Preliminary Report on Damage and Control Costs Associated with Feral Pigs

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Costs associated with feral pig control are difficult to monitor at the best of times. This initial assessment is based on data collected on farms in the monitoring program set up by Jim Mitchell and Bill Dorney of Department of Natural Resources and Mines (NRM). Regular monitoring of the 19 cane and 11 banana survey sites resulted in data capture for sites in the Wet Tropics of North Queensland stretching from Ingham to Gordonvale.

Table 1 reflects market parameters associated with the initial analysis of the data. The parameters – especially commodity prices of bananas and cane – can vary considerably from one year to the next. Recent banana price variation has been due to an external factor, Black Saratoga, affecting producers in the Tully region, North Queensland. The identification of Black Saratoga in the Tully region resulted in other banana growing areas not being willing to accept the fruit, i.e. market closure for fear of transmitting the disease to these areas. This resulted in prices falling as low as $4.00/box. Due to instability in these parameters, further analysis including sensitivity analysis will be undertaken in the future allowing for various scenarios to be formulated, including the most likely based on data reflecting averages over a period of years. These parameters are applied to the data in order to derive costs for various control measures undertaken, including trapping, dogging, fencing, poisoning and other which includes hunting.

Table 1: Parameters for the financial analysis

Parameter	Unit	Amount
Cane price	$/tonne	27.00
Banana price	$/box	20.00
Labour cost	$/man hour	18.00
Travel cost	$/ kilometre	0.55

Table 2 reflects the price of sugar received by cane farmers over a period of six years. Brenner (2001) indicates that the 1999 and 2000 figures are low and a better indication would about $25 to $30. The suggestion that the price of sugar was at historically low prices would be borne out by sugar prices reflected in Table 2 that dropped during this period from $357 to $250 per tonne. The formula used in calculating per tonne price paid to the farmer is:

SCP = SP * 0.009 (CCS% - 4) + $0.578

where SCP = sugar Cane Price (A$/tonne)
SP = sugar commodity price (A$)
CCS = sugar content of sugar cane (%).

Table 2: Sugar cane and sugar commodity prices

Year	Price ($tonne of cane)	Price ($/tonne of sugar)
1996	25.67	342
1997	25.29	343
1998	23.39	357
1999	18.82	255
2000	20.28	252
2001	Approx. 28.00	Expecting over 350

Source: Jenner (2001).

Two parameters affect the final price derived by farmers for their cane, namely the price of sugar (which is based on futures prices as little sugar is sold on the spot market) and CCS or sugar content of the cane. Individual farmers are price takers as they have no impact on international commodity prices. Local conditions such as climate, rainfall and feral pig damage can affect the level of sugar content. Each farmer's harvest is monitored for sugar content at deliver to the mill and a lower price is paid for a lower CCS.

The two main cost components in feral pig control identified to date are those of labour (labour hours) and travel. Whilst a direct outflow of cash may not take place for attributed labour costs, a dollar value should be attributed as an opportunity cost of the farmer's or external operator's time. Travel costs at an all-inclusive rate of 55 cents per kilometre is assumed for the financial analysis. This comprises mainly vehicle cost rather than labour cost.

Data Capture from the Cooperating Farms

Data for the 19 cane and 11 banana farms are captured approximately ever eight weeks. The sample farms are located close to protected rainforest areas, where damage levels are highest. Population size for of feral pigs is difficult to determine due to the lack of sightings due to the nightime feeding habits and elusiveness of these animals. In an attempt to establish population levels, on each visit Bill Dorney personally records the presence of pigs as reflected by sighting, tracks, wallows, digging, dung and so forth across a number of transects at fixed locations. These transects may be pathways known to be used, water sources, banana dumps and so forth. Mr Dorney also has a data collection form that he completes with each farmer on each farm visit in order to capture data relating to a variety of issues such as feral pig damage, control measures used, costs associated with the control methods and capture/kill rate since the previous survey. The concern with any data is whether there is bias. While there is potential for strategic bias by

farmers due to the commercial and political issues surrounding feral pig damage, control and compensation for damage due to feral pigs living in neighbouring National Parks and World Heritage Areas, the regular farm visits and close rapport with farmers by Mr Dorney is designed to minimise such bias.

The detailed data for each recording period for each participating farm during year 2000 were recorded and captured in an Excel spreadsheet. These data were then aggregated for cane and banana farms respectively. This involved the development of a number of spreadsheet macros to extract data from spreadsheets for individual farms, developed with the assistance of Nick Emtage[1]. These aggregated value were in turn used to develop Tables 3 to 6 reflecting owner and external operator feral pig control costs.

As reflected in Tables 3 and 5, cane and banana farmers do not use fencing as a control measure. This is due to a variety of factors including:

- high cost of electric fence erection and maintenance;
- inadequacy as a control measure unless the whole cropped area is fenced;
- once feral pigs manage to enter the fenced crop area, especially in the case of sugar cane, they stay in the area on a permanent basis due to the fencing; and
- need for group commitment by neighbouring farmers to fencing if it is to be successful.

Likewise, Tables 3 and 5 indicate that little poisoning is done. Problems associated with not having a target specific poison for feral pigs could be a limiting factor in its use. The potential of poisoning native fauna and domestic animals will be high especially with many farms bordering on National Parks and Wet Tropics World Heritage areas.

As indicated in Tables 4 and 6, dogging is the primary feral pig control method used by external operators. A farmer may well use more that one dogger and thus data on activities of various external operators are captured separately (reported as Dogging 1 through to Dogging 3). This could also be useful for the farmer as over time these records will enable the farmer to identify the successful operators and thus which one to use for future dogging control.

Currently no government bounty is paid for pigs killed, although farmers may from time to time put a price on the head of a rogue boar or sow that is causing extensive damage. Others methods of showing gratitude may take place from time to time but in most instances dogging is undertaken by external operators for pleasure, i.e. as a sport or recreational activity.

The lack of involvement in trapping of external operators for both cane and banana farmers can readily be seen when comparing Tables 3 and 4 and Tables 5 and 6 respectively. For both cane and banana farms, farmers carry out their own trapping rather than relying on external operators. Bait in the form of bananas is currently used in the traps and is obtained free of charge from farm banana dumps. In the event that this source of free bait were no longer available – e.g. if a market were found for bananas which cannot be sold onto the fresh fruit market – the trapping cost would be increased substantially, and this would further favour dogging relative to trapping.

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Table 3: Owner feral pig control costs, cane farmers

Factor	Number of units	Unit	Cost ($)	Total cost ($)	Control cost ($/pig)
Owner Controls					
Dogging	678.25	Man hours	12,208.50		
Travel	1400.4	Kms	770.22		
Other costs	242		242.00	13,220.72	
Success	42	Pigs killed			314.78
Trapping	1697.25	Man hours	30,550.50		
Travel	12837	Kms	7,060.35		
Other costs	560		560.00	38,170.85	
Success	181	Pigs killed			210.89
Poisoning	9	Man hours	162.00		
Travel	17	Kms	9.35		
Other costs	0	Bait	0.00	171.35	
Success	1	Pigs killed			171.35
Fencing	0	Man hours	0.00		
Fencing	0	Materials	0.00		
Travel	0	Kms	0.00		
Other costs	0		0.00	0.00	
Success	0	Pigs killed			0.00
Other Control [1]	502.5	Man hours	9,045.00		
Travel	2158	kms	1,186.90		
Other costs	0		0.00	10,231.90	
Success	13	Pigs killed			787.07

[1] Mainly hunting, and some checking of tracks for pig movements.

Table 4: External operators, feral pig control costs, cane farms

Factor	Number of units	Unit	Cost ($)	Total	Control cost($/pig)
Dogging 1	1201	man hours	21,618.00		
Travel	8452	Kms	4,648.60		
Other costs	420		420.00	26,686.60	
Success	81	pigs killed			329.46
Dogging 2	440	man hours	$ 7,920.00		
Travel	2231	Kms	$ 1,227.05		
Other costs	20		$ 20.00	$ 9,167.05	
Success	52	pigs killed			176.29
Dogging 3	7	man hours	$126.00		
Travel	10	Kms	$ 5.50		
Other costs	0		$0.00	131.50	
Success [1]	0	pigs killed			
Trapping (CBFPTP + Pvt)	194.25	man hours	3,496.50		
Travel	2293	Kms	1,261.15		
Other costs	0		0.00	4,757.65	
Success [1]	0	pigs killed			
Other Control	0	man hours	0.00		
Travel	65.5	Kms	36.03		
Other costs	342		342.00	378.03	
Success [1]	0	pigs killed			

[1] No pigs caught, hence no average/ cost per pig.

Table 5: Owner feral pig control costs, banana farms

Factor	Number of units	Unit	Cost ($)	Total	Control cost ($/pig)
Dogging	171.25	man hours	3,082.50		
Travel	794	Kms	436.70		
Other costs	210		210.00	3,729.20	
Success	31	pigs killed			120.30
Trapping	399	man hours	7,182.00		
Travel	759	Kms	417.45		
Other costs	0		0.00	7,599.45	
Success	31	pigs killed			245.14
Poisoning	9	man hours	162.00		
Travel	9	Kms	4.95		
Other costs	0	Bait	0.00	166.95	
Success	1	pigs killed			166.95
Fencing	0	man hours	0.00		
Fencing	0	Materials	0.00		
Travel	0	Kms	0.00		
Other costs	0		0.00	0.00	
Success	0	pigs killed			
Other Control[1]	192	man hours	3,456.00		
Travel	248	Kms	136.40		
Other costs	0		0.00	3,592.40	
Success	4	pigs killed			898.10

[1] Mainly hunting, and some checking for evidence of pig movements.

Table 6: External operators, feral pig control costs, banana farms

Factor	Number of units	Unit	Cost ($)	Total	Control cost ($/pig)
Dogging 1	73	man hours	1,314.00		
Travel	1114	Kms	612.70		
Other costs	500		500.00	2,426.70	
Success	30	pigs killed			80.89
Dogging 2	144	man hours	2,592.00		
Travel	120	Kms	66.00		
Other costs	0		0.00	2,658.00	
Success	4	pigs killed			664.50
Dogging 3	0	man hours	0.00		
Travel	0	Kms	0.00		
Other costs	0		0.00	0.00	
Success[1]	0	pigs killed			
Trapping (CBFPTP + Pvt)[2]	288	man hours	5,184.00		
Travel	2740	Kms	1,507.00		
Other costs	0		0.00	6,691.00	
Success[1]	0	pigs killed			
Other Control		man hours	0.00		
Travel	15	Kms	8.25		
Other costs	270		270.00	278.25	
Success[1]	0	pigs killed			

[1] No pigs caught, sono average cost per pig.
2 CBFPTP + Pvt

Cane farmers incur greater levels of damage by feral pigs than banana farmers. The extent of damage may however vary from one season to the next. A number of consecutive dry seasons may cause feral pigs to obtain greater amounts of food from on-farm sources resulting in greater levels of damage. A further factor that may currently be playing an important role in minimising damage suffered by banana farmers is the availability of bananas from farmers' banana dumps and bunches left between rows in the plantation.

The two most commonly used methods of feral pig control are trapping and dogging. The control methods and their costs for both owners and external operators have been captured. Both

methods appear to be effective, and a combination of the two is likely to be the most cost effective. Trapping can be used to trap the main herd population followed up by hunting and dogging used to target rogue boars and sows and mopping up the herd not yet captured.

Dogging costs per pig caught or killed are similar for farmers and external operators. They are on average $44.00 higher than the average costs for trapping of feral pigs in cane areas.

Table 7 reflects combined costs for all control methods utilised by farmers and external operators. Table 7 provides summaries of the dollar levels of total damage, total control costs, total cost per pig caught and total damage per pig caught as per this study.

Table 7: Summary damage and control costs, for cane and banana farms

Item	Cane farms	Banana farms
Total damage	771,650 tonnes	245 bunches/cartons
Value of total damage	$208,346	$4,900
Total control costs	$102,915.65	$27,142
Total pigs captured/killed	370	101
Total damage cost/pig [1]	$563	$269
Total control cost/pig	$278	$49

[1] Damage per pig caught or destroyed.

As indicated in Table 8, external operators have not been involved in trapping feral pigs This has been true for both cane and banana operations. For owners, trapping has been successful with trapping capturing 181 and 31 feral pigs on cane and banana operations respectively.

Table 8 summary figures suggest that dogging may be a more appropriate control measure due to much lower average control costs. This may be due to the fact that the traditional bait of bananas will not be effective in banana producing areas, as bananas are readily available to pigs from the farmers' dumps. Banana plantations offer greater visibility and thus dogging is likely to be much more successful than in cane fields where visibility is limited. The average cost of dogging by farmers and external operators is $225.38 lower than the corresponding cost for trapping. When the total control cost per pig is compared with the total damage cost per pig as reflected in Table 8, it would appear that the cost of control exceeds the cost of the damage. This in no way suggests that no control measures should be undertaken, because damage levels could escalate greatly without pig control measures.

Table 8: Trapping costs versus dogging costs

Item	Cane farms		Banana farms	
	Trapping	Dogging	Trapping	Dogging
Total external operator control costs	$4,758	$35,985	$6,691	$5,085
Pigs captured or killed	0	133	0	34
External operators control cost per pig	-	$271	-	$150
Total owner control costs	$38,171	$13,221	$7,599	$3,729
Pigs captured/killed	181	42	31	31
Owner control cost per pig	$211	$315	$245	$120
Overall control cost per pig	$237	$281	$461	$136

REFERENCES

Brenner. B. (2001), Manager, Cane Growers, Cairns, personal communication.