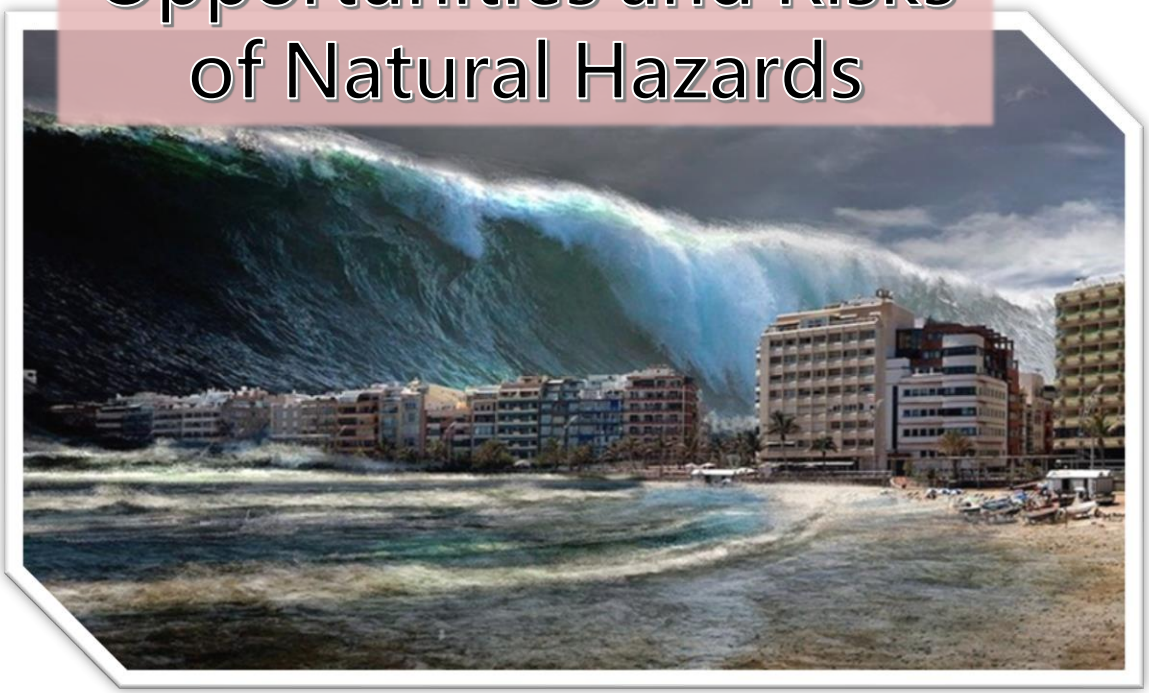
明愛陳震夏郊野學園
Caritas Chan Chun Ha Field Studies Centre

Opportunities and Risks of Natural Hazards



Student Name：_____ **Group No.**：_____

Course Date：_____

OBJECTIVES

- Knowledge：
  - To recognize major natural hazards in Hong Kong
  - To understand the reasons behind people's different responses to natural hazards
- Skills：
  - To use data collection methods such as questionnaire, interview and scoring
  - To draw choropleth maps and scatter diagrams
  - To summarize the interviews
- Value：
  - To understand the role of human beings in the complex man-land relationship through the topic of natural hazards

Relevance to the DSE geography curriculum

✪ Opportunities and Risks

Concept recap：Natural hazards

Watch the videos and fill out the form below:

Natural hazard	**1.**	**2.**
	https://www.youtube.com/watch?v=Unu8nCQhmKM	https://www.youtube.com/watch?v=4StilBcPXsk
Causes		
Impacts		

Typhoons can trigger storm surges, which have been described by the Hong Kong Observatory as "like a mini tsunami". The field studies took typhoons and storm surges, which are the more common natural hazards in Hong Kong, as a starting point to understand the reasons behind people's different responses to natural hazards.

STAGE 1 : PLANNING & PREPARATION

Focus of studies : <u>Factors affecting the response to natural hazards (typhoons and storm surges)</u>

✪ **Hypotheses setting :**

The higher the risk of natural hazards (typhoons and storm surges), the <u>more / less</u> response plan people will take.

What factors affect the people's response to natural hazards (typhoons and storm surges)?

STAGE 1 : PLANNING & PREPARATION

➢ When to collect data?

Date: _____ Mon to Fri / Sat / Sun & Public holiday Season: _____ Time: _____ to _____	What factors would you consider in choosing the fieldwork date?
1. Any weather warnings & signals issued by the Hong Kong Observatory in the **past three days**? ☐ Tropical cyclone warning signals ☐ Rainstorm warnings ☐ Frost warning ☐ Cold weather warning ☐ Very hot weather warning ☐ Other:_____	
2. Is today ideal for fieldwork of this topic? Why?	

➢ Where to collect data?

Is Cheung Chau an ideal field site of this topic? Why?	What factors would you consider when choosing the field site?
Referring to the map in P.15, when setting up the data collection locations, the sampling method applied (see P.19 for details) : **The study area covers the whole / central / southern / northern part of Cheung Chau Island.** **Sampling method for study points :** **Simple random / Systematic / Stratified / Quota / Convenience / Purposive**	

STAGE 2 : DATA COLLECTION

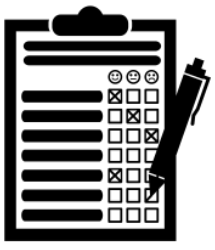
➢ What data to collect and how to collect data?

Items	Primary data collection methods [A-I] *(see Table 1)* *(may choose more than one)*	Equipment [1-6] *(see Table 2)* *(if needed)*	Operational precautions
Topography			
Accessibility / Distance to sea			
Number of shops / residences			
Location and view			
Wind speed and building Orientation			
Opportunities and risks index			
People's responses to natural hazards			

Table 1 Primary data collection methods *(details on P.18)*

A) Observation	B) Measurement	C) Counting	D) Category	E) Distribution (mapping)
F) Scoring	G) Field sketching	H) Questionnaire	I) In-depth interview	

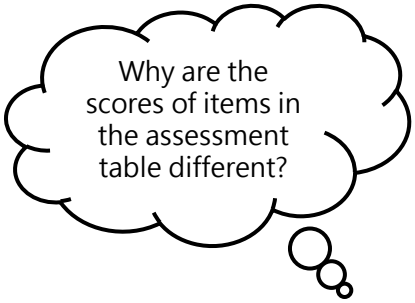
Table 2 Equipment for fieldwork *(Make sure you know how to use them correctly before fieldwork.)*

Equipment / tools used in the fieldwork		
 **1. anemometer**	 **2. compass**	 **3. assessment table**
 **4. questionnaire**	 **5. map**	 **6. colour pencils (for data processing)**

STAGE 2 : DATA COLLECTION

"Opportunities" and "Risks" Index

To calculate the total score of the study points based on the following scoring criteria. To understand the "Opportunities" and "Risks" Index of the location.



"Opportunities" assessment table

Assessment items	Score / Description			
Topography (Contour height)	41 m or above	21 – 40 m	11 – 20 m	10 m or below
	(0 point)	(2 points)	(4 points)	(6 points)
Accessibility (Distance from town center)	401 m or above	201 – 400 m	101 – 200 m	100 m or below
	(0 point)	(1 point)	(2 points)	(3 points)
Economic activities (Number of shops)	none	rarely	moderately	a lot
	(0 point)	(1 point)	(2 points)	(3 points)
Location & View	far from the sea & hidden	far from the sea / hidden	near the sea & open	seaside & open
	(0 point)	(3 points)	(6 points)	(9 points)

Assessment items	Study route _____ and Score					
	_____	_____	_____	_____	_____	_____
Topography (Contour height)						
Accessibility (Distance from town center)						
Economic activities (Number of shops)						
Location & View						
Total score of "Opportunities"						
"Opportunities" index						

Total score of "Opportunities"	0 – 4 points	5 – 9 points	10 – 14 points	15 points or above
"Opportunities" index	**very low**	**low**	**high**	**very high**
Legend colours	light blue	light green	orange	pink

"Risks" assessment table

Assessment items	Score / Description			
Topography (Contour height)	41 m or above	21 – 40 m	11 – 20 m	10 m or below
	(0 point)	(2 points)	(4 points)	(6 points)
Distance to the nearest sea	101 m or above	51 – 100 m	11 – 50 m	10 m or below
	(0 point)	(3 points)	(6 points)	(9 points)
Population density (number of residences)	none	rarely	moderately	a lot
	(0 point)	(1 point)	(2 points)	(3 points)
Windy level	wind speed 0 - 0.2 m/s (force 0 wind)	wind speed 0.3 – 1.5 m/s (force 1 wind)	wind speed 1.6 – 3.3 m/s (force 2 wind)	wind speed 3.4 – 5.4 m/s or above (force 3 wind or above)
	(0 point)	(1 point)	(2 points)	(3 points)

Assessment items	Study route _____ and Score					
	_____	_____	_____	_____	_____	_____
Topography (Contour height)						
Distance to the nearest sea						
Population density (number of residences)						
Windy level						
Total score of "Risks"						
"Risks" index						
Measurement with anemometer and compass						
Wind speed (m/s)						
Building orientation						

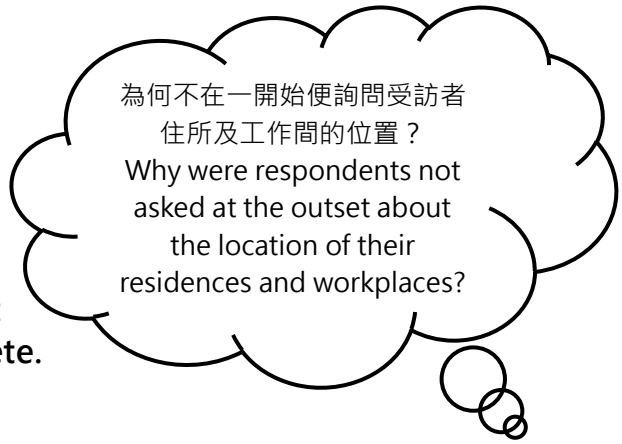
Total score of "Risks"	0 – 4 points	5 – 9 points	10 – 14 points	15 points or above
"Risks" index	**very low**	**low**	**high**	**very high**
Legend colours	dark blue	dark green	yellow	red

階段 STAGE 2：數據蒐集 DATA COLLECTION

市民對自然災害（颱風及風暴潮）的回應
People response to natural hazards (typhoons and storm surges)

根據以下的問卷內容，訪問 _____ 位途人，了解他們對自然災害（颱風及風暴潮）的回應。
Based on the following questionnaire, _____ passers-by were interviewed to find out their responses to natural hazards (typhoons and storm surges).

問卷 Questionnaire



你好 _____，我們有一份關於「颱風及風暴潮」的功課需要完成，可否詢問你幾條有關問題？
Hello, _____. We have a homework assignment on "Typhoons and Storm Surges" to complete. May I ask you a few questions about it?

組別 _____ 受訪者編號：A / B / C / D **Group _____ Respondent No. : A / B / C / D**	**住所 / 工作間（請圈出較受自然災害影響的地點）** **Residence / Workplace (Please circle the location more affected by natural hazards)**
1) 你認為你的住所或工作間容易受到颱風或風暴潮的影響嗎？ Do you think your residence or workplace is vulnerable to typhoons or storm surges?	Not easy ---------- Easy 不容易 ---------- 容易 1 / 2 / 3 / 4
2) 承上題，為甚麼你會認為影響較大 / 較小？ Continuing from the previous question, why do you think the impact will be greater / lesser?	
3) 當天文台預告即將有威力很強的颱風或風暴潮影響香港時，你通常採取的預防措施足夠嗎？ When the Hong Kong Observatory forecasts that a very powerful typhoon or storm surge is about to affect Hong Kong, are the preventive measures you usually take adequate?	Not adequate ---------- Adequate 不足夠 ---------- 足夠 1 / 2 / 3 / 4

4) 承上題，有甚麼因素會影響你是否採取足夠的預防措施？ Continuing from the previous question, what are the factors that affect whether you take adequate preventive measures?	
5) 在過往的颱風或風暴潮襲港期間，你的身體/財物/住所/工作間因此而試過嚴重損壞嗎？ During previous typhoons or storm surges in Hong Kong, has your body / property / residence / workplace been seriously damaged as a result?	1 沒有 No / 2 輕微 Slightly / 3 嚴重 Seriously
➢ **向受訪者展示超強颱風「山竹」於全港造成嚴重破壞的圖片。** **Showing respondents pictures of the devastation caused by Super Typhoon "Mangkhut" in Hong Kong.**	
6) 假若超強颱風「山竹」每年均會正面襲港一次，你會選擇遷出或離開你的住所/工作間嗎？ If a super typhoon "Mangkhut" were to hit Hong Kong once a year, would you choose to move out or leave your residence / workplace?	1 不會 No / 2 不確定 Not sure / 3 會 Yes
7) 承上題，有甚麼因素影響你是否遷出或離開？ Continuing from the previous question, what are the factors affecting your decision to move out or leave?	
8) 你是否長洲居民 / 在長洲工作？ Are you a Cheung Chau resident? / Do you work in Cheung Chau?	長洲居民：是 / 否 長洲工作：是 / 否 Cheung Chau Resident : Yes / No Working in Cheung Chau : Yes / No
若第 8 題有其中一個答案「是」，請受訪者在地圖上指出大約位置。 （若未能指出 / 不在地圖範圍內，請受訪者說出地點名稱。）地點：_____ If one of the answers to Question 8 is "Yes", please indicate the approximate location on the map. (Respondents were asked to name the location if it could not be identified / was not on the map.) Location : _____	

✪ **多謝你接受我們的訪問，非常感謝你，再見！**

Thanks for accepting our interview. We appreciate it very much. Bye!

STAGE 3 : DATA PROCESSING & PRESENTATION

- We can use _____ to show the spatial distribution of the total scores of "Opportunities" and "Risks" of the study points. Please draw the maps on pages 10-11 according to the following legend colours.

What are the advantages and limitations of this type of map?

Study points	A1	A2	A3	A4	A5	A6	B1	B2	B3	B4	B5	B6
Total score of "Opportunities"												

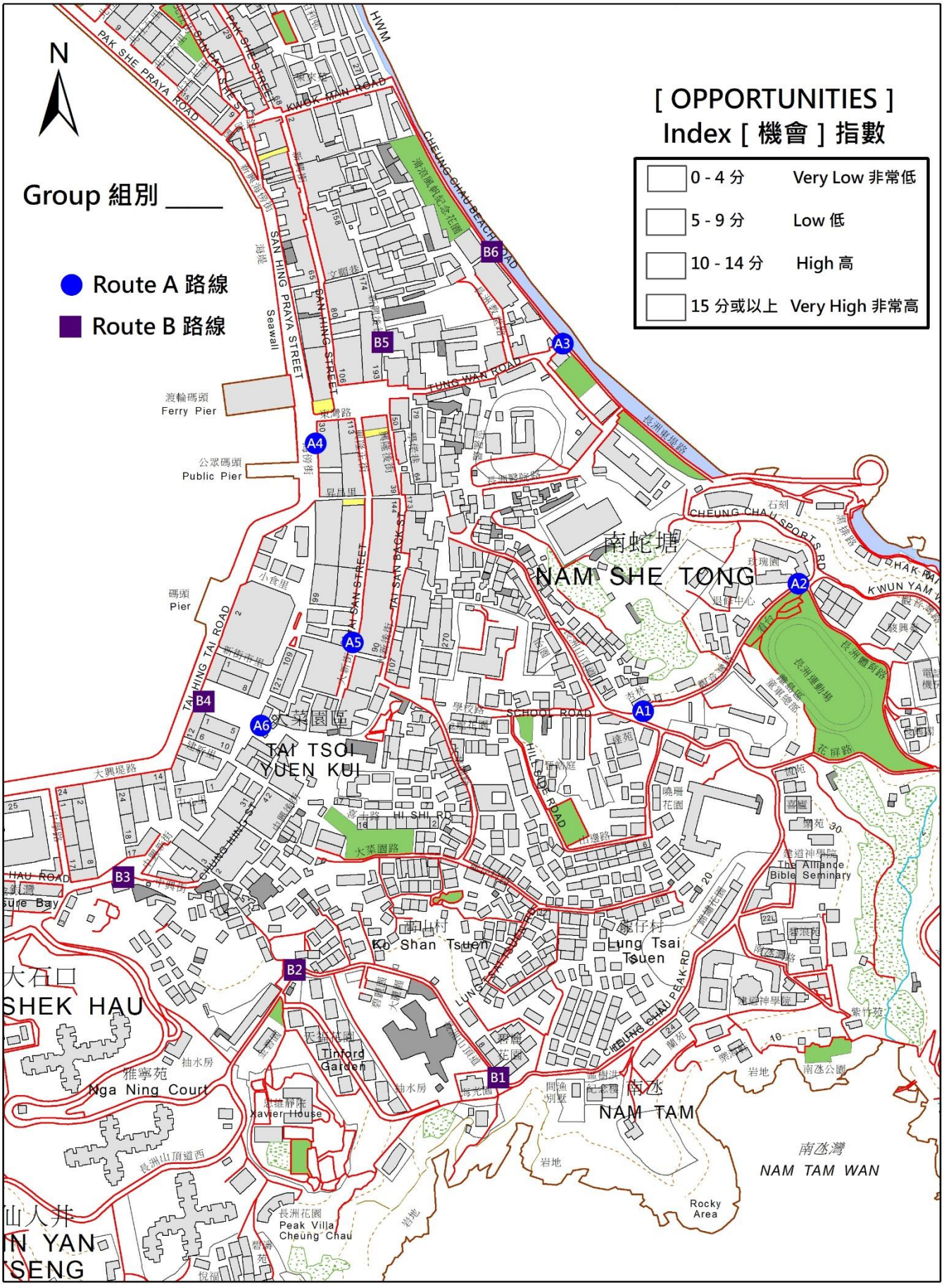
Total score of "Opportunities"	0 – 4 points	5 – 9 points	10 – 14 points	15 points or above
"Opportunities" index	very low	low	high	very high
Legend colours	light blue	light green	orange	pink

Study points	A1	A2	A3	A4	A5	A6	B1	B2	B3	B4	B5	B6
Total score of "Risks"												

Total score of "Risks"	0 – 4 points	5 – 9 points	10 – 14 points	15 points or above
"Risks" index	very low	low	high	very high
Legend colours	dark blue	dark green	yellow	red

Advantages and limitations of choropleth maps

Advantages	Limitations


N
Group 組別 ____
Route A 路線
Route B 路線
[OPPORTUNITIES]
Index [機會] 指數
0 - 4 分 Very Low 非常低
5 - 9 分 Low 低
10 - 14 分 High 高
15 分或以上 Very High 非常高
南蛇塘
NAM SHE TONG
大菜園區
TAI TSOI YUEN KUI
大石口
SHEK HAU
南丫
NAM TAM
南丫灣
NAM TAM WAN
Ko Shan Tsuen
Lung Tsai Tsuen
Nga Ning Court
Tinford Garden
Xavier House
Peak Villa Cheung Chau
Rocky Area
渡輪碼頭
Ferry Pier
公眾碼頭
Public Pier
碼頭
Pier
Seawall
The Alliance Bible Seminary
A1
A2
A3
A4
A5
A6
B1
B2
B3
B4
B5
B6
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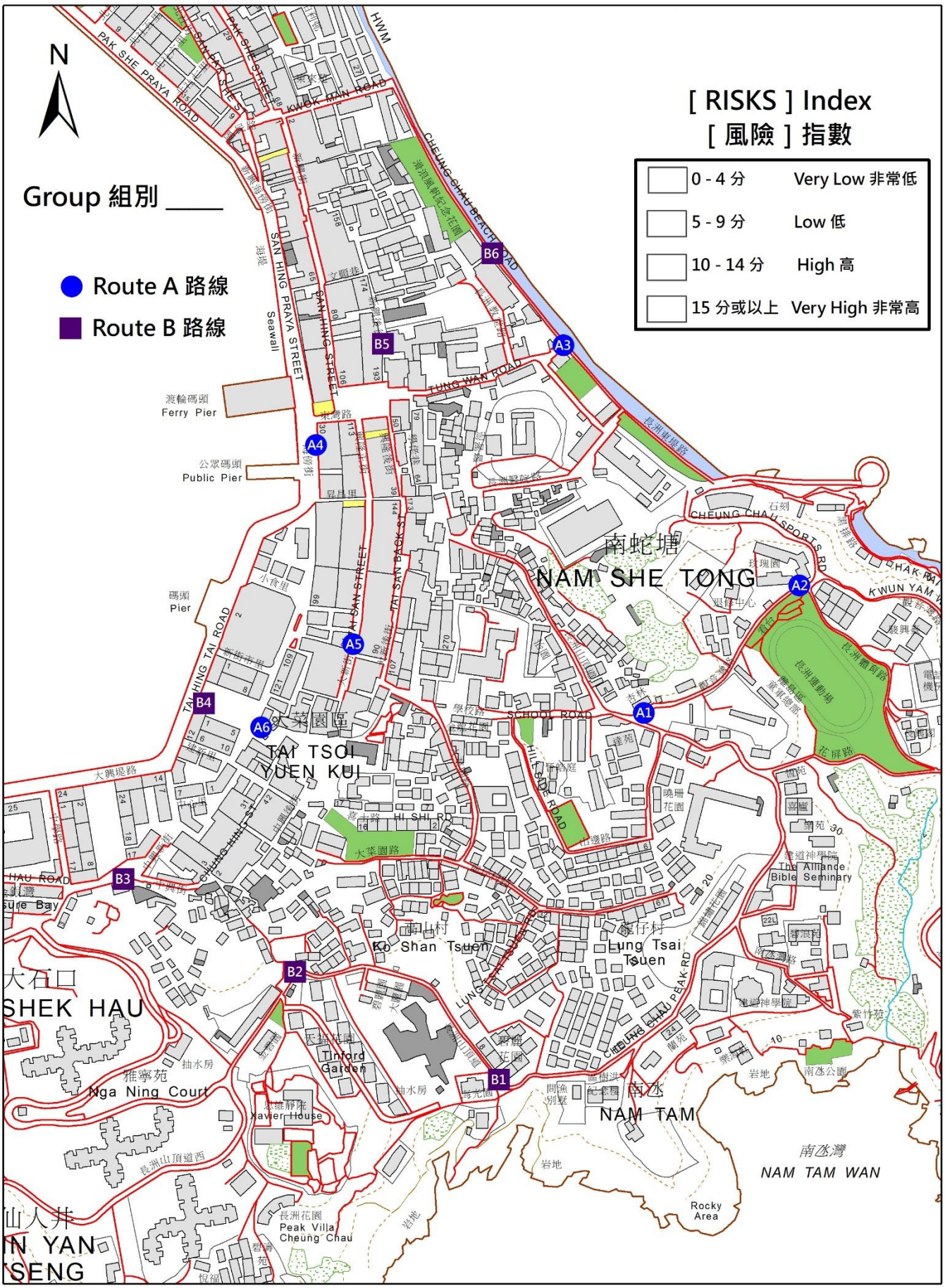
0 25 50 100 150 200
Meters


N
Group 組別 ____
Route A 路線
Route B 路線
[RISKS] Index
[風險] 指數
0 - 4 分 Very Low 非常低
5 - 9 分 Low 低
10 - 14 分 High 高
15 分或以上 Very High 非常高
南蛇塘
NAM SHE TONG
大菜園區
TAI TSOI YUEN KUI
大石口
SHEK HAU
南山村
Ko Shan Tsuen
龍仔村
Lung Tsai Tsuen
南丫
NAM TAM
南丫灣
NAM TAM WAN
渡輪碼頭
Ferry Pier
公眾碼頭
Public Pier
碼頭
Pier
Tinford Garden
雅寧苑
Nga Ning Court
Xavier House
The Alliance Bible Seminary
Rocky Area
PAK SHE PRAYA ROAD
KWOK MAN ROAD
SAN HING PRAYA STREET
SAN HING STREET
TUNG WAN ROAD
CHEUNG CHAU BEACH ROAD
CHEUNG CHAU SPORTS RD
SCHOOL ROAD
HILLSIDE ROAD
TAI HING TAI ROAD
CHEUNG CHAU PEAK RD
A1
A2
A3
A4
A5
A6
B1
B2
B3
B4
B5
B6
Caritas Chan Chun Ha Field Studies Centre
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0 25 50 100 150 200
Meters

STAGE 3 : DATA PROCESSING & PRESENTATION

✪ We can use _____ to show the relationship between two variables.
Try to match the following two variables to draw a diagram about them.
What are the advantages and limitations of this type of diagram?

X axis	Y axis
Extent to which people's residences / workplaces are affected by typhoons or storm surges	Adequacy of preventive measures taken by people
Extent of damage to people's body / property / residence / workplace	People's preference to move out or leave their residences / workplaces

Diagram 1

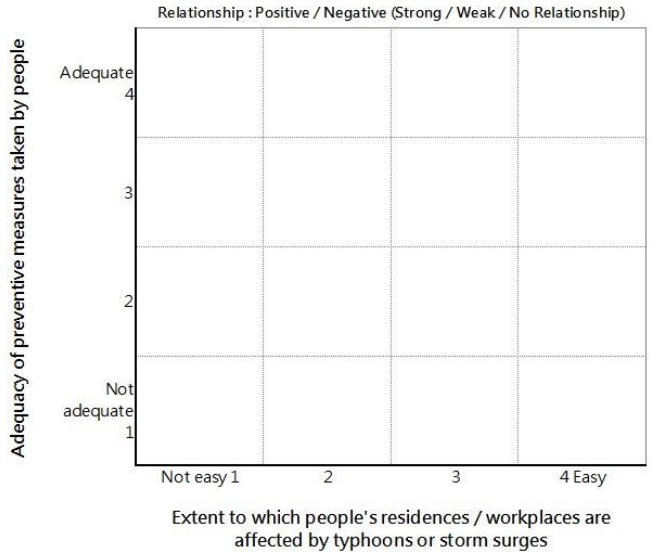


Diagram 2

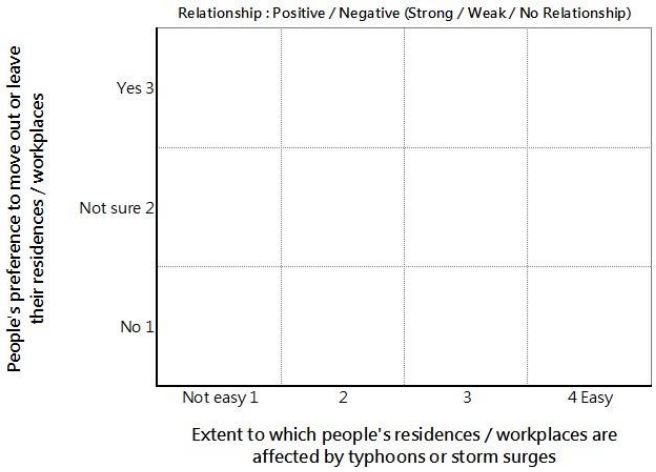


Diagram 3

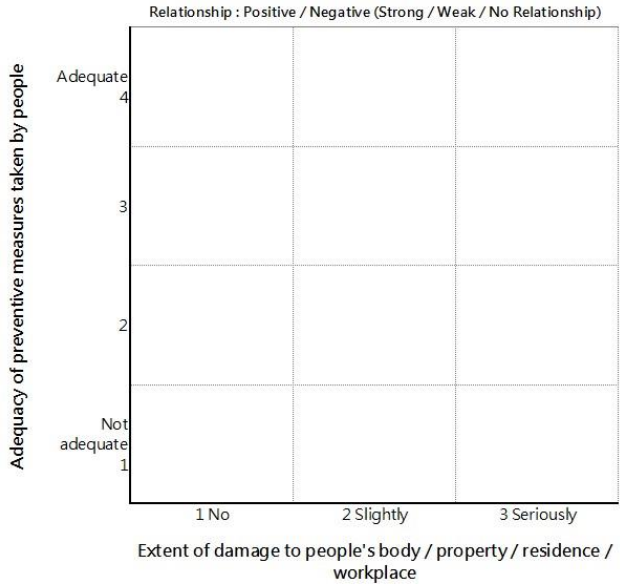
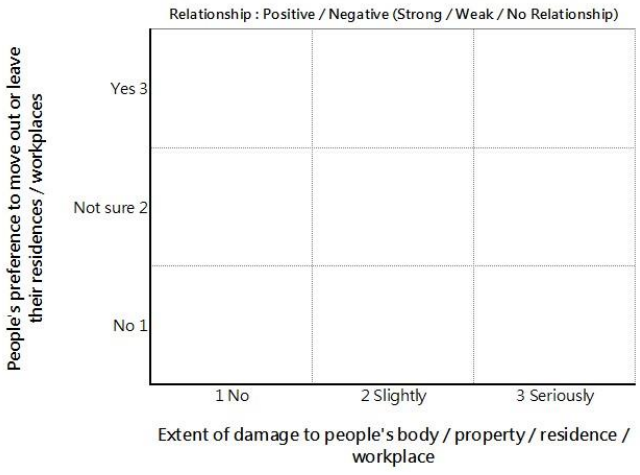


Diagram 4



STAGE 3 : DATA PROCESSING & PRESENTATION

Summarizing the answers to the following two questions from all respondents.

Try to summarize the reasons in different areas.

Reasons affecting people take adequate preventive measures	Reasons affecting people's decision to move out or leave their residences / workplaces?

STAGE 4 : DATA ANALYSIS & CONCLUSION

1. Referring to the choropleth maps (pages 10-11), what do you find when you compare the opportunities and risks index of different study points?
   What conclusions can you draw?

2. With reference to the results of the scatter diagrams (page 12), describe and explain the relationship of the following four variables:

Scatter diagram	X axis	Y axis
Diagram 1	Extent to which people's residences / workplaces are affected by typhoons or storm surges	Adequacy of preventive measures taken by people
Diagram 2	Extent to which people's residences / workplaces are affected by typhoons or storm surges	People's preference to move out or leave their residences / workplaces
Diagram 3	Extent of damage to people's body / property / residence / workplace	Adequacy of preventive measures taken by people
Diagram 4	Extent of damage to people's body / property / residence / workplace	People's preference to move out or leave their residences / workplaces

3. With reference to the respondents' answers, summarize the reasons behind people's response to natural hazards (typhoons and storm surges) (page 12).

STAGE 5 : EVALUATION

1. What sampling method is used to select the study points? Account for the **merits** and **demerits** of this sampling method.

2. Scoring is used for assessing when collecting data. State the **advantages** and **limitations** of this method.

3. Reflect on the planning of fieldwork. Discuss the factors that might cause data bias and propose methods to improve the **validity** and **reliability** of the data.

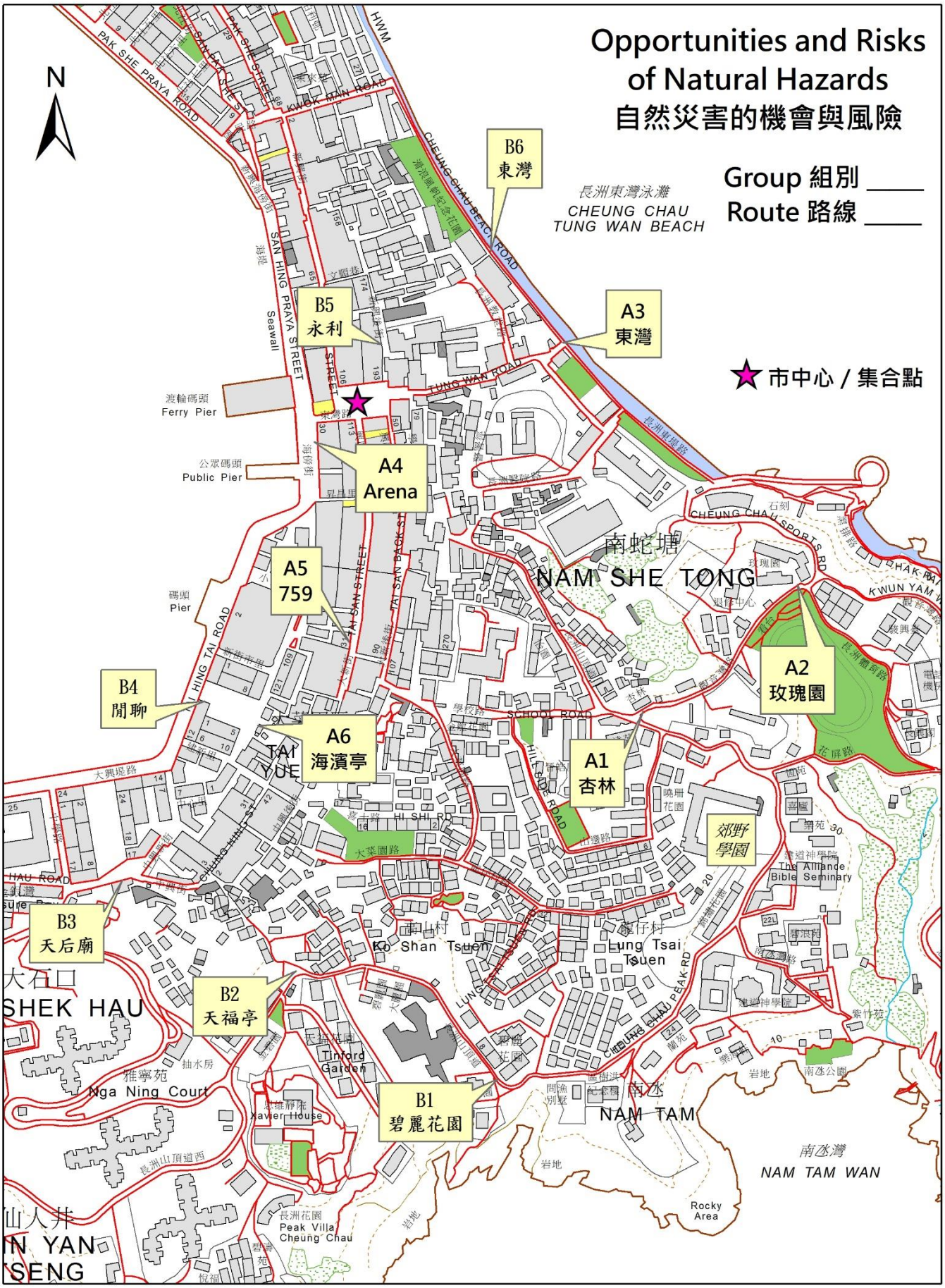
Factors affecting the data reliability and validity		Suggestion for improvement
Fieldwork date/ time ◆ Fieldwork date and time representative? ◆ Any impact by today's weather condition?		
Field site/ study area ◆ Field sites match with research topic? ◆ Field study area adequate?		
Location of data collection (Sampling) ◆ Sampling method in choosing field site appropriate? ◆ Location of measurement representative? ◆ Sample size sufficient?		
Data collection items/ methods ◆ Data collection items adequate to respond the enquiry questions? ◆ Are the data obtained from the data collection method(s) objective and without bias? ◆ Any inadequacy about the equipment/ instruments? ◆ Measurer using the equipment/ instruments correctly?		

4. Further study:
   Set a study area in **the community of your school** and devise a study plan on the topic related to **natural hazards.** *(including fieldwork date / fieldwork time / field sites / sampling methods / data collection items and methods / equipment required, etc.)*

……

Homework

After the fieldwork, complete the field trip diary (page 16-17) as a means to consolidate this fieldwork experience and reference for revision of field-based question.



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My Field Trip Diary

Opportunities and Risks of Natural Hazards

- Related modules: C1 Opportunities and Risks
- Key point of fieldwork/topic: _____

▪ Date:_____ (Weekday/ Public holiday) ▪ Time:_____ ▪ Field site: _____	▪ Weather condition:
Is the above planning appropriate for this fieldwork?	

- Primary data:

Strategies of data collection	**Data collected**	**Equipment/ Instrument** *(if any)*	**Merits☺/ Demerits☹ of the data collection strategy** *(give examples)*	**Suggestion for improvement** *(give explanations)*

- Secondary data:

Data collected	Use	Obtained from
Apart from the above, what other supplementary information would be necessary to respond to the fieldwork topic?		

- Sampling method (if any):

Sampling method	Applied during data collection of	Merits☺/ Demerits☹

- Data processing and presentation:

Type of graph/ chart	Content and function of graph/chart	Merits☺/ Demerits☹

- For deeper learning or further study, I suggest modify the following aspects:

		Suggestion (give examples)
❑	Key point of fieldwork/ topic	
❑	Data to be collected and method of data collection	
❑	Date and time of fieldwork	
❑	Field site	

Primary data collection methods

Data collection methods	Explanations		Examples
A) Observation	● Using sensory observation to explore the details of research subject (people, things or environment) in a purposive and planned way. Data are recorded using text, photos, sketch, map, etc. (Refer to other data collection methods listed below)		● Identification of the surrounding environment of a field site
B) Measurement	● To estimate or measure the physical quantity of the research subject. It usually requires the use of equipment or tools. Data are usually shown in certain standard, weights or measures.		● Measurement of the width of street and the building height
C) Counting	● To record the number of occurrence of a single item.		● Statistics of pedestrian flow at the pier
D) Category	● To classify based on the nature, characteristics and uses: ◆ to group the same or similar things; ◆ to separate different things.		● Types of goods sold in supermarket ● Customers (serving local residents and tourists) of different shops
E) Distribution (mapping)	● To group similar things according to the research topic (similar to "**D. Category"**); ● Only suitable for spatial representation (different from category); ● Useful in showing the mode of occurrence of research subject in a complex environment.		● Distribution of shops selling big fish balls in Cheung Chau
F) Scoring	● To quantify abstract or subjective concepts; ● To merge various data for easy comparison; ● Scoring items should include different aspects.		● Risk index of natural hazards of Cheung Chau ● Air Quality Health Index (AQHI)
G) Field sketching	● To make simplified drawing of the field site to show what the data collectors observed. Annotations related to the research subject are added to provide key feature or additional information.		● Draw the characteristics and formation of weathering landforms
H) Questionnaire	● Forms: face-to-face, telephone, written, etc.; ● Using questionnaire to understand the opinion of research subject; ● Larger sample size than "**I. in-depth interview"**; ● Mainly closed questions (with options available).	● To collect information by questioning; ● To obtain information which is difficult to be obtained through observations; ● To understand the rationales and opinions of interviewees.	● The main reasons for tourists to visit Cheung Chau ● The level of satisfaction among residents regarding a revitalization project
I) In-depth Interview	● To obtain information through face-to-face/ telephone interview; ● Smaller sample size than "**H.Questionnaire"**; ● Mainly open questions and forthcoming questions will change upon the answer of respondents.		● Opinions of District Council members on the future development of that district

Sampling Methods

Probabilistic sampling methods

- *Need to know the size of population;*
- *Few differences among individuals;*
- *Individual has equal chance of being selected;*
- *Representativeness of data depends on sampling percentage.*

Non-probabilistic sampling methods

- *Size of population might not be relevant to the research objective;*
- *Chance of individual being selected is unknown;*
- *Representativeness of the results depends on the judgment of researcher in sample selection (Such as the correlation between samples and research targets).*

Sampling methods	Simple random sampling (簡單隨機抽樣)	Systematic sampling (系統抽樣)	Stratified sampling (分層抽樣)	Quota sampling (配額抽樣/ 定額抽樣)	Convenience sampling (便利抽樣/ 方便抽樣)	Purposive sampling (立意抽樣)
Explanations	To select sample from the **whole population randomly**. (using computer program, bamboo slip or random number table)	Each member of the whole population is sequentially numbered, then selected according to a **fixed, periodic interval**.	The whole population are classified according to the variable and divided into separate stratum. Then samples are selected randomly by proportion from each stratum.	The whole population are classified according to the variable and divided into separate stratum. Then desired number (quota) of samples are selected from each stratum.	Research subjects are selected due to convenience of recruitment.	Samples are selected according to research objectives and special requirements.
Examples	To choose a certain number of students to conduct questionnaires/ surveys according to the class number.	To measure the noise level of a street in a regular interval.	To group buildings according to their ages (e.g. above or below 50), and select a certain number of buildings in each group randomly.	To select a certain number of male and female customers, then record the amount spent in a shop.	To interview a certain number of relatives who work in mainland China To interview a certain number of passersby on the street	To conduct an in-depth interview with a district councilor about the social problems of that district.
Remarks	Suitable for small population and few variations among samples (for relevant research objectives).	Suitable for large population (hidden cyclic ordering which may affect the representativeness of data).	Effectively show the relationship / effect between variables.	Effectively show the relationship / effect of variables, but the characteristics and size of samples are judged subjectively.	Should not generalize the data to larger population	Suitable for qualitative research (data is easily influenced by the subjective judgment of researcher)