DOES EXPERIENCE EFFECT HOW WE FEEL AND PREPARE FOR A CYCLONE

Analysing Cyclone Data Obtained From Innisfail after Cyclone Larry

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1.0 INTRODUCTION

1.1 Background

According to the Bureau of Meteorology (2005), a severe tropical cyclone is an intense, low pressure system of sufficient intensity that can produce gale force winds of at least 118km/h. In addition to their extreme winds, cyclones produce extensive rainfall and storm surge, which can cause wide spread destruction to coastal areas (Anderson-Berry 2003).

These tropical depressions generally form over warm ocean waters during the monsoon season, which ranges from November to April (Anderson-Berry 2003). They can vary enormously in intensity, speed and a number of other factors, which requires them to be categorised so that these factors can be easily distinguished (Anderson-Berry 2003). In Australia, five categories have been assigned to cyclones, with Category 1 being the least destructive and Category 5 being a disaster (BOM 2006). The difference in intensity and damage for each category is outlined in the table below.

Table 1: Cyclone Category Descriptions (Australia)

Category	Strongest gust	Typical effects (indicative only)
1.	Less than 125 km/h	Negligible house damage. Damage to some crops, trees and caravans. Craft may drag moorings.
2. Cyclone Justin 1997 Cyclone Steve 2000	125–170 km/h	Minor house damage. Significant damage to signs, trees and caravans. Heavy damage to some crops. Risk of power failure. Small craft may break moorings.
3. Cyclone Rona 1999	170–225 km/h	Some roof and structural damage. Some caravans destroyed. Power failure likely.
4. Cyclone Tracy 1974	225–280 km/h	Significant roofing loss and structural damage. Many caravans destroyed and blown away. Dangerous airborne debris. Widespread power failure.
5.	More than 280 km/h	Extremely dangerous with widespread destruction

Source: http://www.bom.gov.au/info/cyclone/

Although meteorologists and researches suggest that the past century has been quiet in terms of cyclone events (Anderson-Berry 2003) figures from the Bureau of Meteorology (2005) website states that an average of ten cyclones develops every cyclone season, with at least six of these crossing Australian coasts. Furthermore, records show that since the 1880s, when cyclone recording began, Far North Queensland has experience 47 severe tropical cyclones that have resulted in millions of property loss and approximately 393 deaths (Callaghan 1998).

1.2 Cyclone Larry

On the 17th of March 2006, the Bureau of Meteorology (2006) began to observe a tropical low over the eastern Coral Sea. By the early hours of the 18th of March this low had developed into a Category 1 cyclone. From then, Cyclone Larry continued to intensify as it moved west toward the Far North Queensland Coast (BOM 2006). Between 6:20am and 7:20am on the 20th of March, Cyclone Larry crossed the coast near Innisfail (see Figure 1) as a Category 5 Cyclone with winds of up to 200km per hour, causing wide-spread destruction to the region (BOM 2006). From here it continued to move further inland, weakening until early morning on the 21st when it again became a low depression (BOM 2006).

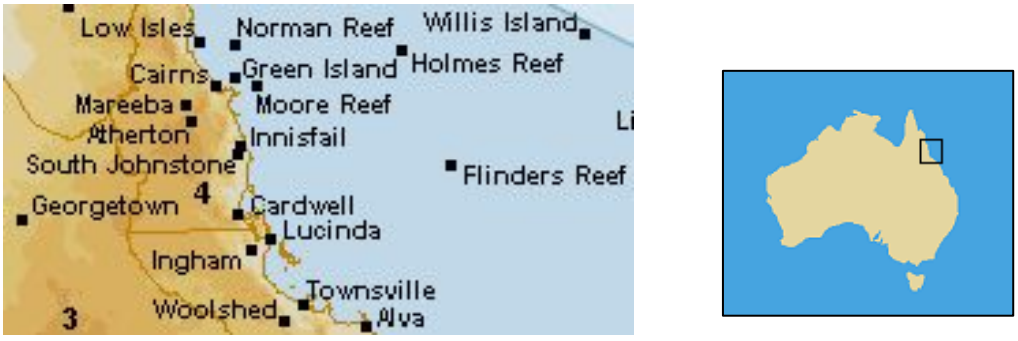


Figure 1 – Locality Map - Innisfail

The impact of Cyclone Larry on the infrastructure of the region was devastating, with more than 50% of homes damaged, 35% of private industry damaged and 25% of government buildings, such as school, were destroyed (BOM 2006). Electricity and water was lost for up to weeks for some areas and several areas were isolated due to flooding. Fortunately, little storm surge damage occurred due to the cyclone crossing at neap tide and therefore, only overtopped the highest astronomical tide (HAT) by a small amount (BOM 2006).

As part of the disaster response team, a group of five researchers, from the Centre for Disaster Studies, travelled to Innisfail to carry out post disaster studies. 147 household surveys were carried out face to face, with over 200 people being interview, in order to obtain vital information into the preparations, feelings, activities, communication, etc. involved in the event of a disaster. This was done in order to provide information to emergency planners into the successful management of disaster situations (King and Goudie 2006).

2.0 METHODOLOGY

2.1 Aims and Hypothesis

It is predicted that the way in which these residents prepare and feel for and during a cyclone, a cyclone prone area such as Innisfail, Australia, is dependant on their experience of severe cyclones in the area.

2.2 Methods

In order to determine whether the above hypothesis is correct, secondary data was obtained from a post disaster household survey that was carried out within a week of Cyclone Larry. 147 households were surveyed, which held a total of 471 people during the cyclone event. These residents were asked a series of questions related to warnings, preparations, feeling, experience etc. and results were recorded (see Appendix for survey instrument). However, some limitations occurred during the surveying as the residents of the houses which were entirely destroyed were not interviewed, therefore, causing some biasness in terms of damage and impact of the area.

This data was then entered into the software package, Statistical Package for the Social Sciences (SPSS), by the director for disaster studies, David King. To do this each response to the questions were given a code so that the results could be entered in a numerical way. This meant that some of the similar responses were added into the same category, which caused some of the results to be simplified.

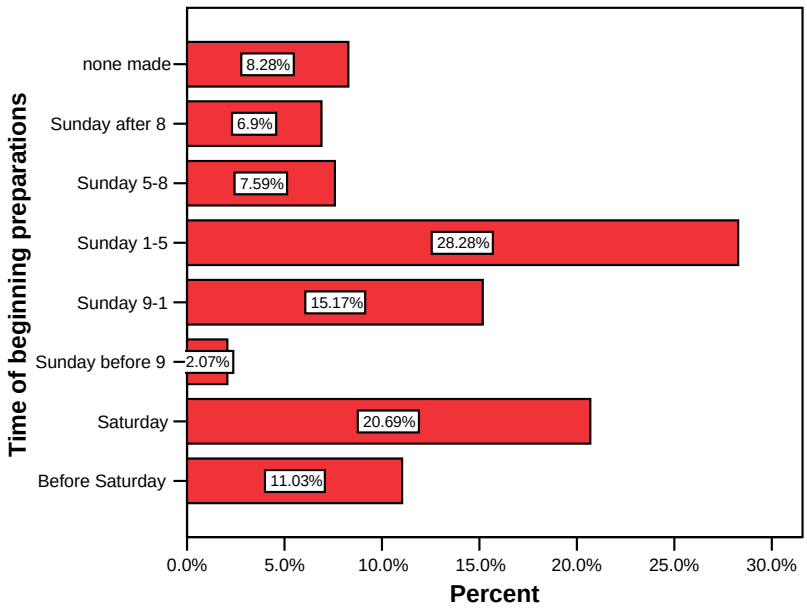
This data was then analysed in terms of when and what preparations were made and how adequate these preparations were, peoples feelings and reactions during the cyclone, and previous experience of cyclones, to help determine the accuracy of the hypothesis.

3.0 RESULTS AND DISCUSSION

3.1 Preparations

State Emergency Services and Local Government authorities encourage residents in cyclone prone areas to carry out pre-cyclone season preparations to ensure the safety of people and belongings (Anderson-Berry 2003). Once a cyclone watch or warning is issued further preparation instructions are given to help minimise loss and damage to the impacted area (Anderson-Berry 2003).

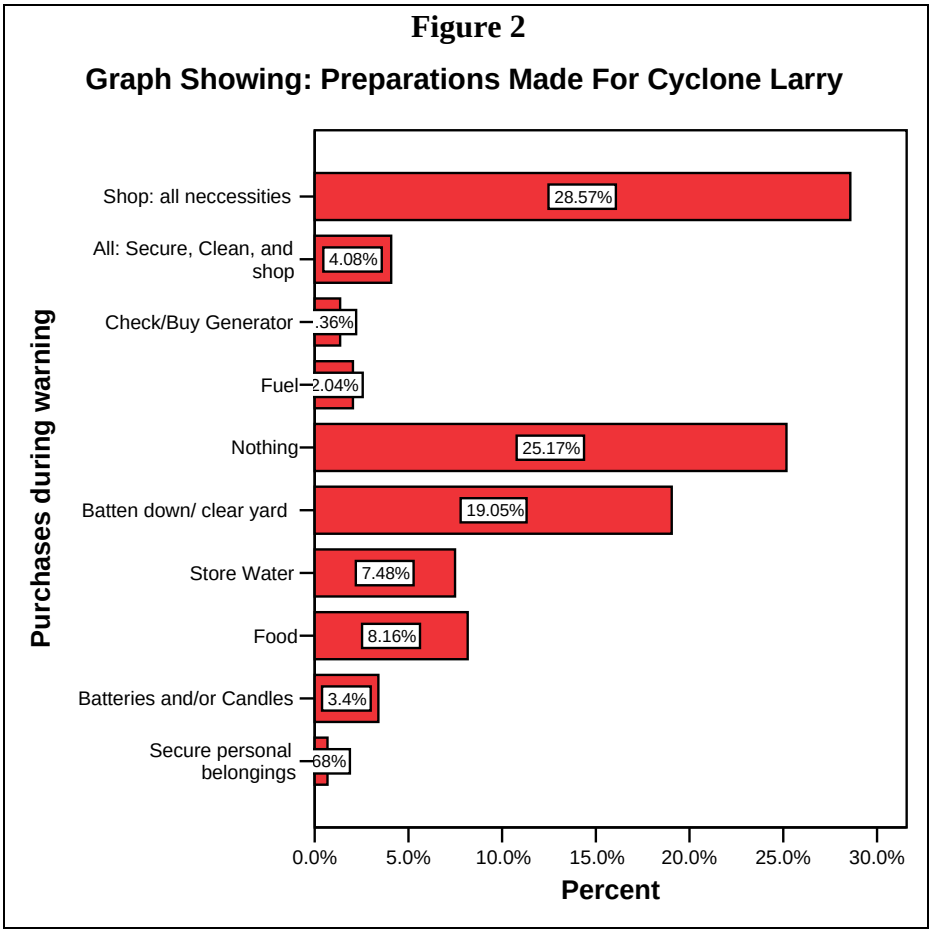
Figure 1
Graph Showing: When People Made the Neccessary Preparations for Cyclone Larry



In the early hours on the 18th of March 2006, the Bureau of Meteorology declared that the tropical low situated of the North Queensland coast had intensified into a Category 1 cyclone (BOM 2006). It is interesting then to see that almost 30% of the Innisfail residents (see Figure 1) did not make the necessary preparations until late Sunday afternoon (19th March 2006). A further 20% made their preparations on Saturday and only 11% made preparations before Saturday, which suggests that the pre-cyclone and warning preparation advises are not adequate.

Figure 2

Graph Showing: Preparations Made For Cyclone Larry



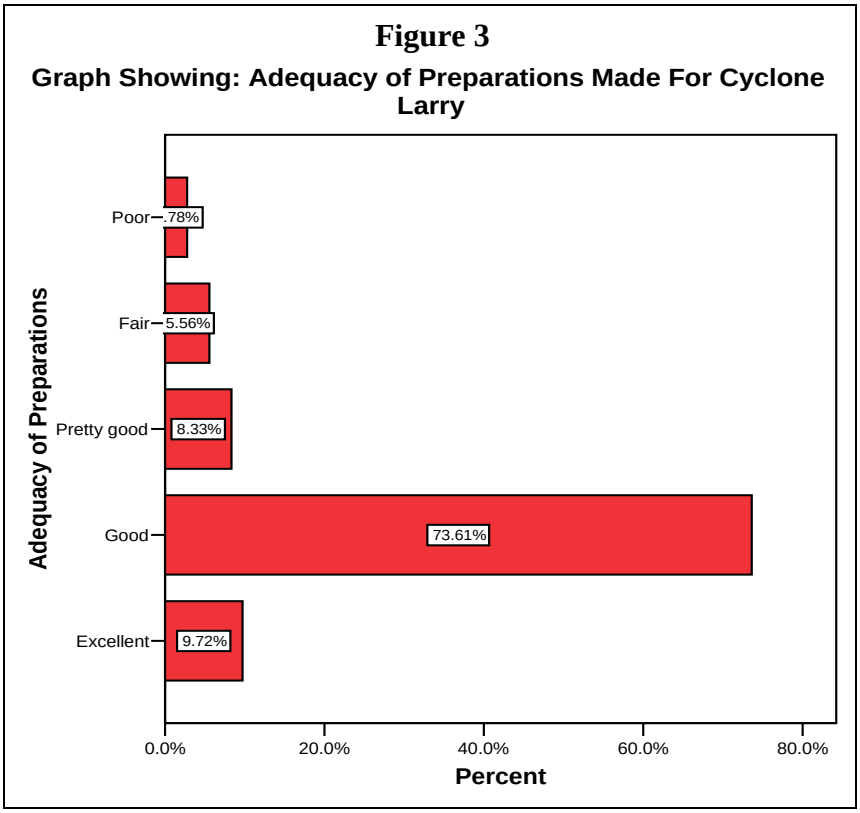
The Bureau of Meteorology and Emergency Management Australia 2005 have released an information booklet titled “Surviving Cyclones” that outlines the preparations that should be made before, during and after a cyclone event.

General preparations include: checking and securing loose items outside of the property, prepare an emergency kit (radio, torch, batteries, candles, matches, first aid materials, canned/dried food, water, cooking utensils, etc.), fuel up vehicles, and make sure personals are easily located in case of evacuation (BOM and EMA 2005).

Figure 2 shows that only 4% of the residents actually carried out all of these advised preparations. About 30% shopped for all the necessities need for the emergency kit and 19% cleaned up and battened down loose objects. However, a surprising 25% of the interviewed residents did nothing to prepare for the cyclone, which again suggests that these warnings and information may not be clear as to how important they are.

Figure 3

Graph Showing: Adequacy of Preparations Made For Cyclone Larry



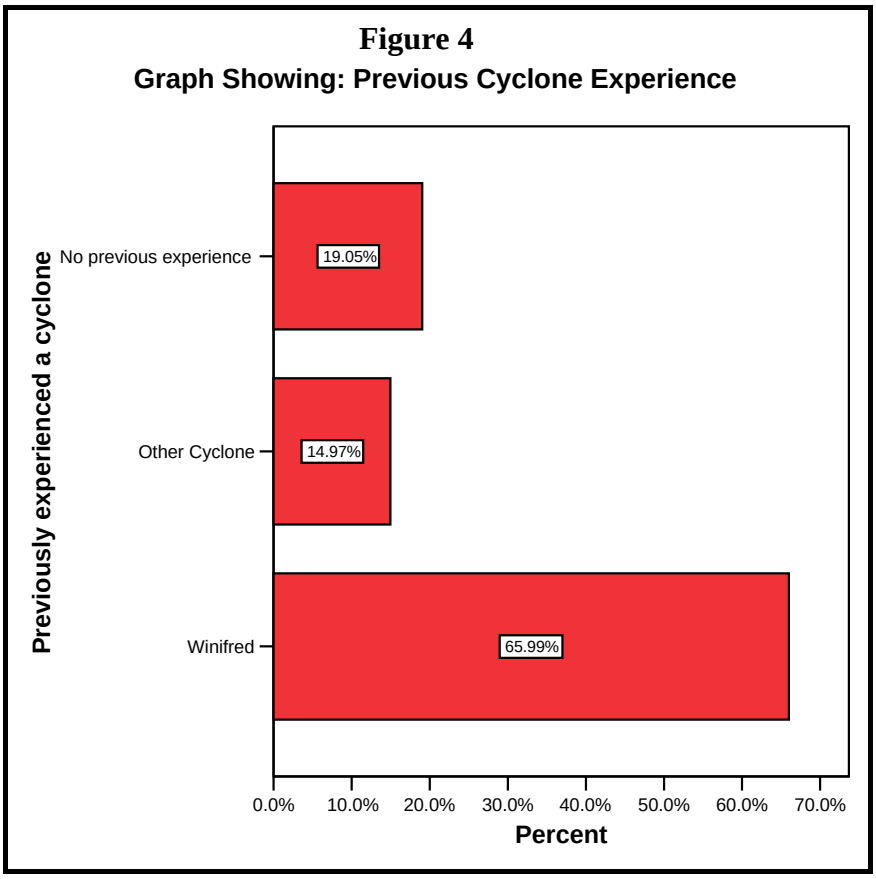
Although, over a quarter of the survey sample did nothing to prepare, Figure 3 shows that almost 75% of the residents thought that their preparations were adequate, 9% excellent and only 14% said their preparations were poor or fair. These results however, could be biased due to the most affected residents not being interviewed.

The results show that despite the warning and pre-cyclone information available most people made their preparations late and a surprising 25% didn't prepare at all. Despite this and the devastation that was caused in Innisfail and the surrounding towns, 75% of residents thought that their preparations were adequate or Cyclone Larry.

3.2 Cyclone Experience

Figure 4

Graph Showing: Previous Cyclone Experience



Cyclone Larry was the first severe cyclone to cross the coast since Cyclone Rona in 1999. However, in terms of the Innisfail area and the devastation caused, Cyclone Winifred, in 1986, was the last Cyclone, which caused similar destruction in the region (BOM 2006).

From the household surveys, over 66% of the residence had experienced Cyclone Winifred. However, 19% had no cyclone experience and therefore, may have had little knowledge as to how to prepare and what to do.

3.3 Feelings about Cyclone Larry

Figure 4 shows, the nearly 40% of the residents didn't become concerned til Monday morning when Cyclone Larry actually crossed the coast. A further 30% became concerned on the Sunday and the remaining either was concerned very early or not concerned at all.

Figure 5
Graph Showing: When People Became Concerned About Cyclone Larry

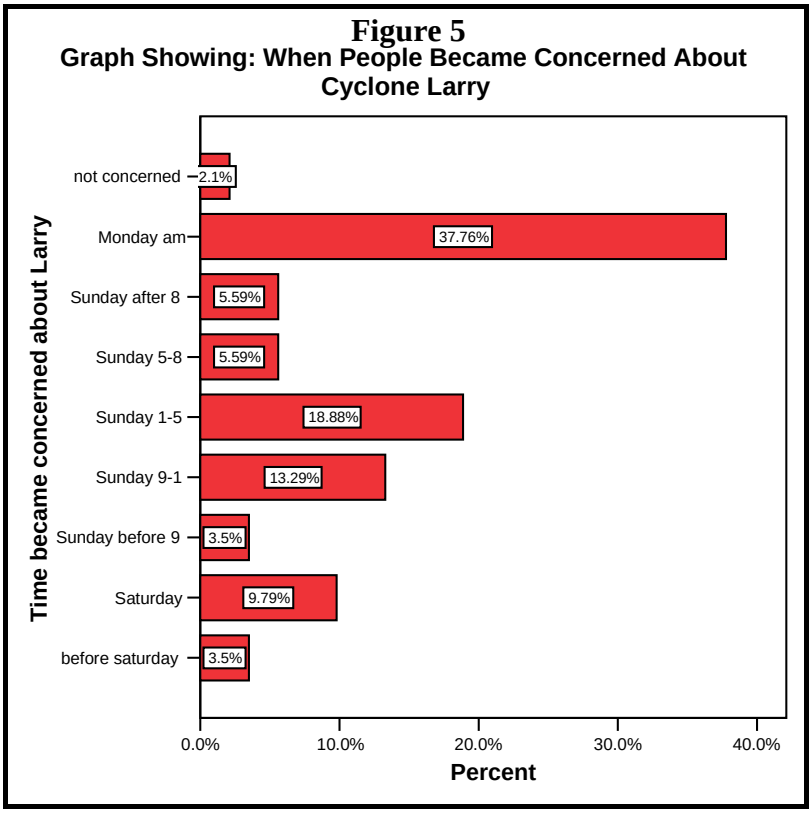


Figure 6
Graph Showing: Peoples feelings During Cyclone Larry

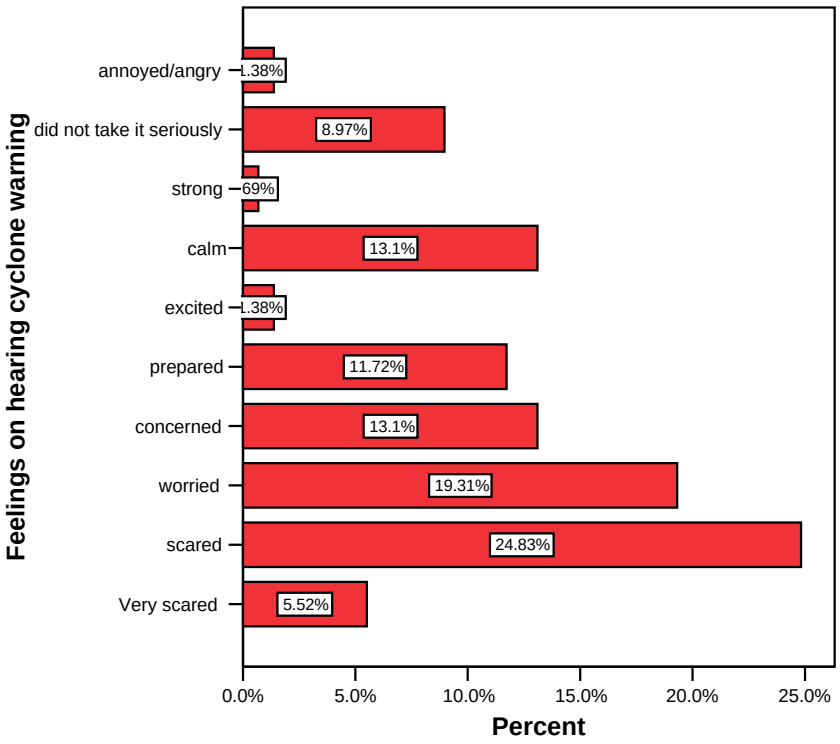
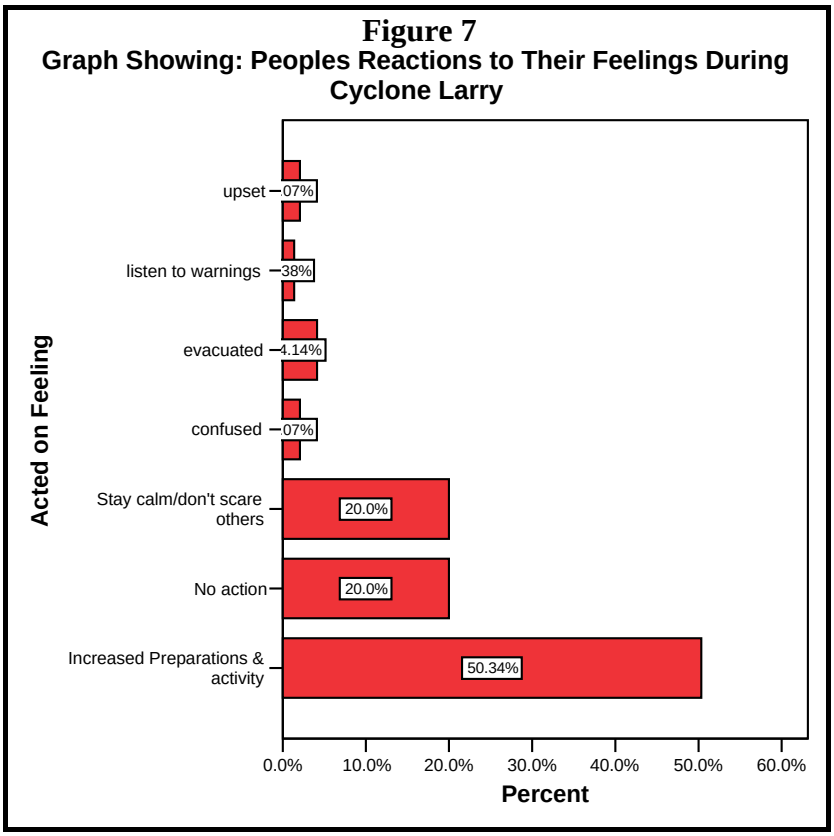


Figure 7
Graph Showing: Peoples Reactions to Their Feelings During Cyclone Larry



The above figures show that 25% of people felt scared during the cyclone, which was expected. A surprisingly large number of people felt prepared and calm. About 10% of people didn't take it seriously and a small proportion even felt angry about the cyclone. This could also suggest that warning systems are not portraying the real risk of these events and therefore, people are not taking it serious enough.

Figure 7, however, shows that no matter what the feeling was 50% of the residents increased their preparation actions due to these feelings, a further 20% took no action and another 20% stayed calm so as not to frighten others. These feelings are expected during any disaster, and this could be due to past experience or lack thereof.

3.4 Preparations and Feelings in terms of Experience

Before looking at how experience affects people's feelings and preparations, it is important to understand how people feel during cyclones in terms of when they made their preparations.

Table 1:

		Time of beginning preparations							
		Before Saturday	Saturday	Sunday before 9	Sunday 9-1	Sunday 1-5	Sunday 5-8	Sunday after 8	none made
Feelings on hearing cyclone warning	Very scared		12.5		37.5	50.0			
	scared	2.8	13.9	2.8	22.2	44.4	8.3	2.8	2.8
	worried	12.5	48.1		18.5	7.4			7.4
	concerned	5.3	31.6	10.5	10.5	10.5	21.1	10.5	
	prepared	23.5				35.3		11.8	11.8
	excited	50.0					50.0		
	calm	15.8	5.3		5.3	26.3	15.8	10.5	21.1
	strong					100.0			
	did not take it seriously	8.3	8.3		16.7	25.0		25.0	16.7
	annoyed/angry					100.0			

Table 1 shows that the concerned people tended to make their preparations between Saturday and Sunday afternoon. This was the general trend for all feelings with most people preparing late Sunday. However, out of the people who felt prepared it is interesting to notice that 11.8% actually made not preparations yet they felt prepared.

Table 2 – Feelings and Experience

		Previously experienced a cyclone		
		Winifred	Other Cyclone	No previous experience
Feelings on hearing cyclone warning	Very scared	7.2		3.7
	scared	28.9	14.3	18.5
	worried	18.6	23.8	18.5
	concerned	11.3	19.0	14.8
	prepared	8.2	14.3	22.2
	excited	1.0		3.7
	calm	17.5	9.5	
	strong		4.8	
	did not take it seriously	6.2	9.5	18.5
	annoyed/angry	1.0	4.8	

It is usually stated that people with past experience of cyclones and other disasters tend to deal with cyclone better in terms of how they feel (Morrissey and Reser 2003). Table 2 above, however, shows that 28.9% of the community who had experienced Cyclone Winifred felt scared and a further 29.9% felt worried and concerned. This was the general trend for people with other cyclone experience also. However, of the part of the community that had no cyclone experience before, 22.2% felt that they were prepared and another 18.5%did not take the warning seriously. So, from this data, it seems that cyclone warnings and preparation information is not adequate for those

people who have not experienced a cyclone before and therefore, needs to be examined in order to effectively protect a vulnerable community during a cyclone event.

Table 3 – Preparations and Experience

		Previously experienced a cyclone		
		Winifred	Other Cyclone	No previous experience
Time of beginning preparations	Before Saturday	8.2	19.0	14.8
	Saturday	22.7	19.0	14.8
	Sunday before 9	3.1		
	Sunday 9-1	16.5	4.8	18.5
	Sunday 1-5	28.9	33.3	22.2
	Sunday 5-8	6.2	14.3	7.4
	Sunday after 8	7.2		11.1
	none made	7.2	9.5	11.1
Purchases during warning	Secure personal belongings		4.5	
	Batteries and/or Candles	3.1		7.1
	Food	4.1	22.7	10.7
	Store Water	8.2	9.1	3.6
	Batten down/ clear yard	21.6	9.1	17.9
	Nothing	24.7	22.7	28.6
	Fuel	2.1	4.5	
	Check/Buy Generator	1.0		3.6
	All: Secure, Clean, and shop	5.2		3.6
	Shop: all necessities	29.9	27.3	25.0

Preparations for cyclones are encouraged at the beginning of every cyclone season and when a cyclone warning/watch is issued, by the SES and Local governments (Anderson-Berry 2003). The types of preparation made are dependant on the communities perception of the risk that they are and their financial ability to prepare for the cyclone (Anderson-Berry 2003).

It is common knowledge that Far North Queensland is a cyclone prone area and therefore, would be expected that when a cyclone warning is issued the community would respond and prepare all the necessities. This should be

strengthened if the community has experienced a devastating cyclone in the past (BOM 2005).

However, the household surveys from Cyclone Larry show that of the people who had experienced Cyclone Winifred, 45.4% did not make preparations until Sunday, which was well after the warnings were issued. Although almost 30% shopped for all necessities, such as batteries, food, etc., a further 46.3% did nothing or little (cleared yard) to prepare for the event. People with other cyclone experience also tended to make late preparations, and although 50% shopped for food and other supplies, another 22.7% did nothing. This was also the general trend for the no experience category, however, a larger proportion of these made no preparations at all, again suggesting that their knowledge of the risk was minimal.

4.0 CONCLUSIONS

Overall, preparations for Cyclone Larry were fairly well carried out although they were made late in terms of when they were advised to prepare. However, about a quarter of the residents did not prepare for the cyclone and but still felt that this was adequate. Although most people became concerned only as the eye crossed the coast this caused them to increase their preparations. A large part of the community had experience some cyclone activity before, however, when comparing this to feelings and preparation experienced residents tended to make late and little preparations. However, this trend was not real strong. Therefore, the result show that a lack of education and information to those inexperienced people may have caused them to perceive

the risk as minimal, which caused them to make little or no preparations. Also, majority of the sample made late preparations in terms of when warnings were issued, which suggests that communication is lacking as residents are advised to prepare before the cyclone season.

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APPENDIX - **Survey Instrument**

Number:
1. Where did you get information from on how to prepare for this cyclone season?
2.. At the beginning of this cyclone season did members of this household discuss the possibility of a cyclone affecting you this year?
If **yes**, what sort of household emergency plan did you have for such an event?
3. What did you do to prepare for this cyclone season?
4. At what time (and day) did you first become aware cyclone Larry was heading your way?
5. As Cyclone Larry approached on Sunday March 19th, where did you mainly get information about the cyclone?
6. What further preparations did the warnings prompt you to carry out?
7. Can you remember how you *felt* when you heard the cyclone advice messages for cyclone Larry?
8. Can you recall how you acted on this feeling?
9. Who was in your household on Sunday March 19th as Cyclone Larry approached the coast (ie were all the family at home? did others come to your household?) (List ages and gender)
10. Were all the usual members of your household contactable and accounted for on Sunday March 19th?
If **no**, were you able to do anything about this? Please explain.
11. Was this a cause of particular concern to you?
12. Were any of your family or relatives (that do not live with you) also in the Cyclone Larry warning area? If **yes**, did you have contact with them?
13. Did members of your household talk to / visit / stay with, neighbours during the Cyclone Larry warning period on Sunday March 19th? If **yes**, when or how often?
14. Did you track Cyclone Larry using a cyclone tracking map?
15. Where did you get the map from?
16. Was the forecast track map useful? (prompt for reaction to the new style of BoM forecast track map)
17. What did you expect would occur on Sunday night and Monday morning when you heard that Cyclone Larry was likely to impact the Innisfail area within a few hours?
18. Did you expect there to be a storm surge associated with Cyclone Larry crossing the coast at or near Innisfail?
19. Did you expect to be affected by storm surge and why?
20. When did you begin to be concerned about cyclone Larry?
21. When did you begin to make preparations for Cyclone Larry?
22. When the cyclone warning was in force, what preparations, including purchases, did you make?
23. How adequate do you think your household's preparations were for Cyclone Larry?
24. Did you stay in your own residence while cyclone Larry impacted the Innisfail area on Sunday and Monday and where in the house did you shelter?
If no, where did you go?
25. What was the effect of Cyclone Larry on your property (or properties)?
26. About how old is/was your home?

27. Is your property insured for cyclone damage? a) Yes, House only b) Yes, Contents only c) Yes, House and contents d) No
28. What was the effect of Cyclone Larry on your workplace?
29.What was the effect of Cyclone Larry on your community's amenities and resources?
30. How much rainwater came into your house? How did it enter? About how much (a cup, a bucketful)? What damage (if any) did that rainfall cause?
31. Was your floor covered by floodwaters? If yes, by about how much? (Specify if there is a business as well as a residence)
32. What did you and members of your family do to shelter and protect yourselves during the passage of Cyclone Larry.
33. Do you have any pets? If yes, what did you do with them during the time that Cyclone Larry threatened the area?
34. During the passage of Cyclone Larry the Weather Bureau issued regular cyclone advice messages. Is there anything about the delivery of these messages that members of this household believe could be improved?
35. Did the messages contain the information that you felt you needed?
Were they easy to understand? Were they too technical? (extra Question)
36. Please add any additional remarks you would like to make regarding the advice messages put out by the weather bureau.
37. What was the effect of Cyclone Larry on you personally?
38 What did you learn from your experiences that may help others facing a natural disaster threat?
39. Have you previously experienced a cyclone? (which ones and where)
40. Is there anyone in this household who has special needs? If yes how were their needs met during the passage of the cyclone?
41. Suburb
42. Visual observation of damage

Themes
1-3 = Cyclone season
4-6 = Awareness, actions carried out
7-9 = Feelings
10-13 = Things that affect feelings (Family members etc)
14-16 = Tracking Map Questions
17-19 = Expectations and perceptions
20-23 = preparations
24-25 = Actions
26 = Age of House (building codes bought in 1970s)
27 = Insurance
28-31 & 42 = Effects of cyclone on property
32 (24) = Behaviour during event
33 = pets
34-36 = Bureau updates Questions
37-38 = Feelings (After event – related to 7-9)
39 = Previous experience
40 = Special Needs (what they consider special needs)
41 = Suburb (Innisfail – Johnstone shire and Babinda – Cairns city)