Agriculture in Hong Kong (Long Valley)

Enquiry Skills Approach, Version 2.0

A. Planning and Preparation

Module
Combating famine

Enquiry Question

Hypothesis 1 : ***In gentle lowland, the lower the altitude, the higher the soil moisture level.***

Hypothesis 2 : ***Active farmland has higher soil fertility than abandoned farmland.***

Hypothesis 3 : ***Dry agriculture has more types of crop than wet agriculture.***

Key Concepts

Agriculture	Farming system	Farming types	Sustainable agriculture
Organic farming	Mutiple cropping	Mulching	Fallowing

Scope of the Study
1. Long Valley in Sheung Shui

Time of the Study
Date: _____ Season: _____

Think About

Is this an appropriate time for fieldwork? Explain your answer.

List the safety risks when conducting farming fieldwork.

Field Work Plan

A1 Measure altitude and soil moisture

1. There are two routes, A to B and X to Y on Map 1.1.
2. Choose a sampling method and select three sampling points on each route.
3. List the steps for selecting sampling points in detail and mark the sample points on Map 1.1.
4. Measure the altitude and soil moisture at each sampling point and record in Table 1.1.

List the sampling method you choose and the steps to select sampling points.

I choose_____sampling.

Step 1:

Think About

List the merits and demerits of the chosen sampling method.

A2 Measure soil fertility

1. There are four agricultural farmlands P, Q, R and S on Map 1.1. Identify the types of farmland and record them in Table 1.2.
2. Select three sampling points for each farmland by quota sampling and mark them on Map 1.1.
3. Meaure nitrogen(N), phosphorus(P) and potassium(K) of soil at each sampling point, and record in Table 1.2.

A3 Count the types of crop

1. There are two routes, A to B and X to Y on Map 1.1.
2. Identify the location and area of dry agricultural land (green) and wet agricultural land (yellow) on both sides of each route by designated colour on Map 1.1, and record in Tables 1.3a and 1.3b.
3. Count the types of crop in each farmland and record in Tables 1.3a and 1.3b.
4. If there is no agricultural product on the farmland, record as " Not Applicable (N/A)".

B. Data Collection

Complete the following table.

Primary Data Items	To Examine			Data Collection Method			Equipment Required (Number on the equipment checklist)
	H1	H2	H3	Observation	Counting	Measuring	
1. Land altitude							
2. Soil moisture							
3. Soil fertility (N, P, K)							
4. Location and area of dry and wet agricultural land							
5. Number of crop types							

Think About
List the secondary information used in the field work.

Sampling Method

1. _____Sampling
2. Quota Sampling

Equipment Checklist

Items	Quantity	Checked	Returned
1. Base map (Individual)	x1	❑	❑
2. Clipboard (Individual)	x1	❑	❑
3. Compass (Individual)	x1	❑	❑
4. Colour pencils	x1	❑	❑
5. Soil meter (Temp. & moisture, N, P, K)	x4	❑	❑
6. Altimeter	x1	❑	❑

Think About
List the possible errors when collecting data.

Data Recording Sheet

Table 1.1 Altitude and soil moisture

Sampling point	Altitude (m)	Soil moisture (%)	Sampling point	Altitude (m)	Soil moisture (%)
A1			X1		
A2			X2		
A3			X3		

Table 1.2 Soil fertility

	Farmland P			Farmland Q			Farmland R			Farmland S		
Farming activities												
Sampling point	P1	P2	P3	Q1	Q2	Q3	R1	R2	R3	S1	S2	S3
Nitrogen (mg/kg)												
Phosphorus (mg/kg)												
Potassium (mg/kg)												

Table 1.3a Number of crop types on Route A to B

Left side of Route A to B				Right side of Route A to B			
Farmland ID	Farming activity		Number of crop types	Farmland ID	Farming activity		Number of crop types
	Dry	Wet			Dry	Wet	
AB_L(1)				AB_R(1)			
AB_L(2)				AB_R(2)			
AB_L(3)				AB_R(3)			
AB_L(4)				AB_R(4)			
AB_L(5)				AB_R(5)			
AB_L(6)				AB_R(6)			
AB_L(7)				AB_R(7)			
AB_L(8)				AB_R(8)			
AB_L(9)				AB_R(9)			
AB_L(10)				AB_R(10)			

Data Recording Sheet

Table 1.3b Number of crop types on Route X to Y

Left side of Route X to Y				Right side of Route X to Y			
Farmland ID	Farming activity		Number of crop types	Farmland ID	Farming activity		Number of crop types
	Dry	Wet			Dry	Wet	
XY_L(1)				XY_R(1)			
XY_L(2)				XY_R(2)			
XY_L(3)				XY_R(3)			
XY_L(4)				XY_R(4)			
XY_L(5)				XY_R(5)			
XY_L(6)				XY_R(6)			
XY_L(7)				XY_R(7)			
XY_L(8)				XY_R(8)			
XY_L(9)				XY_R(9)			
XY_L(10)				XY_R(10)			

C. Data Processing, Presentation and Analysis

1. Calculate the average types of crop per farmland and record in Table 1.3c.
2. According to Table 1.4, convert the data of soil fertility into a 5-point-scale mark, and record in Table 1.6.
3. Referring to Soil Fertility Overall Score Formula, calculate the overall score for each sampling point and record in Table 1.6.
4. Calculate the average score of soil fertility for each type of farming activities, and record in Table 1.6.
5. Referring to Table 1.5, assess the level of soil fertility and record in Table 1.6.
6. Draw the most appropriate diagrams to present the collected data.

Table 1.3c Average types of crop per farmland of different farming activities

		Total no. of farmland	Total types of crop	Average types of crop per farmland
Route A to B	Dry agri.			
	Wet agri.			
Route X to Y	Dry agri.			
	Wet agri.			

Table 1.4 Soil fertility score (5-point-scale)

Score	Nitrogen (mg/kg)	Phosphorus (mg/kg)	Potassium (mg/kg)
5	> 150	> 40	> 200
4	> 120-150	> 20-40	> 150-200
3	> 90-120	> 10-20	> 100-150
2	> 60-90	> 5-10	> 50-100
1	≦60	≦5	≦50

Table 1.5 Soil fertility level

Overall score	Soil fertility level
≧ 4.5	Rich
≧ 3.5 − < 4.5	Slightly rich
≧ 2.5 − < 3.5	Moderate
≧ 1.5 − < 2.5	Slightly poor
< 1.5	Poor

Table 1.6 Summary of scores of soil quality at each sampling point

	Farmland P			Farmland Q			Farmland R			Farmland S		
Farming activity												
Sampling point	P1	P2	P3	Q1	Q2	Q3	R1	R2	R3	S1	S2	S3
Nitrogen score												
Phosphorus score												
Potassium score												
Total score												
Average score												
Level of soil fertility												

Think about

List the merits and demerits of the chosen graphs or diagrams.

D. Interpretation and Conclusion

Discuss question

1. Does the fieldwork result support the Hypothesis 1 ***In gentle lowland, the lower the altitude, the higher the soil moisture level.*** ? Support your conclusion with the collected data and graphs.

2. Does the fieldwork result support the Hypothesis 2 ***Active farmland has higher soil fertility than abandoned farmland.***? Support your conclusion with the collected data and graphs.
   (Extended question: What methods do the farmers adopt in the farming process to improve the soil quality?)

3. Does the fieldwork result support the Hypothesis 3 ***Dry agriculture has more types of crop than wet agriculture.***? Support your conclusion with the collected data and graphs.
   (Extended question: What are the disadvantages of monoculture?)

E. Evaluation

1. Other than the data collected in this course, suggest other enquiry question, data and information you might need for a field work in the field site. Explain your answer.