quickly.

Oliver obviously sees some prospects in the DVF industry, as is evident in his recent redevelopment. However, the capacity for him to redevelop further is very constrained. As well, his capacity to absorb any further major shocks is very limited.

Patty

Patty has a 50 acre DVF business. Five acres of this used to be WG, but she has been top-working (grafting) these over to DVF. Patty bought the original block in the mid 1980s and has been slowly buying blocks over the years to get it to its current size. She worked off-farm for the first 10 years to acquire the capital to build up the farm. She doesn't want the business to get any bigger. The aim was always to get to a size that was viable for her family without having to hire other people. This is where it is now.

Patty has a fully mechanised system and owns her own DVF harvester. She produces a mix of sultanas, currants, and muscat grapes. Some of the varieties have been grafted over from WG. Patty has selected the mix of varieties to ensure varieties ripen at different times, which will help spread the risk from seasonal variability and variable prices.

Normally, in a good year, Patty's farm produces about 100 tonnes of dried fruit. A few years ago, when the prices were \$1100 to \$1200 a tonne, this wasn't fantastic. However, now Patty is getting up to \$2000 a tonne, which is better. She associates this better price with the competition that now exists from having three processors. She has always had a contract and, with the guaranteed minimum price, this works well for her.

Patty has a 150 ML water entitlement. Her farm is irrigated with under-vine sprinklers. She has just finished converting it all to this and cannot see the point of putting in drippers. She typically uses about 80% of her entitlement.

During the first year of a low allocation Patty irrigated overnight to reduce evaporation. She also stretched out the time between watering, focusing on ensuring she watered enough at the critical times, such as during flowering and when it was really hot. She tried to make sure things didn't dry out too much, though. She also focused on her young sultana and Carina Currant vines because they were higher yielding. She didn't 'go overboard' on the WG as the price wasn't good for them. Throughout the drought, Patty was able to maintain the profitability of her DVF, in part due to the price for DVF going up.

With these practices she ended up using about 60-70% of her entitlement in that first drought year. This means she did buy some temporary water, though the most she paid for it was about \$450 a ML. She only bought about 20 ML at that price and then the price dropped off. She was then able to buy carryover water. She continued in a similar fashion the second year and even bought almost half of her entitlement's worth of carryover water coming into last season, which she didn't end up needing. Patty thinks that, even though that water wasn't needed last year, it was still pretty cheap insurance at \$2,500 for 70 ML of water.

Last season's extreme rainfall affected Patty's yield. She only harvested 39 tonnes of fruit, about 40% of what she aims for. The rain increased the disease pressure on her farm and she ended up with a severe downy mildew problem just before Christmas, which meant she had to keep spraying. The real damage, though, came with the late summer, as it brought Botrytis close to harvest. All Patty could do was to harvest early, which meant that her sugars were a bit low and tonnage not as high as it normally would be.

Patty's property is worth about \$500,000 and she said that her debt is only about 20%. She pays her interest a year in advance, which helps to keep the taxes down. She then tries to pay a bit off of the principal, depending on the season. However, last year's lower production levels have made it difficult to cover operating costs and pay a bit off the loan. This year, Patty had to increase the loan by \$20,000 to cover operating expenses.

She is thinking about retraining some of her older vines, to get a bit of the vigour back in them again and to make it a bit quicker pruning. While this would knock vine production back for a year she believes it would be worth it. She is also

thinking about changing over to different varieties that are more rain resistant. At the moment the alternatives are too expensive.

She could possibly make more in table grapes. 'It's too much hard work though, plus you've got to come up with a fair bit of money upfront, before you get any crop'.

Patty's son has been working on the farm but, given the low prices, drought and last year's rains, Patty has been encouraging him to get off-farm experience. Patty's confidence about the future for farming 'is shaken a bit' and she wants her son to have alternatives.

Patty: Description of farm flexibility and options for the future

Patty has a rigid system over all. There is no flexibility to change the output mix within her current business strategy, and hence no strategic flexibility.

Patty has a contract with a guaranteed minimum price so she knows what she will get from the processor for her fruit. This helps her to plan expectations in her business but demonstrates little control over output prices. She associates the currently higher price she is getting for her fruit with the competition among three processors in the district. Patty is rigid in relation to output prices.

During the years of a low water allocation, Patty was able to keep her productivity up on her DVF by altering the timing of when she watered (at nights and at critical times), reducing the amount of irrigation water she used on her less productive vines (WG) and through purchasing temporary water for use at the time or as carryover. Prices were important to her success in getting through the years of low allocations. The prices of her WG, which she under-watered, were low and her DVF prices were higher. Thus, though she may have had a reduced yield, she was able to offset that with a higher price. So while Patty is rigid in relation to her irrigation allocation, she is less so when compared to some of the other interviewees.

Patty is rigid in relation to her capacity to manage the increased disease pressure associated with the extreme rainfall last year. Sprays worked to manage the mildew pressure, though it would have cost time and money to do so. However, the late-season rains were not manageable and had a very costly affect on her productivity.

Patty has had a few bad years, but overall is doing all right. She can see that there is a future for DVF, as long as the prices continue to go her way. She sees the possibility that new rootstock may help her manage the risk of late rain, which could help increase her flexibility.

Patty's current long-term business plan can be described broadly as *maintaining*. She does not have an interest in increasing her size as this would require hiring other labour to run the business. Her focus is on ensuring the business remains viable, and the options she is considering for the future relate to increased production from existing vines or changing varieties to increase her tactical flexibility.

Quinn

Quinn has a 300 acre TG enterprise in which he produces Crimson Seedless, Menindee Seedless and Red Globe grapes. He sells 80% of his grapes to the export market and 20% domestically. The focus for Quinn is on achieving premium quality, essential to be able to sell his product.

TG production is labour intensive. Quinn employs five people full-time and has another 10 casual staff who work for him for 10 months of the year. He has as highly technically-efficient a business as he can; he doesn't believe he can be any more efficient.

Quinn converted his farm from overhead sprayers to drip irrigation in 1997-8. He maintained his overhead sprayers to cool the vines in extreme heat. Originally, Quinn had over 1000 ML of water on his farm and he had purchased 400 ML of water for another property. He sold half of this water permanently to the government so, leading up to the years of low irrigation allocation, Quinn had a 700 ML water entitlement. He needs 1000 ML to adequately water his vines.

In the first low allocation year, Quinn had a hard time working out what to do, because the allocation decisions were coming so slowly. He ended up having a 45% allocation in March, which was no use at all because he needed the water back in November/December.

Given that he needs 1000 ML, Quinn had no choice but to buy water. Given the investment he has put into the business and the type of enterprise it was, he faced a choice to either 'put 100% on or nothing at all'. So he bought temporary water. At one stage he bought 160 ML of water for \$170,000.

Even with the temporary water Quinn did not have enough to manage his property. He made the decision then to cut back 40% of the blocks that were less profitable. He top-worked (grafted) to new varieties what he took out of production. That knocked production back for two to three years but it meant that they only needed 2 ML/ha rather than 9 ML/ha.

During the first year of low allocations Quinn noticed that there was a huge difference in allocations between states. At the end of that season he decided to sell his permanent water entitlement in Victoria and buy a property with a 500 ML water entitlement in another state. This enabled him to transfer water back to his Victorian property.

Quinn sees a lot of the problems with water, including the 'panic buying' that increased the price of water, as coming out of government policies such as unbundling of water from the land. Therefore, he sees the blame for the increased risk to his farm arising from low allocation as sitting squarely with government policy.

Quinn used to have issues getting water to irrigate, as he was competing with others on the system for the time he needed. This was especially important when it was very hot, as extreme heat can affect fruit quantity and quality. Farms have started to 'go under' over the last 5 years, which means that he no longer has issues getting water because there is no one left on the irrigation system to fight over water with anymore.

During a heatwave in 2010 Quinn lost 70% of his crop, which was flowering at the time. While other producers in the region lost a bit as well, it especially affected Quinn because his varieties flower earlier. He had losses of \$700,000 to \$800,000 from that crop.

After two years of poor productivity due to low allocations, and a 70% loss due to extreme heat, Quinn then had to try and manage extreme rain and subsequent flooding. Any money he may have saved on not having to buy water he spent last season on chemicals. Quinn had pre-purchased some of his chemicals, so he didn't have a hard time getting what he needed; it was just costly.

That rainy season was a 'salvage job.' Quinn spent the whole time trying to keep on top of disease (downy and powdery mildew). He sprays for Botrytis every year as a matter of course, having had the disease before, so he did not have a problem with it. Quinn covers his grape vines with plastic to keep the rain off, but could not alleviate the humid environment under the plastic. Managing the increased disease pressure was made harder by the fact that 15 % of his property was sitting under water, so the tractor would get bogged and it took a lot longer to spray. Even so, he was at least able to get his machinery through the floodwaters and he did not lose any vines.

In the end Quinn ended up bringing in 95% of his crop and it was all good quality. The one problem with last year's crop was that the quality of his Crimson Seedless got downgraded because it didn't 'eat properly' (they were not sweet enough). This meant the price he got fell by over 20% for those grapes.

After the years of low allocation Quinn kept trying to expand his productive capacity by redeveloping/reworking the unproductive vines. In 2009 he was in a good position financially. He had 70% equity in the farm and only 30% debt. Now, after two 'disastrous seasons' he is sitting at 70% debt and 30% equity. The bank is getting nervous, especially since land values have dropped, not just about his farm but about the whole industry. With Quinn's 80% export orientation, the high Australian dollar is not helping.

Quinn believes the problems he is having on his farm are putting his family finances at risk. For the first time in the 40 years or more he has been on the farm, Quinn is thinking about getting out, trying to work out how he can minimise the financial damage for his family.

Quinn thinks 'things will get very interesting' if he doesn't get a good year very soon. He's had an early bud burst this year because it was the hottest August ever. This was followed by the coldest September/October ever. The region has had every extreme of weather in the last few years. What can he do?

Quinn: Description of farm flexibility and options for the future

Quinn has a rigid system overall. There is no flexibility to change the output mix within his current business strategy, and hence no strategic flexibility.

Quinn's farm business is rigid in relation to output prices. He produces 80% of his fruit for the export market, which achieves a higher price for high quality fruit. The high Australian dollar, however, is reducing the price he gets for his fruit.

Quinn's capacity to manage a low water allocation is extremely limited. He currently only has a 500 ML water entitlement, which means in a year of 100% allocation he still needs to buy 500 ML to water his vines fully. His system is very sensitive to any drop in quantity of water application because of the focus on quality TG for the export market. Other than buying water, all that Quinn is able to do is sacrifice blocks of vines so he can divert water to those that are more productive. Quinn's decisions to sell permanent water have actually decreased his system's capacity to manage a reduced allocation. Quinn is rigid in relation to a low water allocation.

Quinn's use of plastic covers each year to keep rain off the fruit was a useful tactic, though it could not protect against the humidity, which increased the disease pressure he faced. Though Quinn found managing the extreme rain and flooding time consuming and expensive, he was able to keep disease at bay. His previous experience with Botrytis has led him to include Botrytis control as a regular part of his spray program. While others experienced huge losses to this disease, he did not. However, Quinn did experience a lowering of quality in his Crimson Seedless grapes due to a low sugar content, which may have resulted from less sun exposure. Quinn is rigid in relation to extreme rain.

As well, Quinn has relatively early varieties of TG. This may have mitigated the affects of extreme rain later in the season on his crops, if his earlier harvesting occurred before the disease became prevalent in the region. This means earlier varieties may help with managing late season rain.

Conversely, having earlier varieties actually increased the impact of early season extreme heat on Quinn's farm. Though he could turn on overhead sprayers to cool the vines, these were obviously not enough in the 2010 early season heatwave which cost Quinn 70% of his fruit production. Quinn is rigid in relation to extreme heat.

Overall, Quinn is 'walking a knife's edge'. The flipping of his profit to debt ratio is an indicator of his current position. Quinn's decisions regarding his permanent water may have been sound when he had relatively deep pockets. Unfortunately, his circumstances have changed, which means he has reduced the capacity of his business to cope with low water allocations in the future. This means that any reduced allocation is likely to actually affect his business, and possibly more than the 4% loss of production he faced last time.

Quinn's current long-term business plan can be described broadly as *maintaining*. He is actively trying to sustain a viable TG business, even though he is now considering 'getting out'. This consideration of leaving is due to his current dire financial conditions rather than a long-term business plan.

Rob

Rob has a 65 acre DVF farm. The farm has been in the family for generations. Rob and his wife are both currently full-time running the farm. The farm has expanded and contracted over time with different family partnership and ownership arrangements. The farm currently has a majority of sultanas, some Sun Muscat, Gordo raisins, Carina and Zantia currants. Most of the farm is machine harvested. Rob typically gets about 120 tonnes of fruit when in full production, though he did get 166 tonnes one year.

Rob has several varieties because there is a market for these. He is in the middle of a DVF contract with one of the processors. The increased competition among the contractors is a good thing; though Rob thinks that the processors will struggle to keep afloat unless they can get greater quantities of fruit.

Rob's fruit is graded on quality, which is essentially based on colour. Rain affects quality, as does the way the fruit is produced and harvested. He is always conscious of not damaging fruit, harvesting at the right time and making sure when cutting and wetting that he's 'doing the right thing' as this all affects the price he gets for his fruit.

Rob has been actively redeveloping the farm. It has mixed row widths and some older plantings with older trellises, so currently he has to use three different harvesters on the property. He is trying to put in swing-arm trellises and standardise row lengths.

Rob is focused on getting a good crop every year. He thinks that when they are in good condition the new vines on the modern trellis can yield just about double the production of the old vines on the old trellis. The sooner he can change things over, the better. However, it is an expensive and time-consuming exercise, and he doesn't quite have enough resources to do all the work. If he had a bit more income he would employ another person to help. At pruning time Rob hires three people casually for two months. At harvest time he hires five people for two months.

Rob has a 240 ML water entitlement. When he took over the farm he started upgrading the irrigation from flood to low level sprinklers. When the low allocation due to drought hit, half of the farm was still being flood irrigated. The flood irrigation vines need about 8-8.5 ML/ha.

In the first year of low allocation Rob tried a number of things. He made the furrows narrower on the flood-irrigated half of the farm and watered during the day so that he could monitor the water flow and avoid over-watering. On the spray-irrigated half he watered at night to avoid evaporation. Across the whole property he rationed water and emphasised watering at crucial times (flowering, fruit set). He also took eight acres out of production; sacrificing a block of the older vines on flood irrigation. He did buy \$35,000-40,000 worth of temporary water, but only when it was down to \$350/ML. He waited as he could see a lot of 'panic buying' because it was an 'immature market'.

Rob found it hard to make decisions about what to do that first year of low allocations. Saying he had a 43% allocation doesn't actually describe what happened. He had to make decisions based on having a lot less so he watered less. He watered more and more as the season went on. Unfortunately, by that time he had lost half of the crop because of early under-watering. In the end his vines grew quite well and what was there was good quality. He ended up only harvesting 37 tonnes though.

At the end of that first year Rob had some water that he had purchased for carryover. And while 'predictions were dire' for that season he had good fruit set and produced 120 tonnes. He considers it a coincidence and that he just had the perfect conditions for fruit set that spring.

During that time, he converted the half that was still being flood irrigated over to drippers, using a \$20,000 government grant. He plans converting the low-level sprays over to drippers as well when he is able to do so. The drippers required

some kind of soil moisture monitoring, which Rob hadn't used before, so he is finding it a bit tricky. He is still working out the new system and suspects that he is under-watering. It takes time to work that out, and last year's rainfall would have masked any under-watering anyway. Even if he is under-watering a bit, he is seeing a decrease in water use. He thinks that the drip irrigation vines will need about 8 ML/ha.

Rob runs a disease prevention spray program. This means he generally doesn't use curative or eradicated chemicals, which are a lot more expensive. Usually he has his diseases under control. But last year he had trouble because of the rain. With the benefit of hindsight he knows that he didn't spray often enough, even though at one stage he was spraying every seven days. He had problems with downy mildew, which he was never really able to eradicate.

Then there was more rain in the harvest, which split the berries and caused Botrytis. Rob had never seen Botrytis before. When the late rain came he had to start harvesting early to prevent splitting. But the maturity wasn't in the fruit; 'there wasn't enough sugar in the berries to convert to weight at the end of the day'. He ended up only harvesting 48 tonnes last year and the quality was bad.

Rob had to borrow a bit of extra money over the last couple of years to maintain some cash flow and to commence some of the redevelopment work he has been planning. His debt has probably increased a little, but his equity is still higher than his debt, though 'not quite what it used to be'. Certainly the two recent low crops have 'knocked things around'. Rob is looking forward to a good season.

The recent problems have slowed down Rob's redevelopment. At the moment he is replanting two acres of vines to a new variety of sultana which is rain-tolerant and hopefully 'a bit more consistently yielding than our traditional sultanas'.

He would like to expand but thinks that they would need three people to run a bigger place. He knows of a block nearby where the farmer took the exit package: sold the water. It is right on the boundary by his pump, so it would be easy to put in irrigation. He is going to wait and see how things go for a while, though.

Also, Rob is worried about the viability of the district. The profitability of his farm could be hindered by the loss of the critical mass of DVF farms needed to keep the processors viable. As well, Rob thinks that the government decision regarding the region's irrigation infrastructure could have major implications for the viability of his farm. He is going to wait and see what they do about the irrigation infrastructure before he does anything else.

Rob: Description of farm flexibility and options for the future

Rob has a rigid system over all. There is no flexibility to change the output mix within his current business strategy, and hence no strategic flexibility.

Rob's farm is rigid in relation to output prices. He produces a number of varieties based on their marketability, though this does not determine price. He has a contract with one of the processors and believes that increased competition is good for the viability of the industry and his prices. However, he has no control over this.

Rob has a limited capacity to manage a low irrigation allocation. When his tactics were obviously deficient in the first year of low allocation, as was evident in his very low output, he converted his flood irrigation over to drippers. He fared better the second year, though he still had to purchase temporary water and maintain eight acres of land out of action. Rob is rigid in relation to his irrigation allocation. The conversion to drippers may have increased his tactical flexibility.

Rob is also rigid in relation to rainfall and its related increased disease pressure. Rob has two problems with disease. First, his spray program does not seem to manage increased disease pressure, as was apparent in his recurring downy mildew problem. While his disease prevention approach works for him in a typical year it was not adequate last season. It may be possible that Rob could change his chemical spray practices to improve the effectiveness of this tactic. Second, late season rain is affecting his fruit at harvest. Other than harvesting early, which leads to a reduction in tonnage and quality, he has been actively planting more rain-tolerant varieties to reduce this problem. This may increase his tactical flexibility in relation to late-season rain.

Overall, Rob's current long-term business plan can be described broadly as *building*. He is constrained by resource limitations to redevelop less quickly than he would like. He wants to redevelop so that he can increase his profitability and have the resources he needs to expand. If he can get a few profitable seasons this may buoy his capacity to keep moving forward. Conversely, continued poor profitability could lead to contraction of his farm and of his plans for redevelopment.

Due to issues beyond his control, Rob has a clear lack of confidence in moving forward with plans to redevelop and expand. Rob is monitoring the state of DVF production and processing in the coming year and beyond while he waits for a good crop, and is waiting for government to finalise policy decisions that may impact substantially on the viability of his farm.

Samantha

Samantha produces DVF and a small amount of TG on a 35 acre farm. She has been on the property for over 40 years and is getting close to retirement. The farm currently has 20 productive acres: 18 acres of mechanically-harvested DVF and 2 acres of hand-picked TG. She has all sultana DVF, and a couple of varieties of TG. She likes having different varieties to spread the production risk if something fails.

Samantha put in WG in 1993 when the market for them was looking good. When the market dropped in 2003-4 she started converting (top-working) some of these over to sultana DVF. As well, seven and a half acres were just taken out of production and are currently grass for personal livestock.

Samantha and her husband are both full-time on the farm. She has had some work such as fruit packing, but only to earn a little side money; 'nothing that has really supplemented the farm'. They used to hire other people to help with some of the tasks on farm, but haven't had the money to do this in the last few years.

Samantha has a 109 ML water entitlement to irrigate her vines, using a pipes and risers flood irrigation system. She looked at going onto drippers but it was expensive and would give her very little benefit for the cost. In a typical year Samantha uses about 75-80% of her entitlement.

During the years of low allocation due to drought Samantha only bought water twice, at a cost of \$17,000 in total. Additionally, she took 1/3 of the property, the oldest vines, out of production. She was able to get full production off the blocks that she watered.

After the years of low allocation, Samantha was then affected by flooding. Earlier in the season she was able to spray to control disease but when her property flooded she just couldn't get on to spray. The fruit started rotting. She ended up cutting the DVF crop, harvesting early to try and get something off it but wishes she hadn't. It wasn't worth the harvest as she only brought in 14 tonnes, a quarter of what she should have harvested from those vines.

After a few bad years Samantha has watched her farm drop in value from about \$700,000 to \$200,000-300,000 at best. Everything has gone backwards. She had to pull \$160,000 out of her superannuation to put back into paying the running costs of the farm. Only last month she had to pull another \$25,000 of what she had put away in a term deposit to pay the bills.

Samantha and her husband are considering applying for the pension soon. With the farm they are making so little that they could get at least a partial pension, which would at least pay for the groceries. If getting the pension works out, Samantha and her husband are thinking about keeping the block the size is it now, with 20 acres of production. As long as the farm produces enough to pay for the running costs and they are healthy, Samantha plans to keep it going.

Samantha thinks she could only really get about \$300,000 for the farm right now anyway. She 'couldn't even get a decent house in town for that' so they might as well stay.

Samantha: Description of farm flexibility and options for the future

Samantha has a rigid system over all. There is no flexibility to change the output mix within her current business strategy, and hence no strategic flexibility.

Samantha's approach to managing prices has been to plant varieties that are in demand. She is rigid in relation to output prices.

Samantha had limited options with regard to responding to a reduced water allocation. Her response, to sacrifice 10 acres of her productive farm, is a clear indicator that she has no flexibility in her farm to manage variable water; hence, her farm is rigid in relation to her irrigation allocation.

Samantha was able to manage the increased disease pressure associated with last year's extreme rainfall. She was greatly affected, however, by the flooding, which blocked access to her vines. Samantha's farm is rigid in relation to the flooding associated with extreme rain.

Samantha's current long-term business plan can be described broadly as *winding back*. She and her husband are nearing retirement and considering going on a pension. She does want to maintain the farm, potentially in its current smaller size if it can pay for its own running costs. This would allow them to stay on the property.

Samantha's circumstances have changed over time since the first year her allocation was reduced. Not only has she lost the vast majority of her savings; she has also dropped 1/3 of the productive capacity of her farm. This may work well in years of low allocation, as it may allow her to adequately water her vines down to below a 50% allocation (given she still has her water entitlement). This may put increased pressure on the farm business, however, in years of flooding or extreme late season rainfall (when a majority of her crop is most vulnerable), as her margins may be narrower.

Tony

Tony has a 125 acre farm that is 75% TG and 25%DVF. The farm has been in the family since the mid 1950s and started as a DVF enterprise. Tony and other family members have been adding blocks over time.

Running the farm is very labour intensive. The TG are all done by hand and the DVF require a lot of work as well. Overall, there are three family members who work full-time on the farm and also 20 casual staff over a 12-month period.

In around 1998, when the DVF market was really depressed, Tony started converting the entirely DVF business to add TG. He converted to spread the price risk: 'when the price for one is down the price of the other may be up'. As well, he has a variety of each TG (Crimson, Thompson and Menindee Seedless) and DVF (sultana, Sun Muscat and currants) to spread the risk of variable growth performance across the season.

Most of the farm was flood irrigated until 2006 when Tony converted it to automated drippers. He got a \$20,000 government grant that covered 10% of the cost. This was the year before the low allocations due to drought, but Tony could see the low allocations coming and thought 'we've got to get more efficient with what we're doing'. So, while he wasn't really financially ready, he borrowed money to do the conversion. It is now a great management tool as well as water saver, as he can water the whole farm in 24 hours (when it used to take eight to ten days).

When the low allocations did come he found it difficult to decide what to do. It was a gamble - buy temporary water now, hope the market softens later or allocations go up later. He kept close track week-to-week and ended up buying temporary water two to three times each season to make sure he had enough. He spent about \$500,000 on water over three years. That money was all of Tony's superannuation; the money went 'into thin air' but he 'had to do it'.

Tony ended up stretching out the time between watering and, coupled with the drippers and temporary water, he was able to keep 100% of the farm alive. Keeping it all alive was important for Tony, as crop yields are determined, in part, by the management practices from the previous year. So, if he didn't water enough one year, the negative effects would last for two. He ended up having a good, high quality yield throughout the drought.

Trying to keep the rain off the TG is important to Tony. He uses rolls of plastic to do this, but there are costs. The plastic costs \$1200 an acre just for the material, then it requires time to put it on and take it off.

Last year's extreme rainfall made managing the affects of rain challenging. All Tony and his family could do was spray two to three times the amount of fungicide they would normally to hold off the downy mildew and powdery mildew. Whenever he could, Tony was out on his tractor spraying.

The flooding did stop Tony for a week or two at a time but, fortunately, one of the advantages he has with his drip irrigation is that the centre of his rows are kept a bit drier, which helped him to get on quicker. There were also some low-lying parts that had water on them for months, but Tony just pumped the water out.

The quality in the DVF was one of the worst in 10 years, just in terms of grade quality. But he didn't lose as much in quantity as he could have: only 50% of his latest variety (Sun Muscat). The biggest issue was low quality, which was true of the whole district. Quality is one of the things that determine the price Tony gets for his DVF and quality is based on colour, which is affected by rain. There was nothing he could do about that.

The TG yield was better than expected, given the conditions. The main issue was the increased labour requirements at harvest. The yield was down 25% but the quality was good. Tony is not really sure if he ended up going backwards or breaking even last year, given the increased costs in chemicals.

Tony has been actively redeveloping and expanding the farm. He is trying to get the yield of the existing farm up to 100% of its capacity. Tony thinks it is only at 70-75% currently. Some more redevelopment will be necessary for this, though some of it is just 'a waiting game' while the young vines get bigger and start producing more.

Once Tony gets more output from the farm then he will look at getting another adjoining block. He wants all of the blocks to be connected. If one of his neighbours' blocks came up for sale, he might have to take a bit more debt than he is comfortable with because 'you have to take the opportunities as they come'.

Debt is a factor for Tony. He doesn't want to get over 50 % debt; otherwise 'you dig a hole that you can't climb back out of'. Having to put the \$500,000 into temporary water has slowed down redevelopment. He thinks that, with everything that has happened, they haven't gone backwards, but they have stagnated. He thinks they are probably not going to expand for another three to five years now.

In thinking about the future options of his farm Tony is concerned about the 'two to four year blocks of decisions' being made by government. This worries him because, with his permanent plantings, he has to make decisions over much longer timeframes. He needs some certainty about long-term water security for the region. At the moment he is worried that he may be 'creating a white elephant' and that he will turn around and his asset will be worth nothing.

Tony: Description of farm flexibility and options for the future

Tony has a rigid system overall. There is no flexibility to change the output mix within his current business strategy, and hence no strategic flexibility.

Tony produces both DVF and TG to spread the price risk for his business, but this does not indicate significant control over his output price. Overall, Tony is rigid in relation to output prices.

Tony's capacity to manage a low water allocation is limited but was greatly improved by the timely adaptation to drip irrigation. He went into years of low allocation with more tactical flexibility than he would have had with flood irrigation. As it was, with the increased efficiency of drip irrigation and stretching out the time between watering Tony still ended up needing to purchase \$500,000 worth of temporary water. Tony is rigid in relation to his irrigation allocation.

Tony is also rigid in relation to rainfall. While he could cover his TG and spray to manage the increased disease pressure, these were not sufficient to stop the impacts from translating into a drop in output quantity and quality.

Tony's long-term business plan can be described broadly as *building*. They have long-term plans for their future on the property. While redevelopment and expansion has been slowed for Tony, it has not been stopped. However, increased variability of critical inputs that impact the farm output are likely to, over time, have a negative impact on this long-term plan.

An impediment to Tony's plan is his concern over the state of the region. He is acutely aware that government policy affects the economics of the region and his business.

Umberto

Umberto has a 40 acre TG enterprise. He sells to the export market. He took over the farm in the late 1980s and converted from DVF when the market for DVF dropped in the early 1990s. It took him about 5 years to convert the whole farm to TG. It takes three people full-time to run the farm and about 12-15 extras during the five-month busy period.

When he was converting, half of the vines were simply re-trellised and cultured (retraining/management) for TG. Here he converted own-rooted sultana DVF to Thompson Seedless TG. The other half of his farm was redeveloped with new vines for new varieties such as Red Globe and Crimson Seedless. He has continued to add/change varieties over the years, depending on what is marketable at the time. He aims to have varieties that mature at different times of the year so that he can 'keep a presence in the market'.

Umberto's property has a 160 ML water entitlement. His entire property uses pressurised irrigation and under-vine sprinklers.

Umberto decided during the first year of low allocation that he needed to keep watering his vines. His vines were young, highly productive and he wasn't prepared to lose them. TG vines are permanent plantings; missing a couple of irrigations is enough to stop production of a commercially viable crop.

To ensure he had water to irrigate his vines, Umberto decided to purchase a property with a 200 ML water entitlement. This enabled him to transfer water to his TG business. Umberto took \$440,000 out of his superannuation to purchase the property, with the intention that he could use the water from the property as a source of income, by selling water temporarily off the property each year.

Until recent times his business has been more profitable, but last year, with the high Australian dollar and the floods, Umberto is 'just treading water'. During last year's extreme rain and flooding, Umberto's property has patches of vines that were under water for three to four weeks. Not only did he have the rain from his place but all the water off his neighbours' places ended up on his as well. The flooding meant he couldn't get on to spray some of his farm when he needed to. He did spray more across his property that season, at three times the cost. He struggled to get the right chemicals at times as well.

While Botrytis was a problem in the region Umberto didn't have a problem with it because he regularly sprays for it as a part of his annual prevention program. He has had Botrytis in his TG in the past, which has led him to add it to his disease prevention program.

He ended up losing a patch to downy mildew but was able to pick half of a typical crop. Of course, by the time he adds in the extra cost of sprays, diesel, labour to do the extra cleaning, and the lower average revenue due to the high dollar, he didn't make anything.

Umberto also lost 1,500 young vines that died in the floodwater. Not only was that \$9,000 in the cost of the vines, but it was also two weeks of work for three people and an extra year of lost production.

Umberto had to borrow another \$100,000 this last season to keep the farm going; for some cash flow. While previously he would have had about 10% debt in his farm business, this has jumped up to close to 30%. As for the value of his farm now, 'value is a relative term'. Umberto figures value is 'what one bloke will give you in a cheque'. With the drop in land

prices and unbundling of water from land, Umberto thinks the government has some accountability. The doubling to tripling of his debt to get water is 'not legitimate'.

Umberto's children are growing up and moving on with their lives. He thinks that one of them may return to the farm one day. However, given the current state of things, he is encouraging them to get an education and not to waste their time with the farm. Meanwhile, Umberto is going to keep going with the farm. He doesn't want to get any bigger, as his size is manageable.

Umberto: Description of farm flexibility and options for the future

Umberto has a rigid system over all. There is no flexibility to change the output mix within his current business strategy, and hence no strategic flexibility.

Umberto sells his fruit to the export market. To keep his presence in the export market he ensures that he has varieties that mature at different times of the year. He has no capacity to store output. While producing for the export market may provide a premium price, it includes expectations of high quality. This means that variable production risk may be higher effectively. As well, the high Australian dollar has tremendous influence on Umberto's profitability. Umberto is rigid in relation to output prices.

It was obvious to Umberto during the first year of a greatly reduced irrigation allocation that his farm did not have the capacity to cope. For him, continuing to water was paramount, as any drop in water application would very quickly lead to a drop in a sellable product. Umberto's farm is rigid to a reduced irrigation allocation.

When Umberto purchased another 200 ML of permanent water he increased the capacity of his farm to manage a lower allocation by lowering the allocation percentage at which negative consequences occur for the farm. Assuming Umberto needs 160 ML to water his property, which is his typical allocation, then adding 200 ML means he can drop the allocation percentage to 45% before any other response is needed.

Umberto said that he purchased this with his superannuation as an investment, not as an asset for the farm. Hence, this is another manifestation of the depth of his pockets, rather than an adaptation to the farm system. His aim was to be able to sell water on the temporary market.

The first year Umberto tried to sell his water he couldn't find a buyer, even at as low a price as \$8 per ML. This is not unexpected and reflects the main problem with this strategic decision. Umberto is a net purchaser of water, not seller. The times that he is likely to be able to sell his water temporarily is when the demand for water will be very low. When the price of temporary water is high is when he will need to use it himself. Unfortunately, Umberto made this decision at a time when the price of water was quite high, making his \$2,200 per ML purchase of permanent water appear sound.

Umberto is also rigid to extreme rain and flooding. His spray program was unable to manage the increased pressure of downy mildew, in part due to his inability to access part of his property due to floodwaters. He also lost 1,500 young vines because of the flooding. There does not appear to be anything that Umberto can do to alter this, as it is a result of the low-lying nature of his property which ends up capturing runoff from his and neighbouring properties.

Overall, Umberto is struggling with what, to him, is a dramatic increase in debt and loss of cash flow. However, his rocky times are fairly new after numerous profitable years. He is not actively holding off on existing plans as his plans consist of persisting with the existing farm. Umberto's current long-term business plan can be described broadly as *maintaining*. The new concern that could change things for Umberto is the strong Australian dollar. If he continues to face a reduced profit due to variable production or prices then this could put pressure on the future viability of his business.

Victor

Victor runs a 35 acre DVF business. He has a third of his farm in Sun Muscat and two-thirds in sultanas. He has a mix because it splits the production risk and labour demand. The Sun Muscats are higher producing, but they are later in the season. This means that, if Victor were to have all Sun Muscat, he would struggle to get everything harvested, especially when there is late rain. By having some earlier-maturing fruit he can spread out his harvesting and make sure he has enough time to harvest and dry everything.

Being able to manage his time is important for Victor because he does everything himself. He has everything set up so he can mechanically harvest and run the business by himself. He does use casual labour for pruning and he occasionally looks for a casual person to help with a job, but finds it harder lately to find people. It used to be that there were lots of backpackers around because there was a lot of seasonal work on big properties, and he could just 'skim off the edge' of that. Now 'a lot of the bigger places, a lot of places in general, are just gone' and there are fewer people willing and able to do the casual work.

Victor doesn't have any control over the price he gets for his fruit. He doesn't currently have a contract with a processor. He has had a contract in the past but doesn't see a difference in the price he gets when under contract. Last year he was paid the same for all of his fruit anyway because there was so little of it. He isn't so worried about managing for quality,

which is really just about fruit colour. Rain darkens the fruit. He tries to keep the fruit lighter so that he can get a higher price, but really there isn't much he can do about it.

Victor has a 130 ML water entitlement, which he generally doesn't use in its entirety each year. Overall, there have been a lot of changes over the last few years relating to water. The rules keep changing. He doesn't even really know what he is paying for water because the bills are so complicated. He just finds it hard to keep up with what is going on.

The farm has predominantly been under overhead sprayers. Victor added drippers to his irrigation system when there was a government grant of \$20,000. The drippers allow him to water the whole block in shorter bursts, so when water is hard to order, because of competition along the line, he can still water his blocks. The down side is he needs to water more frequently with the drippers (every day or two versus once every week to 10 days).

While the drippers have been good for his irrigation timing he is not so sure about the water savings. During the years of low allocation he almost wonders if he wouldn't have been better off buying 40 ML of temporary water at \$1,000 a ML that year.

During the years of low allocation Victor basically starved his vines; he gave them just enough to keep them going. He also bought temporary water at \$400 per ML. All of Victor's vines were fairly young and in good production, so sacrificing some of the vines was not an option for him. After a couple of years of having to buy some temporary water, carryover was introduced, which helped.

During the years of low allocation, Victor didn't put in a winter cover crop, which he had always done to add organic matter and nutrients to the soil. Putting in a cover crop requires putting on another couple of irrigations.

He actually got a reasonable crop the first year he did this, but found that in the subsequent years the yields kept dropping. 'They're still suffering really'. During that first year he brought in about 80% of his typical yield. Each year after that it dropped further, down to more like 50%. Victor thinks the vines 'have gone back a bit' without water and cover crops. He has started applying more fertiliser to try to get their production back.

Victor found it really frustrating that the allocations were announced when it was too late. Lower Murray Water would announce in April that there was water, after he had finished the season. Victor needs to know in October what the allocation is going to be, so he can plan on how to get through the season. This is why carryover has helped him a lot; that way he can at least know that he has something at the start of the season.

After the years of low allocations Victor then struggled with last year's extreme rain. His farm had downy and powdery mildew, mice, grasshoppers and three or four episodes of flooding that left water sitting on his block for weeks at a time. This meant he just couldn't get on to spray. He ended up only bringing in 30% of what he should have that year.

Victor has not had any real debt on the farm in a long while. This has enabled him to just keep putting money into the bank over the years. He has also been able to put money into other investments. The aim is for the farm to generally 'pay its own way'. When the farm needs a bit, he just pulls it back out of his reserves. Over the past five years or so, he has had to use some of the reserves, which means he is going backwards. However, he has had over 30 years to build up reserves and isn't too worried about 'a bit of a bad run'.

Even so, Victor is not actively focused on redevelopment or upkeep on the farm at the moment. He can't be bothered to work too hard at it when it only leads to less money in the bank. He is worried about the price he gets for his fruit and thinks any extra money he makes is only due to the labour savings when he switched to mechanical a while back.

Victor: Description of farm flexibility and options for the future

Victor has a rigid system overall. There is no flexibility to change the output mix within his current business strategy, and hence no strategic flexibility.

Victor does not have any control over the price he gets for his fruit and believes that the only profit he is making has come from on-farm efficiencies. He doesn't think that having a contract assures him a good price. As well, while quality is linked to achieving a higher price, this is determined by rain, over which he has no control. Victor is rigid in relation to output prices.

Victor is rigid to a low irrigation allocation. His tactics to cope with the years of low allocation have led to reduction in the productive capacity of his vines that he is still struggling with. Victor put in drippers during the drought and also started using carryover water. These may have increased his tactical flexibility; however, this is uncertain because the consequences of under-watering may be masking the benefits.

Victor is also rigid to extreme rain and the associated flooding. While his vines were still trying to recover from the low allocations during the drought, there was an additional marked drop in yield due to the increased disease pressure that Victor had to cope with. The flooding, which restricted access, added to this rigidity.

The viability of Victor's system is determined by its flexibility and the depth of his pockets to cope with any variability that the tactical responses cannot manage and that flows through to profit. The non-existent debt and his financial reserves

provide a good buffer for Victor in this case. Additionally, Victor's aspiration that the farm just needs to pay for itself may put less pressure on expectations when compared to others trying to extract larger profits from their businesses. This is another reflection of his deep pockets. Victor's current long-term business plan can be described broadly as *maintaining*.

Will

Will has a 70 acre DVF business, which he has been running for over a decade. He slowly transitioned to fully take over the farm over a number of years, which reduced some of the financial pressure.

Will and two others work on the farm; though one person is half-time. He has a mix of sultanas and currants. The entire property has been redeveloped and has 'good productive root stock'. It is all mechanically harvested.

Will aims for top quality, but the reality is that the cheapest fruit to produce is the top quality fruit, because quality is assessed by colour. The lighter-coloured fruit is higher quality and it is light because there is no rain falling on it. Fruit that has not had rain on it is actually cheaper to dry so that is what he wants.

Owning his own harvester, and keeping it in good condition, helps Will to work towards a top quality product. As well, Will has good drying facilities, which means that, if there is a threat of rain, he can quickly pick the light-coloured fruit and get it under cover. This means that he has better potential, compared to some of the other growers, to retain the light colour.

He has had contracts in the past with one of the three fruit processors, but is currently not under contract. If the industry remains small then the demand for fruit will be quite high, which means he benefits from being uncontracted. If the industry grows then he may benefit from a contract. He is considering his options.

Will has a 280 ML water entitlement, which is about 10 ML/ha. This is slightly higher than the typical allocation of 9.1444 ML/ha because the property was originally citrus, which had a higher allocation. The whole farm is under pressurised irrigation, with 2/3 under low level sprinklers and 1/3 on drippers. He needs 8.5 ML/ha to keep his vines watered each year.

Will and his family have invested a lot of money to improve the productive capacity of the farm, so his strategy was to not 'let any of it go' during the drought. This meant that Will bought temporary water. He bought his water incrementally throughout the season because he didn't know how much he was going to need. It was hard to tell because the allocations were being announced incrementally as well.

The approach ended up working quite well for Will. In fact, during the second year of very low allocations he ended up doing quite well. Though he had spent an extra \$60,000 in water, he ended up making a very good profit. His typical yield would be three tonnes to the acre, but that year he harvested 5 tonnes to the acre, and the quality was good.

Last year's extreme rain events increased the pressure of disease, which Will had to manage throughout the season. While there was some commercial damage due to downy mildew, it was low. DVF producers have the option of using a post-infection spray, which is not allowed in WG, so that helped.

The biggest problem Will had was the 200 mls of rain in February, which occurred when the fruit was at a vulnerable stage, just before harvest. It split the fruit which opened the berries up to rot so Will had to harvest early, before the fruit was ripe. Because of the early harvest the fruit weight was way down and Will ended up only harvesting one and a quarter tonne/acre; less than half of a typical year.

To expedite the harvest and reduce his losses, Will mechanically cut his canes for the first time. He normally would do it by hand because it is 'not a terribly onerous task' and it helps to maintain the quality. He used the cutting bar last year though and found it to be really good. He thinks he may continue to use it.

Will also had 10 acres of his property under water. Though he could not get the big harvester out to the vines, he could still harvest. He went out and cut these canes by hand with 'secateurs and a pair of gumboots'.

Botrytis is the main rot Will struggled with late in the season. Though he had seen it before he doesn't think it is worth spraying for earlier in the season as, once it is there, 'it's like trying to hold back the tide'. He thinks it is much better practice to just harvest early.

Cash flow has not been fantastic this year, after the crop losses last growing season. However, when Will had that big year during the drought he was able to put some extra money away into a Farm Management Deposit. That meant he 'had some cash up his sleeve' that helped. He has the FMD to help cover 'lousy years' and also to build up savings for capital expenditure.

Will thinks the farm is probably an 'adequate' size, but he would like to grow it a bit bigger over time. He doesn't mind the idea of having people working for him and having a bigger scale farm. He thinks he could add another 40 acres with his existing equipment. However, after last year, Will's 'aspirations are quite static right now'.

Will thinks he is a DVF specialist, but has a bit of background in WG which means he is confident that he could 'turn a hand to WG'. However, he wouldn't consider this given the current conditions in that industry. TG seem to be going well,

but he is not interested in changing his infrastructure to change industries. With the three processors, things are looking all right with the DVF industry.

Will does worry about the affect that government policy will have on his business; things like the SDLs and the Murray Darling Basin Plan. He is concerned that the government may be thinking of taking some of the water from irrigators.

Will: Description of farm flexibility and options for the future

Will has a rigid system overall. There is no flexibility to change the output mix within his current business strategy, and hence no strategic flexibility.

Will has thought about the potential benefits of having a contract to help him manage the price he can get for his fruit. He sees the size of the industry as a major determinant of whether having a contract is worthwhile. As well, Will aims for high quality and its premium price. While he has his system set up to maximise his chances of achieving this, he acknowledged that rain affects quality, which is outside of his control. Will is rigid in relation to output prices.

Will is rigid in relation to a reduced irrigation allocation. He had no capacity to substitute for water, hence his only option was to purchase temporary water. He has a slightly higher entitlement than is typical, which means that the amount of water that he needed to purchase to get back to 8-8.5 ML/ha would have been less.

Fortunately, his approach of purchasing water incrementally throughout the season meant that he was able to get it at a lower price compared to those who bought a large quantity of water early in the season.

Will is also rigid in relation to rainfall and the associated flooding. He was able to spray to manage the increased disease pressure early in the season. However, the extreme rain just before harvest split his fruit and increased the risk of Botrytis, which led to Will having to harvest early, achieving a yield below 50% of normal. While Will does have some capacity to protect light-coloured fruit by harvesting it quickly and putting it under cover, this was obviously not possible last year. The increased rainfall through the season had darkened the fruit anyway.

Overall, Will has been able to balance a poor yield with a highly profitable one during the drought. This has limited any financial/cash flow pressure.

Will's current long-term business plan can be described broadly as *building*. He is actively considering growing his business in the coming years, but seems to be in a holding pattern at the moment. Information about the future of the industry's processors (and prices), as well as government policy decisions in relation to the future of the region's irrigation water, will influence his confidence in whether or not to move forward with these plans.

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