


3. ArcReader Instructions

- ArcReader instructions can access from "Menu" or "Toolbars". The Menu options are provided below.
- Frequently used instruction in Menu can access from Toolbars. When point the mouse to each tool, it will have balloon pop-up to show their name and explanation at "Status Bar".

File Edit View Tools Window Help

5

1) File Toolbars



Tool	Name	Function
	Open	Open "Published Map Documents" file (*.pmf)
	Recent Files	Open used file.
	Print	Map printing
	Toggle Table of Contents	Show/Hide "Table of Contents"
	Toggle Application Into Full Screen Mode	Switch to normal and full screen

6

2) Navigation Toolbars



Tool	Name	Function
	Zoom In	Expand the map by clicking a box or dragging mouse in square area
	Zoom Out	Contract the map by clicking a box or dragging mouse in square area
	Continuous Zoom/Pan	Continuous expand/contract the map by dragging mouse then move down to expand or move up to contract
	Free Zoom In	Expand the map in center area
	Free Zoom Out	Contract the map in center area
	Pan	Move the map by dragging mouse then move to desired direction
	Full Extent	Show the coverage map
	Go Back to Previous Extent or move the map	Back to previous screen before expand/contract or move the map
	Go Back to Next Extent or move the map	Back to next screen before expand/contract or move the map
	Zoom To Scale	Show the map in specified scale

7


3) Data Toolbars



Tool	Name	Function
	Identify	Look up attribute data by click to the tool of desired data
	Find	Explore data by click to fill in the term condition
	Go To XY	Go to XY position by click to fill in the co-ordinates
	Measure	Distance measure by click to estimate distance of the map
	Hyperlinks	Linkage to hyperlinks data

8


4) Layout Toolbars



Tool	Name	Function
	Zoom In	Expand the map in "Layout View" by clicking a defined area or dragging mouse as square area
	Zoom Out	Compress the map in "Layout View" by clicking a defined area or dragging mouse as square area
	Pan	Move the map in "Layout View" by dragging mouse then move to desired direction
	Fixed Zoom In	Expanding center area of the map in "Layout View"
	Fixed Zoom Out	Compressing center area of the map in "Layout View"
	Zoom Whole Page	Show the coverage "Layout View"
	Zoom To 100%	Show 100% scale of "Layout View"
	Go Back To Previous Extent	Back to previous screen before expand/compress or move the map in "Layout View"
	Go Back To Next Extent	Back to next screen before expand/compress or move the map in "Layout View"
	Change Title	Rename map in "Layout View"
	Zoom To Percent	Show "Layout View" in specified scale

9


5) Layer Effects Toolbars



Tool	Name	Function
	Layer List	Select desired layer
	Transparency	Modify transparency of the selected layer
	Swipe Layer	Modify hidden layer

10


6) Markup Toolbars



Tool	Name	Function
	Pen	Graphic drawing on the map
	Highlighter	Graphic highlighting on the map
	Eraser	Delete graphic on the map

11

4. Open Published Map Documents



- Click "Open" or Click "File > Open" then select "Published Map Documents" (*.prmf) and click "Open"
- In addition, user can open used files by click "Recent Files" or go to "Windows Explorer" then double-click at "Published Map Documents" (*.prmf) to open and access program directly.

12

5. Table of Contents Usage

1) Open/close data layer

User can open/close layers to display in "Data View" and "Layout View" from "Table of Contents" by select in front of wanted layer to display or select in front of layer to not display. The open/close selected layer is comprised of data label and layer.

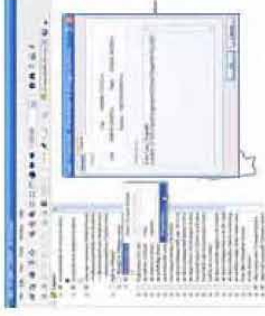
2) View hidden layer

User can view hidden layer and their symbol by click to show details of layer or click to hide details of layer.



3) View layer properties

User can view layer properties such as general data and data source by right-click to layer and choose "Properties"



14

6. Data View Usage

- Data View is a map display window to display maps on the computer screen.
- If current status is "Layout View", user can go back to "Data View" by click "View > Data View".



- User allowed applying various tools for mapping from "Navigation Toolbars"



... When point the mouse at "Data View", the geographical co-ordinates will appear in status bar.

15

7. Layout View Usage

- Layout View is a map printing window
- User can access the window "Layout View" by click "View > Layout View"

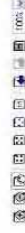


... When point the mouse at "Data View", the geographical co-ordinates will appear in status bar.

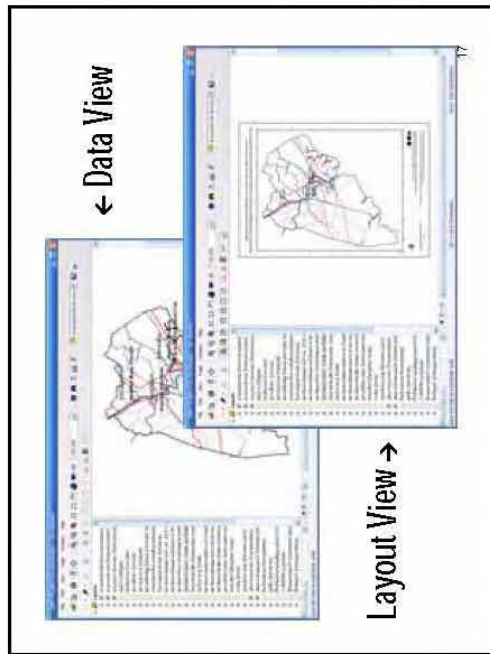
- User allowed applying various tools for mapping from "Navigation Toolbars" to defined scale and boundary for display mapping in "Layout View"



For display a printing map, user can apply various tools in "Layout Toolbars"



16



8. Magnifier Window Usage


- "Magnifier Window" is a tool to show map details by click "Window > Magnifier"
- User can move "Magnifier Window" to the position that wants to expand and choose the wanted size to be enlarged by right-click at "Magnifier Window" and select "Magnifier Factor"

9. Attribute Data Viewing

- User can use "Identify" tool to view an attribute data
- By click "Identify" and the position to be viewed its attribute data in "Data View" or "Layout View"


- User can use "Identify" to drag frame in "Data View" or "Layout View" for display a group of selected data.
- "Identify" command will use the top layer as default. User can specify a condition to "Identify" by using "Identify from"

- "Identify" view is allowed user to apply other commands by right-click to activate selected layer as follows:
 - Flash – Flash to layer
 - Zoom To – Expand to layer
 - Pan To – Move to layer
 - Sort Ascending – Data sort from less to more
 - Remove from Tree – Delete layer from "Identify" window
 - Copy Record – Copy attribute data



21


- The "Identify" window also shows geographical co-ordinates of active layer in "Location". User can change the co-ordinates system to display by click to "Choose Units"



22


10. Data Searching

- User can use "Find" for data searching.
- By click "Find" and fill the condition, then click "Find" the finding results will appear at below window.



23

- From "Find" window in search results, user can apply other commands by right-click to activate a search results as follows:
 - Flash – Flash to layer
 - Zoom To – Expand to layer
 - Pan To – Move to layer
 - Identify – View attribute data of layer
 - Add to My Places – Create "My Places" position
 - Manage My Places – Manage "My Places" position



24

11. My Place Usage

- "My Places" is a data making to identify the position or place which user want to use again without searching.
- From "Find" window in search results, user can bookmark any results in "My Places" by right-click to wanted data and select "Add to My Places"



26

- User can manage "My Places" by click "Tools > My Places"



28

12. Go to XY Position

- User can use "Go To XY" tool to go to XY position by fill co-ordinates in "XY" gap and apply below commands.



- Pan To – Move to co-ordinates position
- Flash To – Flash to co-ordinates position
- Text XY – Show co-ordinates value on the map
- Undo – Select previous co-ordinates

- Zoom To – Expand to co-ordinates position
- Mark XY – Show co-ordinates point on the map
- Label XY – Show co-ordinates label on the map
- Choose Units – Change co-ordinates input system

27

13. Distance Measurement

- User can use "Measure" tool to measure a distance by click "Measure", then "Measure" window will appear to show below commands.



- Measure Line – Length measurement
- Measure An Area – Area measurement
- Measure A Feature – Position measurement
- Snap to Features (on/off) – On/Off move the measured position to data
- Show Total (on/off) – On/Off show total distance measurement
- Choose Units – Change unit of measurement
- Clear and Reset Results – Clear "Measure" window

28

14. Linkage to External Data

- Some layers in "Published Map Documents" are linked to external data such as photo, document, website, etc.
- User can view those linkages in "Table of Contents" and click "Hyperlinks". The linkage data will show  symbol, user can click to view its details.



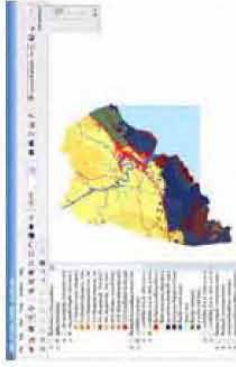
29

15. Display Layer Modification

Display layer can modify by 2 methods of "Layer Effects Toolbars" as follows.

1) Layer List – Layer transparency adjustment

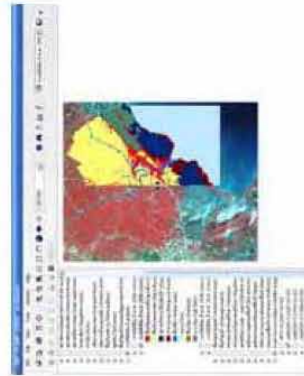
Select layer by click to "Layer List" from "Layer Effects Toolbars", then click "Transparency" tool to adjust by hanging mouse at transparency bar and move up to increase or move down to decrease layer transparency.



30

2) Swipe Layer – Manage hidden layer




Select layer by click to "Layer List" from "Layer Effects Toolbars", then click "Swipe Layer" tool to move a selected layer by hanging mouse and move up/down or left/right.



31

16. Graphic Drawing on the Map

User can draw a graphic to highlight an interested data on the map to use for another propose such as report or presentation. In order to labeling on the map, click "Markup Toolbars" to mark any figure by following tools:

-  Pen – Graphic drawing on the map
-  Highlighter – Graphic highlighting on the map
-  Eraser – Delete graphic on the map

32

17. Map Exportation

- User can export mapping data to picture as Bitmap Files (*.bmp) to use for report or presentation by click to menu "File > Export Map". Then browse and save file location, put the file name, and click to save data.
- While exporting map in "Data View" window, it will export data display in "Data View" only. Similarly, while exporting map in "Layout View" window, it will export full map.



93

18. Map Printing

- User can print out map by click menu "File > Page Setup" to define paper size and click .



94

- After that, click menu "File > Print" to define printer properties and click .
- While printing map in "Data View" window, it will print data display in "Data View" only. Similarly, while printing map in "Layout View" window, it will print full map.



95

2.11 Session 11: Workshop 1-2: How to Provide Area-Based Information on PEQMP (1) (Workshop using ArcMap)

Session 11

Workshop: How to create Water Quality Monitoring Station Map

1

ArcMap Components

2

Required layers and its characteristics

Layer Name	File Name	Layer Type	Join	Data Filtering	Type of Symbol	Label
* Water Quality Monitoring Station	watqrqt	Point	* Relates * Joins	-	* Single symbol	* Name of Water Quality Monitoring Station
Province	province_p	Point	-	-	Single symbol	Name of Province
Amphoe	amphoe_p	Point	-	-	Single symbol	Name of Amphoe
Boundary	polubdy_l	Line	Joins	-	Unique values	-
Transportation	trans	Line	Joins	* Main road, railway	* Unique values	-
River	stream	Line	Joins	Main river	Single symbol	River's name
Water body	wtr_body	Polygon	Joins	Water body	Single symbol	-

1) All layers have been done. Only " " is prepared for the trainees.
2) Source file [D:\ne\PEQMP\GIS Database\SXP PEQMP\GIS Database\GISData\Shapefile

3

Open ArcMap Documents


- Select "File > Open..."
- Then select targeted "ArcMap Documents"

* Source file of ArcMap Documents
[D:\ne\PEQMP\GIS Database\SXP PEQMP\GIS Database\SXP PEQMP\GIS Water Quality.mxd

4

Add Layer

- Select "File > Add Data..."
Then select targeted "Layer"

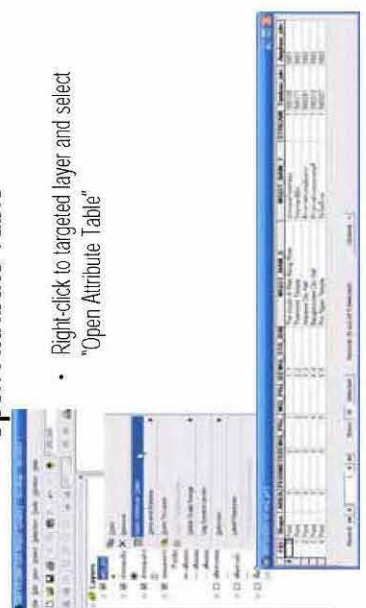


* Source file
[Drive]:\PECOMP GIS Database\SXP-PECOMP GIS Database\GISData\Shapefile\WQ_PPE\lwq_mf.shp

5

Open Attribute Table


- Right-click to targeted layer and select "Open Attribute Table"



6

Add Data Table & Lookup Table

- Select "File > Add Data..."
Then select targeted table

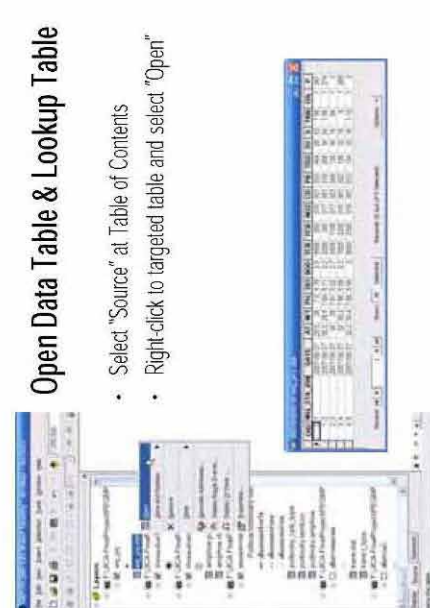


* Source file
[Drive]:\PECOMP GIS Database\SXP-PECOMP GIS Database\GISData\Shapefile\WQ_PPE\lwq_jpt.dat.dbf

7

Open Data Table & Lookup Table


- Select "Source" at Table of Contents
- Right-click to targeted table and select "Open"



8

Layer Properties

- Right-click to targeted layer and select "Properties"
- Layer Properties windows will display




The image shows two screenshots from an ArcGIS interface. The first screenshot shows a right-click context menu over a layer in the Table of Contents, with the 'Properties' option highlighted. The second screenshot shows the 'Layer Properties' dialog box, which has several tabs including 'General', 'Source', 'Scale Range', 'Display', and 'Advanced'. The 'General' tab is currently selected, showing the layer name and scale range settings.

9

Delete Layer

- Right-click to target layer in Table of Contents and select "Remove"

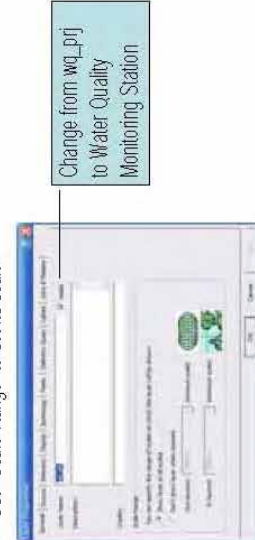


The image shows a screenshot of the ArcGIS Table of Contents. A right-click context menu is open over a layer, and the 'Remove' option is selected. This action will delete the layer from the map.

10

Layer Name and its Scale

- Select "General" in Layer Properties
- Layer can be renamed in Layer Name
- Use "Scale Range" to set its scale

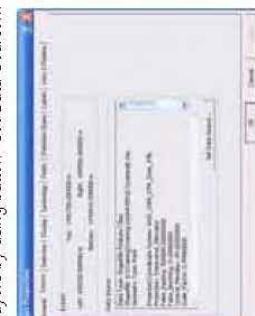


The image shows the 'Layer Properties' dialog box with the 'General' tab selected. A callout box points to the 'Layer Name' field, which contains 'wq_pij'. Another callout box points to the 'Scale Range' section, which is set to 'None'. The dialog box also shows the 'Source' and 'Advanced' tabs.

11

Show details of each layer

- Select "Source" in Layer Properties
- Details of the layer is shown in this window
- Select another layers by using button "Set Data Source..."




The image shows the 'Source' dialog box in ArcGIS. This dialog box allows users to view and modify the data source for a layer. It includes fields for the layer name, data source path, and a 'Set Data Source...' button to select a different layer.

12

Set symbol for display

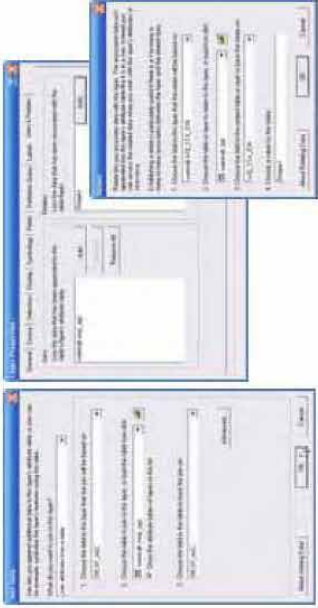
- Select "Selection" in Layer Properties
- Symbol for display can be set in the form of symbol and color



13

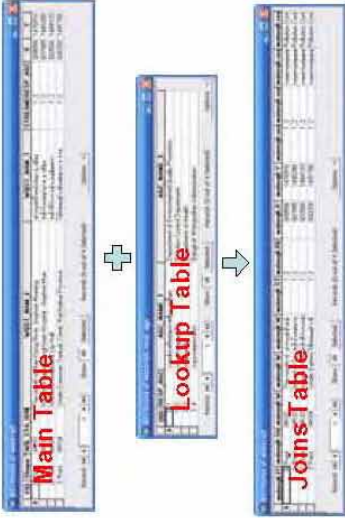
Joins & Relates Table

- Select "Joins & Relates" in Layer Properties
- Click "Add" to define conditions to be related (see the pattern of relation from Data Dictionary)




14

- **Joins:** Put "Lookup Table" which related to "Main Table" behind



15

- **Relates:** Link data between "Main Table" and "Data Table"
- After finished Relates, the user can start the processing by select menu "Option" from Main Table, then select "Related Tables" and the relation created by user earlier



16

Format of table to be displayed

- Select "Fields" in Layer Properties
- Define format of table to be displayed



17

Map Tips, Transparent and Hyperlinks

- Select "Display" in Layer Properties
- Define "Map Tips" (be displayed when put mouse on the map) use Fields bar to show Primary Display Field
- Define Transparent of the layer by input % transparent
- Set Hyperlink to link to other documents, URL or Macro



18

Set label of each layer for map display

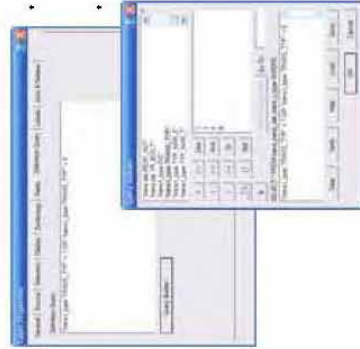
- Select "Labels" in Layer Properties
- Select "Field" to be used for Label and design its format.



19

Definition Query

- Select "Definition Query" in Layer Properties
- Set conditions for data to be displayed. The user can select data to be displayed by applying Query Builder tool and using SQL Command



20

Set symbol for each layer

- Select "Symbology" bar in Layer Properties
- Select required format in "Show"
- Set symbol's characteristics in "Symbol"



21

Symbol Format

- "Single Symbol" represented all data
- Categories - Unique values of each data (each Feature) be displayed by different symbols
- Quantities – each symbol shown different size of data e.g. using shading color for various data range or using different sizes of symbol for different quantity of data
- Charts
- Multiple Attributes

22

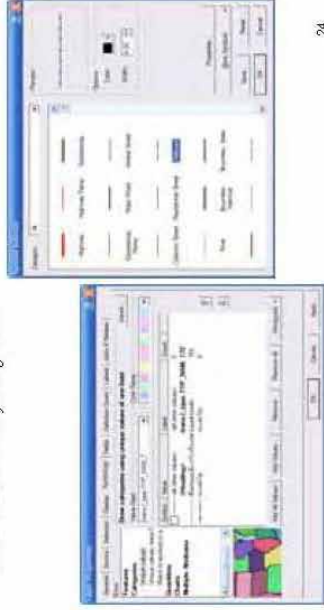
Symbol characteristics

- For Single Symbol click "Symbol" to select format and its characteristic
- On Symbol Selector Window, the user can select Properties to set more details characteristics and add more symbols from "More Symbols"



23

- For Unique values, select "Value Field" which be used for symbol
- Double-click to "Symbol" to select format and its characteristic
- User can rename it by using "Label"




24

How to create and print map

25

Map Components

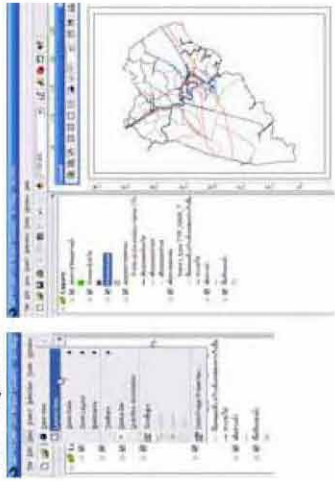
- Data Frame
- Title
- Legend
- North Arrow
- Scale Bar
- Scale Text
- Picture, Text and Neatline
- Reference Grids



26

Layout View


- ArcGIS can be used for create map by go to Layout View and click to "View > Layout View"




27

Display Toolbars in Layout View


Use "Map Scale" for display map in required scale



Standard Tool can be used to define display area of map in Layout View




Layout Toolbars can be used for display and printing map



28

Page Set Up

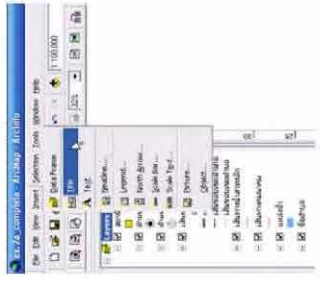
Page set up of map is available at
File > Page and Print Setup



29

Input Map Components

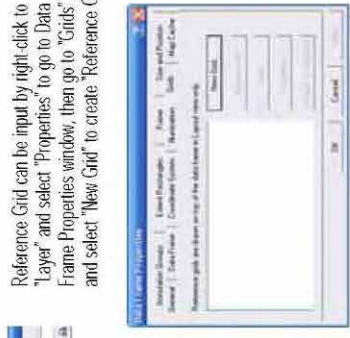
Map components can be input by
using menu "Insert"



30

Input Reference Grid

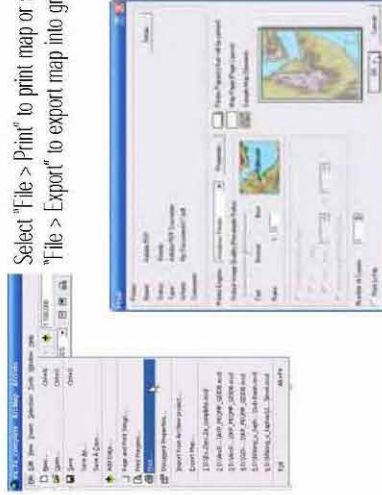
Reference Grid can be input by right-click to
"Layer" and select "Properties" to go to Data
Frame Properties window, then go to "Grids" bar
and select "New Grid" to create "Reference Grids"



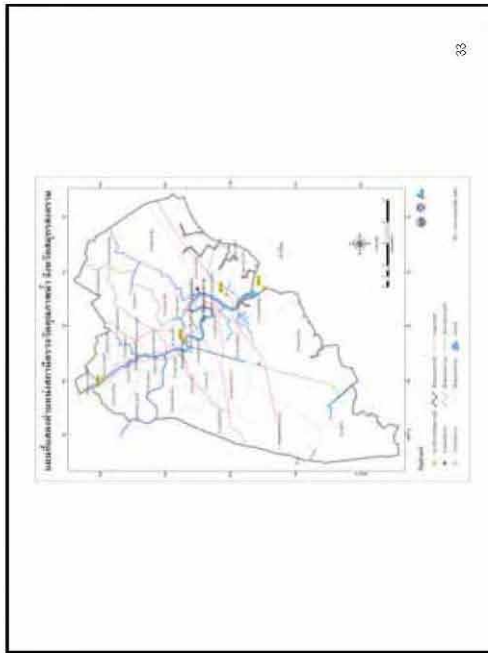
31

Printing Map

Select "File > Print" to print map or select
"File > Export" to export map into graphic



32



2.12 Session 12: How to Provide Area-Based Information on PEQMP (2)

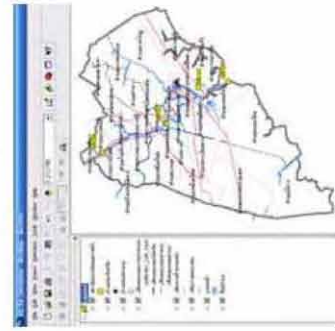
Session 12

How to create Published Map Documents from ArcMap and presented by ArcReader

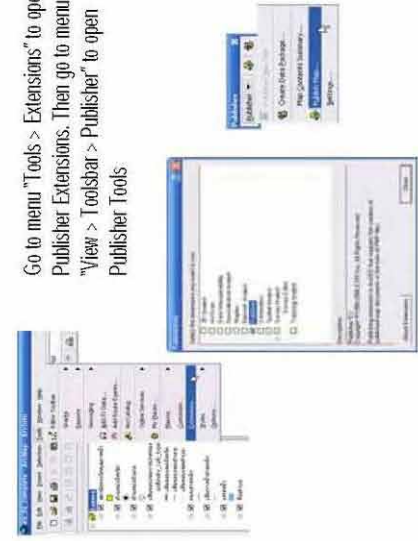
ArcReader

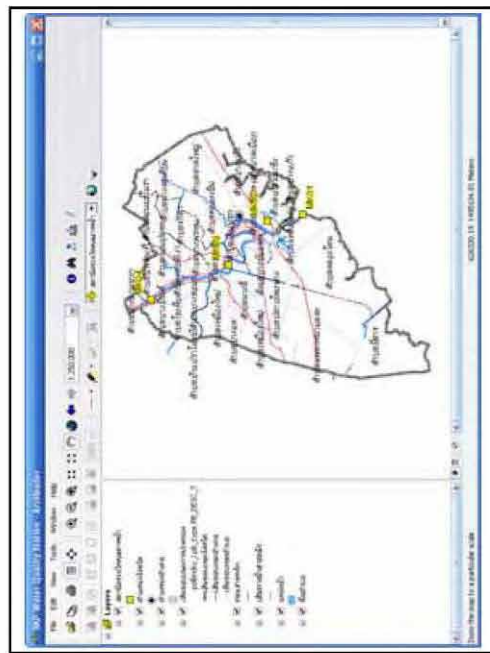
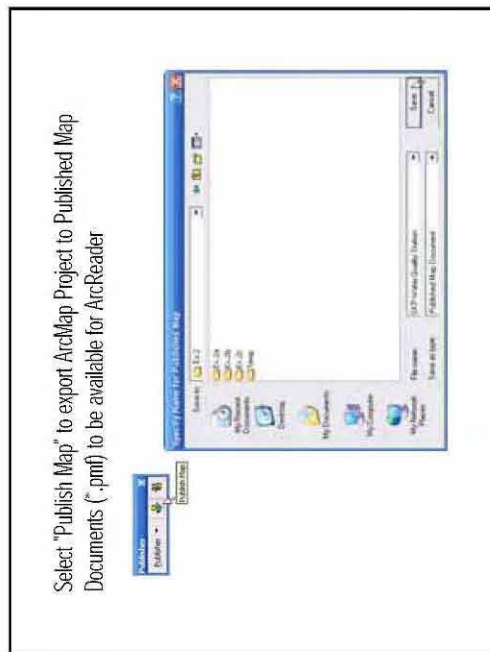
ArcReader is an application program for map display, attribute data viewing, and Published Map Documents (*.pmf) printing. This program is based on ArcGIS with ArcPublisher Extension using. ArcReader is available for free to download.

Define data and map format to be displayed by using ArcReader in ArcMap Project



Go to menu "Tools > Extensions" to open Publisher Extensions. Then go to menu "View > Toolbar > Publisher" to open Publisher Tools





2.13 Session 13: Background, Objectives, and Procedures of Day 3 Workshop

Session 13

Objectives and Procedure of Day 3 Workshop

June 20, 2008
ONEP and JICA Study Team
The Study on Supporting System for
Administrations on Natural Resources and
Environmental Management

Objectives of Day 3 Workshop

1. To understand REO duty on supporting PEQMP-KPI to be done by PEO
2. To exchange opinions to complete the tools (2 manuals) as a revised PEQMP-KPI Manual for the revision of submitted PEQMP-KPI

Procedure of the Workshop

1. Group Discussion: 2 groups

Group 1: ONEP, REO 6, PEO/AYP, PEO/Samut Prakarn, PEO/Ang Thong, PEO/Nonthaburi

Group 2: ONEP, REO 8, PEO/SKP, PEO/Ratchaburi, PEO/Prachuap Kiri Khan, PEO/Petchaburi, PEO/Kanchanaburi

2. Procedure of the Workshop

Workshop 2-1: How to use NREM GIS database for PEQMP-KPI

Contents of Discussion

- ◊ How to use NREM GIS database on planning the natural resources and environmental management
 - How to select appropriate layer for each plan
- ◊ Opinions and suggestions on using GIS database for PEQMP-KPI (questionnaire)

2. Procedure of the Workshop (Cont'd)

Workshop 2-2: Brainstorming and Suggestion on PEQMP-KPI

Contents of Discussion:

- ∅ Opinions and Suggestions on Improvement of PEQMP-KPI Manual
- ∅ Opinions and Suggestions on Public Participation Methods for NREM

2. Procedure of the Workshop

3. Representative of each group shall present conclusion of discussions on the Workshop 2-1 and Workshop 2-2

Thank you!



2.14 Session 14: How REO can Support PEO in Formulating PEQMP-KPI

Session 14
Roles of Regional Environmental Office (REO) in Supporting the Formulation of PEQMP-KPI
20th June 2008
Napaporn Witsawakul
REO

Sections within REO


- Environmental Planning Section
- Environmental Monitoring and Controlling Section
- Environmental Quality Analyzing Section
- Promoting and Public Relations Section
- Environmental Information Section

Environmental Planning Section

- Advise the formulation of PEQMP-KPI
- Review plans/projects/annual budget proposals
- Provide technical advices/recommendations and environmental measures + Support and increase capacity in environmental management
- Provide consultants/experts



Environmental Monitoring and Controlling Section

- Provide technical advices/recommendations and environmental measures + Support and increase capacity of environmental management
- Advise and participate in examining complaints
- Provide consultants/experts





Environmental Quality Analyzing Section

- Provide technical advices for environmental quality analysis
- Cooperate in environmental quality analysis
- Provide consultants/ experts





Parameters

pH BOD COD TP NH₃-N FCB
TDS SS TS TCB TKN Cl₂
Fat,Oil and Grease Hardness
TKN Mn Zn Pb Cu Cr Cd Ni



Promoting and Public Relations Section

- Provide training/ environmental knowledge to target groups
- Advise training
- Provide consultants/ experts and public relations media
- Support the establishment of environmental network




Environmental Information Section

- Provide environmental information services to support natural resources and environmental management
- Act as regional network center for NRE GIS
- Provide training on computer/ programs operating
- Provide services to general public



GIS Service Centers


- REO 6 Nonthaburi (24 Hours)
<http://reo06.envicluster.deqp.go.th>
- REO 8 Ratchaburi (Office Hours)
<http://reo08.envicluster.deqp.go.th>
- DEQP (24 Hours)
<http://qis.envicluster.deqp.go.th>



Available Database

1. Resources:


- Boundary, Infrastructure, Geography,
- Climate, Mineral resources, Land use,
- Land/ soil resources, Water resources,
- Forest, Marine and coastal resources,
- Cultural/ tourism assets



Available Database

2. NRE Sector Information:

Fish farms, Discharge water, Noise, Locations of sewer, Cremations, Land development, Pig farms, Junk shops, Old power plants, Rubber tree plantations, Seawater quality monitoring stations, Rock salt, Surface water quality, Air quality, Incinerators, Ores boat ports, sand pits, Community wastewater treatment systems, Slaughterhouses, Community solid waste disposal sites, Rock crushing factories, Industrial estates/ factories, Building type A. (Building or cluster of buildings that provide over 500 bedrooms or space over 25,000 sq.m. e.g. hotel, school, mall)



Contact



- **REO 6 Nonthaburi**
Tel.02-968-8064 Fax 02-968-8062
<http://www.reo06.net>
E-mail: reo06@mnre.go.th
- **REO 8 Ratchaburi**
Tel.032-315-395 Fax 032-315-044
<http://www.reo08.mnre.go.th>
E-mail: reo08@mnre.go.th

2.15 Session 15: Workshop 2-1: Discussion on How to Use NREM GIS Database for PEQMP-KPI

Session 15

Group Discussion 2-1
**How to use NREM GIS database
for PEQMP-KPI**



June 20, 2008
ONEP and JICA Study Team
The Study on Supporting System for
Administrations on Natural Resources and
Environmental Management



**"How to use NREM GIS database
for PEQMP-KPI?"**

Question 1
How to use NREM GIS database for Provincial Natural
Resources and Environmental Planning?

Question 2
Which Layers can be used in Natural Resources and
Environmental Planning?





**How to use NREM GIS database
for PEQMP-KPI**

Example: Solid waste disposal site selection

Important Layers

1. Cultural Heritage and Tourist
2. Hospital
3. School
4. Well
5. Water Purification Plant





**How to use NREM GIS database
for PEQMP**

Example: Solid waste disposal site selection

Important Layers (Cont'd)

6. Land use
7. Municipalities
8. Elevation
9. Geology
10. Ramsar Wetland Site
11. Watershed Class








How to use NREM GIS database for PEQMP

Exercise

1. Create a work plan for safe and quality water supply
2. Create a work plan for disaster prevention and mitigation
3. Create a work plan for water quality preservation in public water bodies



Thank you!



2.16 Session 16: Workshop 2-2: Discussion on Suggestions for Improvement of PEQMP-KPI Manual and Selecting Suitable Public Participation Methods for NREM

Session 16

Group Discussion 2-2
Brainstorming and Suggestion
on PEQMP-KPI

June 20, 2008
ONEP and JICA Study Team

The Study on Supporting System for
Administrations on Natural Resources and
Environmental Management

Contents of 2-2

1. Opinions and Suggestions on Improvement of PEQMP-KPI Manual
2. Opinions and Suggestions on Public Participation Methods for NREM

1. Opinions and suggestions on improvement of PEQMP-KPI Manual

Contents of the Manual:

1. Basic Data of the Province
2. Situation and Issues of Natural Resources and Environment of the Province
3. Summary of Situation and Issues of Natural Resources and Environment of the Province
4. Priority Setting of Issues

1. Opinions and suggestions on improvement of PEQMP Manual

Contents of the Manual (Cont'd)

5. Provincial Potential Analysis by SWOT Analysis
6. Priority Projects Selection
7. Details of PEQMP-KPI
8. Details of Priority Projects

2. Opinions and suggestions on public participation methods for NREM

Contents of Discussion:

- 1. Initial Condition of Public Participation**
- 2. Procedures for Public Participation in PEQMP-KPI**
- 3. Procedures for Target Group Selection**
- 4. Appropriateness of Questionnaire**
- 5. Procedures for Questionnaire Data Analysis**
- 6. Reflection of Stakeholder Opinions into PEQMP-KPI**

Thank you!



2.17 Session 17: Workshop 2-3: Presentation on Discussion Results

(No slides)

3 Feedback by Participants

Feedback by participants took two forms: discussion results presented in Session 17, and two questionnaires.

3.1 Discussion Results Presented in Session 17

Discussions were held in two groups, PEO under REO6, and PEO under REO8, in Sessions 15 and 16 (Workshops 2-1 and 2-2) on the third day.

3.1.1 Presentation 1: Responses to Suggestions for Improvement to the PEQMP-KPI Manual

Content of PEQMP-KPI	PEO under REO 6 (Nonthaburi)	PEO under REO 8 (Ratchaburi)
Part 2 1) Basic Data of Province	- Should provide <u>Future Population & Economic Forecast</u>	- Should provide <u>Future Population & Economic Forecast</u>
2) Situation of NRE of Province	- Should provide <u>a complete analysis</u> for each sector. Lack of area-based information is the main issue to be solved, because unclear/incomplete information may lead to the error of analysis.	<ul style="list-style-type: none"> - Should indicate the source of data in the report, particularly on wildlife and biodiversity, since many people have no idea where to find trustworthy data source. - Some databases for NREM are not available, e.g. forest fire, potential land slide areas. - The Study Team should provide "data source" referred to this Study as an example. - Due to the limitation of human resources and capability of staff in PEO, data processing and analysis is considered to be beyond the PEO's capacity. Support from REO should be considered. - Adding column "<u>measure to be taken</u>" in Table 20 is acceptable. - After completion of the Study, ONEP should publish the PEQMP of 2 model provinces (CD, website) to other PEO use as a guideline.

Content of PEQMP-KPI	PEO under REO 6 (Nonthaburi)	PEO under REO 8 (Ratchaburi)
3) Analysis of Current Issues & Impacts from Socio-economic Development	- No comment	- The <u>vision diagram</u> recommended by the Study Team takes too much time and too many experts to create. Instead, the province should simply use "environmental strategy" under "province strategy" as direction for NREM in the province.
4) Priority Setting of Issues	- <u>Issues that should be solved by the target year of PEQMP-KPI</u> should be presented as budget is limited. - In terms of priority ranking, "Natural resources" and "Environment" should be analyzed separately.	- <u>Opinion survey</u> is the best way to grasp actual situation that reflect the needs of people in the province. Some budget should be allocated to hire local students and conduct this survey periodically (every 4 years).
5) SWOT Analysis	- No comment	- Many officials do not know how to use data from SWOT analysis for the formulation of PEQMP.
6) Preventive Measures and Solution for Problems	- No comment	- Present only <u>priority issues</u> discussed in 4) is acceptable. - Each department in MNRE should have master plan of each NRE under their responsibility. PEO should participate in the process of the study of these master plans since they work in the area. The master plans should be disseminated to all related PEO.
Part 3 Details of the PEQMP	- Providing details of <u>the priority programs</u> by using a <u>PDM format</u> is acceptable. Since this method is new, intensive training course for officials in charged is necessary.	- Providing details of <u>the priority programs</u> by using a <u>PDM format</u> is acceptable. Since this method is new, intensive training course for officials in charged is necessary.

Additional Comments on this topic was given on Day 1 by PEO Karnchanaburi:

- Professional/specialist government staff working in different fields should have come together to formulate PEQMP, but some responsible agencies did not cooperate.
- Some responsible agencies did not send their professional/specialist staff to public participation sessions during the formulation of PEQMP, and in some cases even assigned a driver to attend, when no one else was available.
- PEO staffs have difficulty in grouping projects into larger programs, although they have been trained in SWOT analysis and other methods.

- When LAs appeal directly to the governor, or when governor initiates a project that is not in the PEQMP, the PEO must follow the governor's direction.

3.1.2 Presentation 2: Responses to Suggestions on Selecting a Suitable Public Participation Method

Method	PEO under REO 6 (Nonthaburi)	PEO under REO 8 (Ratchaburi)
Set up of PEQMP formulation Committee	- No comment	<ul style="list-style-type: none"> - Some agencies assigned non-NREM officials to attend the meeting. Many had no comments about the PEQMP, and the responsibility came down to PEO. - More than one official from each concerned agency should be appointed in the committee.
Collection of NRE information	<p>- The result of an annual survey, conducted by the Community Development Department (MOI) should be used. The survey gives basic indicators for quality of life, and some are NREM-related.</p> <p><i>Examples:</i></p> <p><i>Indicator 15 – Resident has sufficient safe drinking water (all year).</i></p> <p><i>Indicator 16 – Resident has enough consuming water.</i></p> <p><i>Indicator 17 – Resident lives in healthy environment.</i></p> <p><i>Indicator 18 – Resident has not been annoyed by pollution.</i></p>	- No comment
Opinion Survey for Stakeholders	- The result of survey may differ among each targeted group. This is because people think only about what they need, and those problems may not reflect the actual situation in the area. So, before the formulation of PEQMP, all stakeholders should be clearly identified, and familiarized about the PEQMP process through several meetings, to make sure that all of them have the same background.	<ul style="list-style-type: none"> - The government should allocate budget for conducting opinion survey every 4 years. The survey should be done by local students. - The questionnaire should be adjusted based on the user's requirement.

Method	PEO under REO 6 (Nonthaburi)	PEO under REO 8 (Ratchaburi)
Posting of draft PEQMP	- No comment	- It is possible for PEO to publish PEQMP via website or billboard if they have enough time and human resources. - The study team should make an outline content to indicate what topics should be published as an example.
Holding seminars to collect opinions on draft PEQMP	- No comment	- Two seminars should be enough to collect opinions from stakeholders. Local reporters should be invited to the seminars.
Open/post PEQMP to the public	- No comment	- Using running subtitles on cable TV is an effective way to disseminate PEQMP to the public.

Additional Comments on this topic was given on Day 1 by PEO Karnchanaburi:

- All comments received in the opinion survey – PEO should go to the field sometime, environmental data center should be established, etc. – are interesting and useful. However, it cannot be easily done due to the lack of human resources of PEO. The re-structuring of concerned agencies under MNRE should be considered to solve these problems.
- High-ranking officials, like provincial governors, should be further educated about the importance of NREM.

3.1.3 Summary of Discussion Results

Participants generally agreed to the suggestions made by the Study Team and counterparts on the improvement of the PEQMP-KPI Manual.

When looked at in detail, some suggestions were rejected as too taxing on resources and alternatives were suggested, and some new improvements were suggested:

Content of PEQMP-KPI	Rejected suggestion...	... and Alternative	Additional Improvements and Suggestions
Part 2 1) Basic Data of Province	None		
2) Situation of NRE of Province	None		<ul style="list-style-type: none"> • Cite data source. • Require REO support.
3) Analysis of Current Issues & Impacts from Socio-economic Development	Visions and Goals diagram.	Use 'Environmental Strategy' from 'Provincial Strategy'.	
4) Priority Setting of Issues	None		<ul style="list-style-type: none"> • Rank priority of NR and E separately. • Make opinion survey a requirement and allocate budget.
5) SWOT Analysis	None		

6) Preventive Measures and Solution for Problems	None		<ul style="list-style-type: none"> • Make sector master plans available to PEO level.
Part 3 Details of the PEQMP	None		<ul style="list-style-type: none"> • Additional training for use of PDM.

Related to this topic, a participant described the difficulties faced by PEO in PEQMP-KPI formulation, where other provincial NREM agencies sent inappropriate staff to the Formulation Committee, made inadequate contributions to the discussion. This participant also pointed out that the PEQMP can still be overruled by governor intervention during its implementation.

The participants also generally agreed to suggestions made about improved public participation methods, and made the following suggestions.

Method	Rejected suggestion...	... and Alternative	Additional Improvements and Suggestions
Set up of PEQMP formulation Committee	None		<ul style="list-style-type: none"> • Appoint more than one person per NREM agency.
Collection of NRE information	None		<ul style="list-style-type: none"> • Use Quality of Life indicators.
Opinion Survey for Stakeholders	None		<ul style="list-style-type: none"> • Use local students and conduct every 4 years. • Familiarize the subjects of the survey to the PEQMP process first, in order to weed out self-serving answers.
Posting of draft PEQMP	Some reservation on posting complete PEQMP	Study Team should indicate which part should be posted	<ul style="list-style-type: none"> • Posting on websites is also possible.
Holding seminars to collect opinions on draft PEQMP	The number of seminars	Two seminars are enough	
Open/post PEQMP to the public	None		<ul style="list-style-type: none"> • Use running subtitles on cable TV.

3.2 Results of the Questionnaire

Note that answers to the questionnaire were collected anonymously.

3.2.1 Questionnaire on the Formulation of PEQMP-KPI

a. Questionnaire Form

Question on Formulation of PEQMP-KPI		
1 Question on Formulation of PEQMP-KPI		
Q.1.1. What is the most serious problem that you faced when formulating PEQMP-KPI submitted in 2007?		
Q.1.2. What kind of supports you need from the following organizations for revision of PEQMP-KPI submitted?		
Organizations	Supports	
1. MNRE		
2. Changwat		
3. REO		
4. Others (Specify)		
Q.1.3. Does your province have master plans at provincial level for the following NREM sectors? (Please give us your answer by ticking YES or NO column.)		
NREM Sector	Yes	No
1. Natural Resources		
1.1 Soil and Land Resources		
1.2 Forest Resources and Wildlife		
1.3 Water Resources		
1.4 Mineral Resources		
1.5 Marine and Coastal Resources		
1.6 Biodiversity		
2. Environment		
2.1 Water Quality		
2.2 Air Quality		
2.3 Noise and Vibration		
2.4 Solid Waste		
2.5 Hazardous Waste and Toxic Substances		
2.6 Urban Environment		
2.7 Natural and Cultural Assets		
1		

Q.1.4. What kinds of organization shall formulate a master plan at provincial level for each NREM sector? (Please give us your answer in the column of "Responsible Organizations")

NREM Sector	Responsible Organizations
1. Natural Resources	
1.1 Soil and Land Resources	
1.2 Forest Resources and Wildlife	
1.3 Water Resources	
1.4 Mineral Resources	
1.5 Marine and Coastal Resources	
1.6 Biodiversity	
2. Environment	
2.1 Water Quality	
2.2 Air Quality	
2.3 Noise and Vibration	
2.4 Solid Waste	
2.5 Hazardous Waste and Toxic Substances	
2.6 Urban Environment	
2.7 Natural and Cultural Assets	

2 Others

Q.2.1. What are the serious problems that you are facing for your daily work?

Q.2.2. What kind of supports you need from the following organizations for you to establish a proper NREM in your province?

Organizations	Supports
1. MNRE	
2. Changwat	
3. REO	
4. Others (Specify)	

b. Answers to the Questionnaire

1. Question on Formulation of PEQMP-KPI

1.1 What is the most serious problem that you faced when formulating PEQMP-KPI submitted in 2007?

No.	Answers	No. of Response	%
1	Collecting basic information/ projects from various organizations	2	25
2	Knowledge and understanding of how to formulate PEQMP-KPI	2	25
3	Limitation of time to collect and analyze data	1	12.5
4	Managerial level do not pay attention	1	12.5
5	Lack of staff	1	12.5
6	Lack of budget	1	12.5
Total		8	100

1.2 What kind of support do you need from the following organizations for revision of submitted PEQMP-KPI?

Organizations	No.	Answers	No. of Response	%
MNRE	1	Provide supporting staff	2	8
	2	Budget, equipments, tools, GIS training	2	8
	3	Update data from various departments/ divisions (central government)	2	8
	4	Cooperation/ support the collection and preparation of provincial data	1	4
	5	Strengthen PEO capacity	1	4
Province	1	Cooperation in the planning formulation process	3	13
	2	Budget	2	8
	3	Cooperation/ support the collection and preparation of provincial data	1	4
	4	Information of related projects	1	4
REO	1	Provide data on current situation and issue of the province	3	13
	2	Cooperation/ support the collection and preparation of provincial data	1	4
	3	Provide assistances and advises	1	4
	4	Take part in the formulation	1	4
	5	GIS data	1	4
	6	Provide techniques and IT experts	1	4
Others: LAs	1	Cooperation in formulating the plan	1	4
Total			24	100

1.3 Does your province have master plans at provincial level for the following NREM sectors?

1	Natural Resources	Yes	%	No	%
1.1	Soil and Land Resources	2	25.0	6	75.0
1.2	Forest Resources and Wildlife	1	12.5	7	87.5
1.3	Water Resources	3	37.5	5	62.5
1.4	Mineral Resources	1	12.5	7	87.5
1.5	Marine and Coastal Resources	1	12.5	7	87.5
1.6	Biodiversity	1	12.5	7	87.5

2	Environment	Yes	%	No	%
2.1	Water Quality	2	25.0	6	75.0
2.2	Air Quality	1	12.5	7	87.5
2.3	Noise and Vibration	0	0.0	8	100.0
2.4	Solid Waste	4	50.0	4	50.0
2.5	Hazardous Waste and Toxic Substances	1	12.5	7	87.5
2.6	Urban Environment	2	25.0	6	75.0
2.7	Natural and Cultural Assets	3	37.5	5	62.5

1.4 In your opinion, what organization should formulate provincial-level master plans in the following NREM sectors?

1	Natural Resources	No.	Responsible Organizations	No. of Response
1.1	Soil and Land Resources	1	Dept. of Land Development	6
		2	Provincial Land Development Office	2
		3	Agricultural Land Reform Office	2
		4	Dept. of Lands	2
		5	Provincial Lands Office	1
		6	PEO working with REO	1
1.2	Forest Resources and Wildlife	1	National Park, Wildlife & Plant Conservation Dept.	6
		2	Royal Forest Department	4
		3	PEO	2
		4	PEO working with REO	1
1.3	Water Resources	1	Dept. of Water Resources	7
		2	PEO working with REO	1
		3	Regional Water Resources Office	1
		4	Dept. of Ground Water Resources	1
		5	Provincial Irrigation Office	1
1.4	Mineral Resources	1	Dept. of Mineral Resources	8
		2	DIW	1
		3	PEO working with REO	1
1.5	Marine and Coastal Resources	1	Dept. of Marine and Coastal Resources	5
		2	PEO working with REO	1
		3	Regional Marine and Coastal Resources Office	1
		4	Dept. of Fisheries	1
		5	ONEP	1
		6	PEO	1
1.6	Biodiversity	1	ONEP	4
		2	PEO	2
		3	PEO working with REO	1
		4	Office of Permanent Secretary	1

2.	Environment	No.	Responsible Organizations	No. of Response
2.1	Water Quality	1	PCD	4
		2	PEO	2
		3	PEO working with REO	1
		4	PAO	1
		5	REO	1
		6	DIW	1
		7	ONEP	1

2.2	Air Quality	1	PCD	5
		2	PEO	2
		3	PEO working with REO	1
		4	PAO	1
		5	DIW	1
		6	ONEP	1
2.3	Noise and Vibration	1	PCD	5
		2	PEO	2
		3	PEO working with REO	1
		4	PAO	1
		5	DIW	1
		6	ONEP	1
2.4	Solid Waste	1	PCD	4
		2	PEO	2
		3	PAO	2
		4	PEO working with REO	1
		5	DIW	1
		6	ONEP	1
2.5	Hazardous Waster and Toxic Substances	1	PCD	5
		2	DIW	2
		3	PEO	2
		4	PEO working with REO	1
		5	PAO	1
		6	ONEP	1
2.6	Urban Environment	1	ONEP	4
		2	Dept. of Public Works	3
		3	PEO working with REO	1
		4	PAO	1
		5	PEO	1
2.7	Natural and Cultural Assets	1	ONEP	5
		2	PEO	2
		3	PEO working with REO	1
		4	PAO	1
		5	Cultural Conservation Division	1
		6	Provincial Cultural Office	1

2. Others

What are the serious problems that you are facing in your daily work?

No.	Answers	No. of Response	%
1	PEO has tremendous work, lack of staff, lack of time	4	57
2	Internet/ slow network connection	1	14
3	No legal officer to deal with complaints	1	14
4	Budget	1	14
Total		7	100

What kind of support do you need from the following organizations for you to establish proper NREM in your province?

Organizations	No.	Answers	No. of Response
MNRE	1	Budget	4
	2	Provide staff to support the formulation of the plan	3
	3	Legal issues, laws	1
	4	Improve organizational administration	1
	5	Encouragement	1
	6	Equipments, tools	1
	6	Update GIS data from different organizations	1
Province	1	Financial support	2
	2	Support the formulation of the plan	1
	3	Examining plans/ projects	1
	4	Working on finding resolution seriously and continuously	1
	5	Managerial level pays more attention	1
	6	Collect spatial data to improve database	1
REO	1	Being source of information to support operation	3
	2	Labs, equipments	2
	3	Complete GIS data	1
Other regional offices, e.g. Regional Water Resources Office, Regional Ground Water Office, District Forest Office, Administration of Conservation Area Office	1	Support the operations according to duties/ authorities specified in associated Acts	1
JICA	1	Spatial Analyst Extensions	1

c. Summary of Answers

The most serious problem the participants faced, in their experience of PEQMP-KPI formulation, was the shortage of time and organizational support from their own agency as well as other NREM agencies. A desire for more cooperation and additional information from all levels, from MNRE, PA (Changwat), and LAs was indicated.

Most provinces lacked provincial-level sector-based master plans in one or more sectors; the best statistic was in the Solid Waste Management sector, but even in SWM, only half of the participants said there was a provincial-level master plan.

Contrary to the Study Team's recommendations, however, most participants believed that master plans should be made by agencies other than PEO, i.e. NREM agencies from central and provincial administrations. The following table summarizes the answers to Question 1.4 (*column 2 indicates the total of 'PEO' and also by 'PEO working with REO'):

Sector	Provincial MP to be made by PEO*	Provincial MP to be made by other agency	Total Number of Answers	% who answered PEO
Soil and Land Resources	1	13	14	7%
Forest Resources and Wildlife	3	10	13	23%
Water Resources	1	10	11	9%
Mineral Resources	1	9	10	10%
Marine and Coastal Resources	2	8	10	20%
Biodiversity	3	5	8	38%
Water Quality	3	8	11	27%
Air Quality	3	8	11	27%
Noise and Vibration	3	8	11	27%
Solid Waste	3	8	11	27%
Hazardous Waste and Toxic Substances	3	9	12	25%
Urban Environment	2	8	10	20%
Natural and Cultural Assets	3	8	11	27%

3.2.2 Questionnaire on Using GIS to Support Formulation of PEQMP-KPI

a. Questionnaire Form

Questionnaire
Utilization of GIS database for Supporting the Formulation of
PEQMP

1. Did you use Area Based Information for the formulation of PEQMP (B.E. 2008-2011)?

If the answer is YES...

- How do you use GIS for NREM in your province?
- If you don't have GIS, how do you use Area Based Information in the planning process?

If the answer is NO...

- Why don't you use GIS for provincial NREM planning?

2. After the training, how might you use GIS to formulate PEQMP?

- And how might you use GIS to solve the priority issues in your province?

3. In your opinion, what are the constraints of using GIS for provincial NREM planning?

4. What kind of assistance do you want from central administration (including REO) to support the use of GIS for provincial NREM planning?

b. Answers to the Questionnaire

1. Did you use Area Based Information for the formulation of PEQMP (2008-2011)?

Answer	PEO	% of PEO	REO	% of REO
YES, we used area-based information	4	44%	4	100%
NO, we didn't use area-based information	5	56%	0	0%
Total	9	100%	4	100%

If the answer is "YES, we used area-based information"

1A: How did you use GIS for NREM in your province? (Multiple answers possible)

PEO Answer	PEO	% of PEO that answered 'YES' (n=4)
Support the formulation of PEQMP by pointing out the current issues in the province for considering of suitable management	2	50%
Use basic map and land use map from REO 8 for the formulation of PEQMP	1	25%
To present to other agencies in the meeting of PEQMP formulation. However, the existing data is not covering all areas	1	25%
To select target areas for the formulation of PEQMP	1	25%

REO Answer	REO	% of REO that answered 'YES' (n=4)
Environmental Information Section of REO 8 and DEQP provide GIS database which allow online accessibility to 11 natural resources layers and 23 environmental layers	1	25%
Support the implementation of NRE projects in the province	1	25%

1B: If you didn't have GIS, how did you use Area Based Information in the planning process?

PEO Answer	PEO	% of PEO who answered 'YES' (n=4)
Collect information from related organizations/agencies	2	50%

If the answer is "NO, we didn't use area-based information"

1C: Why didn't you use GIS for provincial NREM planning?

PEO Answer	PEO	% of PEO who answered 'NO' (n=5)
Insufficient data in the database	1	20%
GIS database is not available in the office	2	40%
No GIS software. Currently using map scale 1:50,000	1	20%
No budget and necessary equipments. Currently using an image photo for planning	1	20%

2. After this Training, how might you use the GIS to formulate PEQMP?

No.	Answer	PEO	REO	Total
1	To identify current situation, issues and changes of NRE in the province (e.g. satellite image to show the change of mangrove)	3	1	4
2	Improve NREM planning process	1	1	2
3	Improve site selection and NREM planning process	1	1	2
4	To decide priority area for NREM	1	0	1
5	To summarize the situation of NRE in the province and present to the governor and other agencies in the provincial meeting to be used for NRE planning in each sector	1	0	1
6	Adding some important locations in the database is possible but overlay process is too difficult due to lacking of skillful staff.	1	0	1
7	Use as information for area-based comparison to identify the situation, issues, changes and display as visual information, e.g. maps	0	1	1
8	No opinion, because the GIS databases demonstrated in the workshop is concerned with 2 model provinces only.	1	0	1

2A: Specifically, how might you use GIS to solve priority issues in your province?

No	Answer	Total
1	To show current situation and issues, e.g. trespassing, changing of areas, problems in communities/ villages	3
2	To determine priority site for improvement	2
3	Support managerial level + decision making process	2
4	Find resolution for specific areas	2
5	Information in the area can be collected easier	1
6	To learn which sector of NRE is facing problem	1
7	To provide analysis of situation, and to connect the situation to the solution	1
8	Add more data to database	1
9	Support priority plans/ projects	1
10	SKP: monitor aquatic population and biodiversity, waste disposal site selection project	1
11	Wastewater management; pinpoint pollution sources, water quality, rivers/ canals, polluted rivers/ canals, to plan and solve problems	1
12	At present, there is no budget to pursue the issue	1

**3. In your opinion, what is the constraint of using GIS for provincial NREM planning?
(Multiple answers possible)**

No.	Answers	PEO	REO
1	Capability of provincial GIS officers	2	
2	Limited budget, personnel, equipment	2	1
3	Capacity of computer for GIS processing	1	
3	Lack of data to be entered in the database, or existing data does not covering all NRE issues	3	2

4	Time consuming in collecting data, input & updating data in the database	2	1
5	Updating and utilization of GIS database	1	
6	The data should reliable and update	1	

4. What kind of assistance do you want from Central Administration (including REO) to support the use of GIS for provincial NREM planning? (Multiple answers possible)

No.	Answers	PEO	REO
1	Updating and utilization of GIS database for PEQMP formulation	2	0
2	REO should support the updating and collecting of information covering all NRE sectors, and provide such information to the provinces	3	0
3	Support the collection of basic information on NRE and pollution sources in the province and publish on website	1	0
4	Gather all existing GIS databases from related agencies and inform all provinces of what databases are available and where they can be found	0	1
5	ONEP (or any MNRE department) responsible for Area Based Information should exchange existing data more often, as the utilization of existing data is limited	0	1
6	Provide photo images and maps processed by GIS to PEO	1	0
7	Provide more budget, equipment and staff for REO and PEO	2	0
8	Allocate budget to PEO for outsourcing of the establishment of GIS database in their offices	1	0
9	MNRE should more seriously formulate supporting plan for the utilization of GIS database	0	1
10	Provide GIS training courses for PEO officials periodically	3	1
11	REO has already been supporting on the issue	1	0

c. Summary of Answers

Of the 9 PEO attending the Workshop, perhaps 7 PEO (2 who answered 1B and 5 who answered 1C: 78%) did not use GIS because they did not have GIS software/ hardware, or did not think the NREM GIS Database had useful data for them.

The following possible uses of GIS were understood by the participants.

Possible uses of GIS (from Q2)	PEO	% of total PEO answers (n=9)	REO	% of total REO answers (n=4)
Illustrate situation, issues (No. 1,5,7)	4	44%	2	50%
Planning (No. 2,3,4)	3	33%	2	50%
Presentation (No. 5, 7)	1	11%	1	25%
No opinion/ won't use (No. 6, 8)	1	11%	0	0%

However, when participants were asked to give specific examples (priority issues in which to use GIS), only two participants (most likely this Study's counterparts) were able to do so.

Not only the lack of equipment and skilled staff, but also the lack of appropriate data (i.e. up-to-date data covering all sectors) prevented participants from making full use of GIS.

Answers (from Q3)	PEO	% of total PEO (n=9)	REO	% of total REO (n=4)
Limited by lack of equipment, skilled staff, and budget (No. 1-3)*	5	56%	1	25%
Limited by lack of appropriate GIS data (No. 4-7)*	7	78%	3	75%

Most participants felt that that existing data needed to be better managed and organized by a central organization.

Answers (from Q4)	PEO	% of total PEO (n=9)	REO	% of total REO (n=4)
Updating data, collecting and organizing existing data (No. 1-6)*	7	78%	2	50%
Budgetary support for PEO/REO (No. 7)*	2	22%	0	0%
Budgetary support for outsourcing (No. 8)*	1	11%	0	0%
Training and organizational support (No. 9-11)	3	33%	2	50%