

## **Vulnerability and Preparedness of the Community to Storm Disaster Management: Anthropological Assessment**

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### **Abstract**

Storm has tremendous impact on the life of the community living in urban backward settlements. The health and safety of the individuals becomes a great concern. The storm disaster management can be planned effectively with information from the community. This minimizes the harm faced by the community. Anthropological studies in the urban backward settlement areas are important for helping the disaster management efforts and preparedness. Understanding the vulnerability and preparedness of the community to the aftermaths of storm helps to reduce trauma. The information when shared with the disaster management team paves way for their planning and addressing the vulnerabilities.

The author has used anthropological research method to understand the vulnerability and preparedness to storm disaster management. The study was conducted in three urban backward settlement areas in Chennai - Alandur (XII), Perungudi (XIV) and Sholinganallur (XV). The social survey was structured based on the available descriptive information collected with Key Informants and Focus Group Discussions (FGDs). Systematic process was used to select the study sites. The data were collected from 690 households in 13 sites inside the 3 urban settlement areas. The findings captured the comprehensive demographic profile of the households and constitutional category of the community, the various factors which increase the communities vulnerability like drainage facility, water logging, and height of the water logged during rainy seasons, flood and inundation of the area etc. Further the findings have documented the communities' present effort to manage the storm disaster and their preparedness to join hands with flood protection measures. The study findings will help the corporation to understand the vulnerability and preparedness of the 3 urban backward settlements for disaster management.

**Keywords:** *Storm Disaster Management, Urban Backward Settlements, Anthropological Research*

### **Introduction**

It is common to hear the disaster of the people living in urban backward settlements after the storm hits the area. Mostly the community is not prepared to face the disaster as it is a rare occurrence. In disaster management community preparedness is vital to minimize the damage and reduce the vulnerability of the people. During the time of the disaster certain efforts are taken by authorities to protect the community. The vulnerability reduction efforts are very important and community preparedness and planning for disaster management is a healthy harm reduction practice. When community is prepared, they can manage the hardships of the disaster till they get assistance or support from authorities. Understanding the vulnerability and preparedness of the urban backward settlements which are prone to disaster is useful for service organisations and the Corporation which shoulders the disaster management initiatives.

The disaster management initiatives should not be thought as the responsibility of corporation or service organisation. It is important that community also owns responsibility to minimize the impact of the storm. Further when the community understands their issues related to storm hazards in their geographical location, they respond very well to the disaster management team. They also take self-initiatives to protect their households and families from the consequences of storm. Information about the community helps in a major way during the post disaster period. It makes the community resilient to bounce back to normalcy quickly and save human lives and minimize loss of properties.

Anthropological approaches like Participant Observation (PO) and In-Depth Interviews (IIs) have helped in the social survey to enumerate data. The present study was designed to understand the vulnerability and preparedness of the community in the three urban backward settlements in Chennai. The anthropological approach of data generation helps the community to participate in the information generated and understand the importance of the information. Since community participation is ideal for effective disaster management, the information also should be owned by the community. The researchers have observed the community in the three geographical locations and conducted in depth interviews.

### **Review of Literature**

Mansur Ahamed (2013) has stated that Bangladesh has been frequently prone to cyclones due to its morphology and inefficient cyclone warning signal. Various factors increase the vulnerability such as source of income, quality of the houses, financial resources, age, gender, education level and composition of household members, location of the house, concerns on ownership and occupation, and exposed shorelines. Indigenous coping strategies could minimize the vulnerability of cyclones. Chiba et al., (2018) identified and prioritized the non-economic damages and losses of Cyclone Aila in Bangladesh and have said that the national disaster management should be able to address several issues related to cyclone such as inaccessible sanitation, mental disorders, malnutrition, water borne diseases and school discontinuation through its cyclone shelter policy, disaster preparedness policy and planning and disaster compensation. Goyal et al., (2012) have given a method for evaluation of vulnerability of rural houses due to cyclones, especially for countries where the documentation and the damage analysis are not adequate. Important parameters such as types of houses like new, old, etc., ratio of non-engineered to engineered houses, speed of wind and state of damage were investigated. Mallick et al., (2011) have attempted to understand the challenges posed by cyclone SIDR in Bangladesh and have observed that disaster mitigation approaches are currently only curative and not preventive. The current curative type of measures attracts more dependency on relief works and more vulnerability to other calamities. Local and international partnership could be made stronger for both short-term and long-term benefits in terms of disaster management. Ogie and Pradhan (2019) have identified that failure in finding out the most common vulnerabilities are the cause for disasters. A balanced approach, strength-based social vulnerability index (SSVI) was proposed to apply to the socio-psychology of the people during the disaster in Wollongong area of New South Wales and to use the resources judiciously during the disaster and effective means of recovering, preparing and responding to the natural disasters. Klinken (2020) has focused on societal adaptations to climate-related disasters based on analysis of various episodes of typhoons in Japan (1934), India (1942) and Philippines (1928). Typhoon disasters were due to various distances such as geography, culture and class. Greater the distance leads to less likely the damage and vice versa. The paper also discussed the social relationships and power dynamics involving typhoons.

### **Objectives of the Study**

1. To understand the profile of the 3 urban backward settlements
2. To understand the communities vulnerability in the 3 urban backward settlements towards storm disaster and
3. To understand the communities preparedness in the 3 urban backward settlements

### **Research Method**

#### **Research design**

Social Survey Method and Participant Observation Method were used for the present study. The study was conducted in three urban backward settlements namely Alandur XII, Perungudi XIV and Sholinganallur XV) zones which belong to the corporation of Chennai.

#### **Sampling**

The sampling was done systematically to select the sites and number of families to be studied in the survey. The team identified the low-lying flood prone areas by doing Participatory Observation. The list of the slums in the flood prone areas was obtained from Tamil Nadu Slum Clearance Board. The research team had to identify the non-registered slums in low-lying areas which are not listed.

During the earlier disaster and heavy rain season, 86 sites have been identified as flood prone areas in the three geographical zones - Alandur XII, Perungudi IVX and Sholinganallur XV. The number of families affected by floods in the 86 sites was obtained. The total number of slums listed was XII Alandur - 2709, Zone IVX Perungudi - 19409 and Zone XV Sholinganallur - 12833. The total number of slums non-registered Zone XII Alandur - 4511, Zone IVX Perungudi - 2930 and in zone XV Sholinganallur - 1777. Finally the slums located in the low-lying areas were identified and mapped. 6 percent of the families 690 were selected from the flood prone areas for the survey.

#### **Research Tool**

Participant observation was done which was followed by administering of Social survey questionnaire which was pretested and used for the study.

#### **Analysis**

The data obtained were entered in SPSS and the percentages were computed on the following areas:

1. Socio demographic profile of the study participants, Gender of the heads of the families and Study participants
2. Factors increasing the vulnerability of the community: Family structure, house type and conditions, house types, duration of the families stay in the house, house types, families relocated by the government, owing identity proofs,

constitutional category of the households. Primary occupation of the household heads, gender and occupational status, primary occupation across the constitutional category, source of drinking water and sanitation facilities, access to media and communication tools, methods of solid waste disposal, Flood and inundation of the area, storm water drainage cleaning, experience of the slums with floods, inundation level and the cost of the loss estimated in the last floods.

3. Community Preparedness : Willingness to contribute to storm water management and flood protection, willingness to shift their houses, compensation preferred, concerns of the household willing to shift, reasons for not willing to shift, willingness to pay for operation and maintenance, and the amount which they can afford for maintenance

**Results**

The results of the study have captured the socio-demographic profile of the study participants, the various factors which increase their vulnerability and the community preparedness to face the disaster. The study was conducted in the three vulnerable slums - Alanthur Zone XII, Perungudi Zone VIX and Sholinganallur Zone XV located in the low level areas which are vulnerable to flood disaster. All the three zones are under the Chennai Corporation.

**Profile of the three urban backward settlements**

**Table 1 shows the Gender of the study participants**

S.No	Gender	N	Percentage	Gender of the heads	N	Percentage
1	Male	1398	49.8	Male	624	90.4
2	Female	1412	50.2	Female	66	9.6
	Total	2810			690	100.0

Nearly half of the study participants 50.2 percent were females and the rest 49.8 percent were males. Higher percentages of the heads of the families were males 90.4 percent (Table 1).

**Table 2 shows the Educational background of the family heads**

S.No	Educational levels	N	Percentage
1	Illiterate	215	31.2
2	Primary	102	14.8
3	Secondary	288	41.7
4	Higher Secondary	35	5.1
5	Graduation and above	50	7.2
6	Total	690	100.0

Higher percentage 41.7 percent of the family heads had education qualification till secondary school. 31.2 percent of the family heads were illiterates, followed by 14.8 percent primary school and 5.1 percent, Higher Secondary. Only 7.2 percent of them had educational qualification - graduation and above (Table 2).

**Table 3 shows the Age group of the head of the families**

S.No	Age group	N	Percentage
1	21 -30	84	12.2
2	31 -40	218	31.7
3	41- 50	200	29.7
4	51- 60	116	16.8
5	Above 61	72	9.6
	Total	690	100.0

Higher percentage of 31.7 years belonged to the age group 31-40 years, followed by 29.7 percent belonged to 41 -50 years, 16.8 percent belonged to 51-60 years, 12.2 percent belonged to 21 -30 years and only 9.6 percent were above 61 years (Table 3).

**Table 4 shows the Gender and Occupational Status**

S.No	Gender	N/ %	Government	Private	Business	Daily	Others	Not	Total
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			service	service		wage		employed	
1	Male	N	15	107	42	410	39	11	624
2		%	2.2	15.5	6.1	59.4	5.7	1.6	90.4
3	Female	N	3	7	0	37	9	10	66
4		%	0.4	1.0	.0	5.4	1.3	1.4	9.6
5	Total	N	18	114	42	447	48	21	690
		%	2.6	16.5	6.1%	64.8	7.0	3.0	100.0

Among the male study participants higher percentage, 59.4 percent of them were involved in daily wages and females were less employed. The different occupational status included Government service (2.2 percent males and 0.4 percent females), 2.6 percent, Private service (15.5 percent males and 1 percent females) 16.5 percent, Business (6.1percent males), 6.1 percent, Daily wages (59.4 percent males and 5.4 percent females), 64.8 percent (Table 4).

**Table 5 shows the Family Structure of the study participants**

S.No	Family structure	N	Percentage
1	Single person household s	21	3.0
2	Nuclear family	552	80.0
3	Joint family	117	17.0
4	Total	690	100.0

Higher percentage of 80 percent of the study participants belonged to nuclear family structure. 17 percent belonged to joint family structure and only 3 percent were living as single person (Table 5).

**Table 6 shows the duration of the Family Residing in the House**

S.No	Duration of staying	N	Percentage
1	Less than 1 year	35	5.1
2	1 to 2 years	42	6.1
3	2 to 5 years	69	10
4	5 to 10 years	94	13.6
5	more than 10 years	450	65.2

Higher percentages of 65.2 percent, of the families were residing in the urban backward settlement more than 10 years. The rest 13.6 percent were living for 5-10 years, 10 percent were living for 2- 5 years, 6.1 percent were living for 1-2 years and 5.1 percent were living for less than 1 year (Table 6).

**Table 7 shows the House Types of the study participants**

S.No	House	N	Percentage	House types	N	Percentage
1	Individual House	556	80.6	Hut	138	20
2	Line House	134	19.4	Asbestos roof	318	46.1
3				Concrete	227	32.7
4				Partially concrete	7	1.2
5	Total	690	100.0		690	100.0

Higher percentage of the families lives in individual house, 80.6 percent. Only19. 4 percent live in line house. Higher percentage of 46.1 percent, live in house which has Asbestos roof, followed by 32. 7 percent in concrete house, 20 percent in Huts and 1.2 percent live in partial concrete house (Table 7).

**Table 8 shows houses with Power facilities**

S.No	Electric connection	N	Percentage
1	Yes	683	99.0
2	No	7	1.0
	Total	690	100.0

Nearly all the houses 99 percent had Power facilities in their houses (Table 8).

**Table 9 shows Number households as per the constitutional classes**

S.No	Constitutional classes	N	Percentage
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Higher  
 33.1 of the study  
 belonged to  
 followed by 32.9  
 to Most Backward Class,  
 31.1 percent belonged to  
 Scheduled Caste, 2.6 percent  
 belonged to Scheduled Tribe  
 and only 0.3 percent  
 belonged to other community  
 (Table 9).

1	Scheduled Caste	215	31.1
2	Scheduled Tribe	18	2.6
3	Most Backward Class	227	32.9
4	Backward Class	228	33.1
5	Other community	2	0.3
		690	100.0

percentage of  
 participants  
 Backward Class,  
 percent belonged

### Communities' Vulnerability in the 3 urban backward settlements towards storm disaster

**Table 10 shows Household level sewage facility**

S.No	Sewage facility	N	Percentage
1	Underground drainage system	50	7.2
2	Septic tank	454	65.8
3	No toilet facility	186	27.0
		690	100

Higher percentages of 73.0 percent of the families had Septic tank facility followed by 27.0 percent had no Toilet facility and only 7.2 percent had Underground drainage system in the areas (Table 10)

**Table 14 shows the Issues Faced by the Urban Backward settlements**

S.No	Problems related to the Area	N	Percentage
1	Water Supply	230	33.3
2	Waste Water Disposal	549	79.6
3	Solid Waste Disposal	395	57.2
4	Water logging and flood during rainy days	649	94.1
5	Proper road facility	205	29.7

33.3 percent of the families stated water supply as issue in their area. Higher percentage of 79.6 percent of the families reported that waste water disposal was a big issue in their settlement areas. 57.2 percent stated solid waste disposal as problem in the area. 94.1 percent stated water logging and flood during rainy days. 29.7 percent stated that they didn't have proper road facility (Table 14)

**Table 15 shows storm water drainage in the urban backward settlement**

S.No	Storm water drainage facility	N	Percentage
1	Closed storm water drain	48	7.0
2	No drainage facility available	642	93.0
	Total	690	100

93 percent of the study participants stated that they didn't have drainage facility. Only 7 percent stated that they had closed storm water drain (Table 16).

### Table 16 shows the Frequency of flood in the area

The urban settlements face it rains heavily. 13.8 percent had flood three to five times in a year. 8.7 percent stated that there area had floods one to two times in a year (Table 16)

S.No		N	Percentage
1	Every time it rains	528	76.5
2	One to Two times in a year	60	8.7
3	Three to Five times in a year	95	13.8
4	Not able to tell	7	1.0
	Total	690	100.0

backward flood whenever 76.5 percent. stated that they

**Table 17 shows the Water logging duration during rainy season**

S.No	Duration	N	Percent
1	Less than a day	22	3.2
2	One day	25	3.6
3	Two days	73	10.6
4	Three to five days	209	30.3
5	More than five days	361	52.3
	Total	690	100.0

Nearly half of the study participants stated that water logging during rainy season last for more than five days in their settlement area.30.3 percent stated that water logged for three to five days (Table 17).

**Table 18 shows Height of water logged during floods in year 2015**

S.No	Height of the water	N	Percentage
1	1 to 2 feet	77	11.1
2	2 to 4 feet	220	31.9
3	5 to 6 feet	238	34.5
4	6 and above	95	13.8
5	No floods	60	8.7
	Total	690	100.0

The elevated houses did not face floods. 34.5 percent of the houses had water logged 5 to 6 feet in height. 31.9 percent of the houses had 2 to 4 feet height of water logged. 13.8 percent reported of more than 6 feet height (Table 18)

### Community Preparedness to manage the storm disaster

**Table 19 shows Communities Willingness to contribute for storm water drainage management and Flood protection measures**

S.No	Support	N	Percentage
1	Support to work as daily wage laborers	346	50.1
2	Community meetings and provide information and suggestions and play any role as collective responsibility	83	12.0
3	Community Self Help Group to prevent and manage floods	31	4.5
4	Support evacuation activities	230	33.3
	Total	690	100.0

50.1 percent of the study participants stated that they will support flood relief activities working as daily wage labourers. 33.3 percent of them stated that will support evacuation activities.12 percent stated that they will keep the disaster management team informed about the area. 4.5 percent stated that they will be with the self-help groups to manage the floods (Table 19).

**Table 20 shows the Communities willingness to Shift the Place if it is required**

S.No	Willing to shift the house	N	Percentage
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1	Yes	72	10.4
2	No	618	89.5
	Total	690	100.0

Only 10.4 percent of the families stated that they are willing to shift their houses if required during the floods. 89.5 percent stated that they cannot shift their houses during floods (Table 20).

**Table 21 shows Compensation Preferred by the families willing to shift the place**

S.No	Compensation	N	Percentage
1	Like to get another similar better house	56	77.8
2	Money to repair house	8	11.1
3	Others	8	11.1
	Total	72	100.0

Among the study participants who stated that they are willing to shift their houses during floods 77.8 percent stated that they like to get another similar better house as compensation from the government. 11.1 percent stated that they need money to construct house (Table 21).

**Table 22 shows the communities prepared to pay charges for operation and maintenance**

S.No	Pay for operation and maintenance	N	Percentage
1	Yes	621	90.0
2	No	69	10.0
6	Total	690	100.0

When asked whether they can pay for the operation and maintenance of their areas higher percentage of 90 percent stated yes. Only 10 percent stated that they cannot pay (Table 22).

The results highlighted from the table 1 to the table 22 have captured the findings of the three objectives of the anthropological study.

The discussed themes during the Participant Observations

#### **Word cloud analysis**



The dialogue which was captured during the participant observation was analyzed. The figure above shows the frequently used words by the community. Participant observation helped the researcher to understand the views of the community on storm disaster in the settlement areas. This exercise helped the community to understand their own issues and showed more interest to participate in the survey.

### **Discussion**

The disaster management to be effective and to meet the needs of the victims of the storm and flood needs community participation. To develop action plans for pre-disaster and during the management of disaster information about the geographical location is vital. The present anthropological study which has observed the community and also conducted the social survey has documented salient information about the profile of the community, vulnerability of the community and the community preparedness to face the disaster management. Disaster management when it uses information about the geographical location and the community can undertake comprehensive measures. In the present the researcher has studied the vulnerability and preparedness of the community in the three backward settlement areas which areas an eye opener when looked in the perspective of disaster management. The study when conducted with the participation of the community prepares them to understand their own geographical locations and their issues related to storm and flood disaster. After the completion of the study, the community has expressed that they have gained knowledge to become resilient when storm or flood strikes their settlements. Oliver smith (1996) states, that the disaster research addresses various issues that can bring probable changes in the community.

Informative social surveys can help the government during the time of disaster and any other crisis in the area. When the community understands their vulnerability, they also develop or think of needs to be resilient. Kelman et al., (2016) state that vulnerability of the community towards the disaster refers to the human decisions, values, governance, attitudes and behaviour which contribute during the disaster. The snap shot of the profile of the communities living in the three backward settlement areas are "Majority of the households has males as the head and they are the decision making individuals. The age group of the heads of the families is spread across 21 years to 61 years. More than half of them depend on daily wages and very less percentage of the women goes for work. The dominant family structures in the settlements areas are nuclear type. 65.2 percent of them have lived in their current houses for more than 10 years. Nearly half of them are living in asbestos roofed houses and 80.6 percent of them are in individual houses. All the houses have power facilities in their areas. Majority of the community belong to the



constitutional classes –Schedule Caste (31.1 percent), Most Backward class (32.9 percent) and backward class (33.1 percent).” The profile of the community and the geographic location has major role during and after any disaster. The sewage facility available in the urban backward settlements is septic tank 65.8 percent and 27 percent do not have toilet facility. When asked about their major issues 94.1 percent state that water logging and floods during rainy season is a major issue followed by waste water disposal 79.6 percent, 57.2 solid waste disposals etc. 93 percent have stated that they don’t have drainage facility. 76.5 state that their settlement face flood every time it rains. 52.3 stated that water will be logging for more than 5 days during rainy season. Majority of them have stated that the height of the water is 2 to 4 feet’s (31.9 percent), 5 to 6 feet (34.5 percent) and 13.8 percent have stated that its 6 feet and above near their houses. The infrastructure available in the settlements and the past experiences during rains and flood shows that the present community and their household have great vulnerability to floods and its disaster. Gaillard (2010) state, that the concept of vulnerability is part of disaster literature. It refers to the present condition of the society which paves way for hazards during a disaster. Cettner et al., (2012) have documented the recent trends to advocate for urban storm water management in urban planning efforts. They state that if the storm water management is integrated with urban planning it will a best practice.

The next set information highlights the communities’ preparedness to manage the disaster when asked about the communities’ efforts to manage the storm disaster 50.1 percent stated that will work as daily wage labourers with the disaster management team. 33 percent stated that they support evacuation activities. As compensation 77.8 percent asked for another similar better house and 11.1 percent wanted money to repair their house. It is interesting to know that 90 percent of the community members were willing to pay money for operation and maintenance. The main source of income generation among the community is daily wages and it is difficult for them to store foods and repair their houses to avoid leaking of water. Majority of the houses were having asbestos as their roof top which poses threat during rain and floods. Jessica Yu et al (2016) state, that urban backward settlement programs and disaster resilience can use information from studies similar to the present to build resilience of the community. Parkinson (2003) advocates that non-structural approaches can be effective for the storm water management since the community takes the ownership or participates in the management activities.

### Conclusion

The present study has captured the vulnerability and community preparedness to storm disaster management. The anthropological approach used has helped to elicit data from the community vividly. All the three zones selected for the study had similar vulnerability issues. Though the communities’ means of income was through daily wages, majority of them have agreed to pay for the maintenance work. High percentage of the community was also prepared to shift their houses during floods. The study has mapped the profile of the three urban backward settlement profiles which can be used by disaster management team.

### References

1. Ahamed, M. (2013). Community based Approach for Reducing Vulnerability to Natural Hazards (Cyclone, Storm Surges) in Coastal Belt of Bangladesh. *Procedia Environmental Sciences*, 17, 361-371.
2. Cettner, A., Ashley, R., Viklander, M., & Nilsson, K. (2013). Storm water management and urban planning: Lessons from 40 years of innovation. *Journal of Environmental Planning and Management*, 56(6), 786–801.
3. Chari, F., Ngcamu, B. S., & Novukela, C. (2020). Supply chain risks in humanitarian relief operations: a case of Cyclone Idai relief efforts in Zimbabwe. *Journal of Humanitarian Logistics and Supply Chain Management*, ahead-of-print (ahead-of-print). doi:10.1108/jhlscm-12-2019-0080
4. Chiba, Y., Prabhakar, S. V. R. K., Islam, M. A., & Akber, M. A. (2018). Priority practices for addressing non-economic loss and damages caused by cyclones in Bangladesh. *International Journal of Disaster Resilience in the Built Environment*. doi:10.1108/ijdrbe-11-2017-0061
5. Gaillard, J. C. (2010). Vulnerability, capacity and resilience: Perspectives for climate and development policy. *Journal of International Development*, 22(2), 218–232.
6. Goyal, P. K., Datta, T. K., & Vijay, V. K. (2012). Vulnerability of rural houses to cyclonic wind. *International Journal of Disaster Resilience in the Built Environment*, 3(1), 20–41.
7. Jessica Yua et al., (2016), Slum Upgrading Programs and Disaster Resilience: A Case Study of an Indian ‘Smart City’, *Procedia Environmental Sciences*, 36, 154- 161. 1878-0296 © 2016 Published by Elsevier B.V.
8. Kelman, I., Gaillard, J. C., Lewis, J., & Mercer, J. (2016). Learning from the history of disaster vulnerability and resilience research and practice for climate change. *Natural Hazards*, 82(S1), 129–143.
9. Mallick, B., Rubayet Rahaman, K., & Vogt, J. (2011). Social vulnerability analysis for sustainable disaster mitigation planning in coastal Bangladesh. *Disaster Prevention and Management: An International Journal*, 20(3), 220–237.

10. Ogie, R., & Pradhan, B. (2019). Natural Hazards and Social Vulnerability of Place: The Strength-Based Approach Applied to Wollongong, Australia. *International Journal of Disaster Risk Science*, 10(3), 404-420.
11. Oliver-Smith, A. (1996). Anthropological Research on Hazards and Disasters. *Annual Review of Anthropology*, 25, 303-328. <http://www.jstor.org/stable/2155829>.
12. Parkinson, J. (2011) Drainage and storm water management strategies for low-income urban communities. *Environment and Urbanization communities*, 15, 115, DOI: 10.1177/095624780301500203
13. Van Klinken, G. (2020). Typhoon disaster politics in pre-1945 Asia: three case studies. *Disaster Prevention and Management: An International Journal*, ahead-of-print (ahead-of-print). doi:10.1108/dpm-01-2020-0027