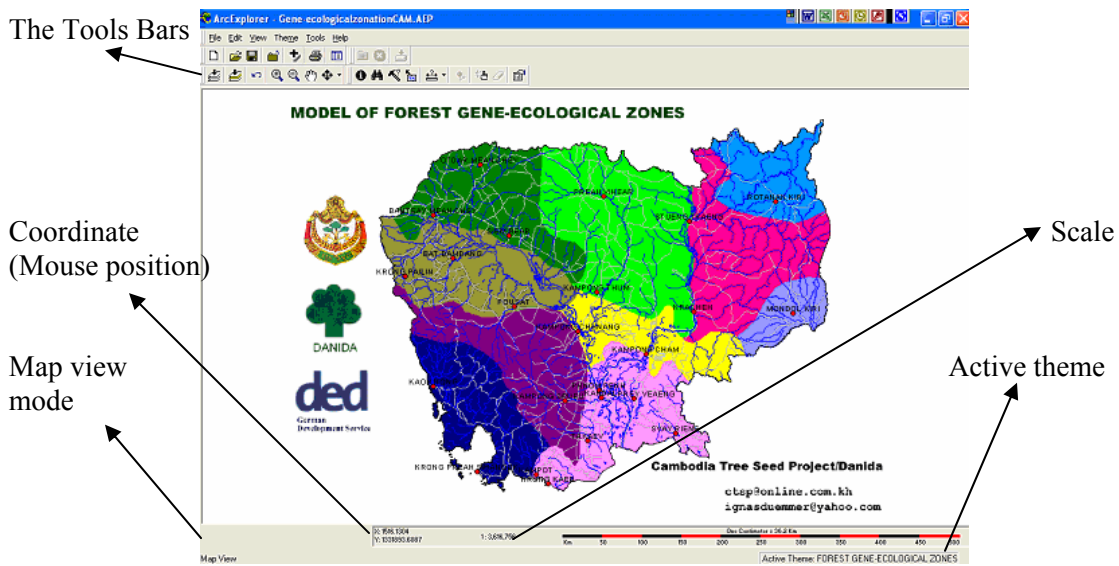



6. Use of Gene-Ecological Zonation Model

This model generates information about specific locations in Cambodia. The information of this system can be selected by using series of queries, and exported to Excel or visualized on a screen. Much of the information relates to maps, and can be accessed or printed out in this format. As noted in section 5, information regarding annual average rainfall (classes 200mm/600mm/average), length of dry seasons (4 month intervals), minimum temperature (lower of higher than 16.5 °C), soil fertility (low, medium and high fertility), geology (sand-siltstone, gneiss-schists, basalt, old/ new alluvium, complex mixture) and types of vegetation (agriculture land, shrub land, deciduous forest, evergreen forest, mangrove/inundated forest) can be investigated according to Provinces, Districts and Communes. There are a total of 8220 specified areas in the model.

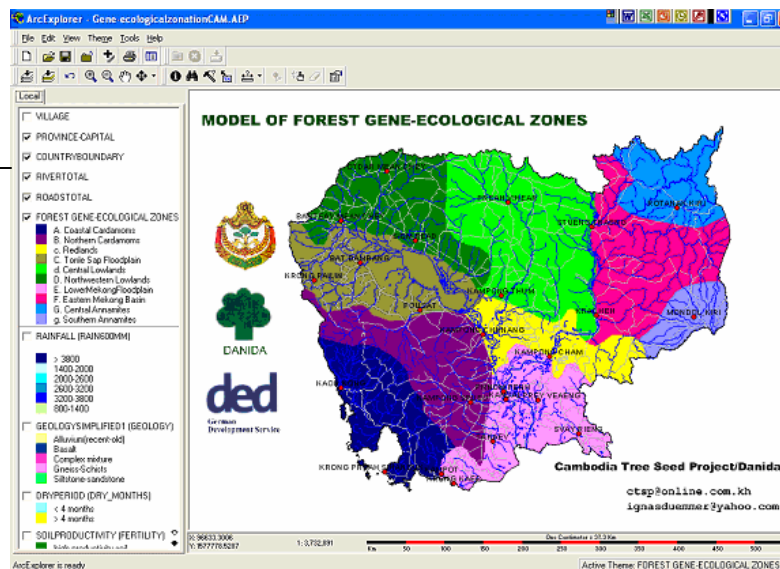


Screen 1. Map view mode of the Forest Gene-Ecological-zoness model.

The Map View mode is the section of the interface where you display, explore, query and analyze geographic data. The Tools Bars display buttons to generate a command. It allows for the use of standard tools, map tools, theme tools, and www tools. Coordinates are shown to the lower left bellow (in UTM, Indian Thailand). Details relating to the functions of the Tool Bars can be found in the help function within the ArcExplorer program.

Screen 2 displays the Explorer view mode (view, toggle legend), and allow the user to access maps that outline the gene-ecological zonation system. The model uses different features to visualize the maps, and the selection of one or more features is possible by using the query builder (the hammer symbol ) (**“A query expression is a precise definition of what you want to select”**).

Active theme ←



Screen 2: Explorer view mode of the Forest Gene-Ecological-zones model.

The following pages will discuss the three possible ways in which to select areas of interest:

- A. Selection of an area that employs the Query tool (🔍)
- B. Selection of areas based on coordinates using identify option (📍).
- C. Selection of areas based on tree specific characteristics (reports).

The feature/fields are as follows:

Name feature	Description	Comment
CODEKHUM	Commune unique number	(used for < and >)
CODESROK	District unique number	(used for < and >)
CODEDKHETt	Province unique number	(used for < and >)
COMMUNE	Commune name (in English)	
SROK	District name (in English)	
KHET_ENG	Province name (in English)	
DRY_MONTHS	Period of dry monts (more or less than 4 months)	Use = option in query buider
ECOZONE	Unique number gene-ecological zone	
ECO_ZONE	Name of gene-ecological zone	e.g. A. Coastal Cardamoms
FERTILITY	Low/medium/high productivity soil	
RAIN600mm	600 mm rain classes	

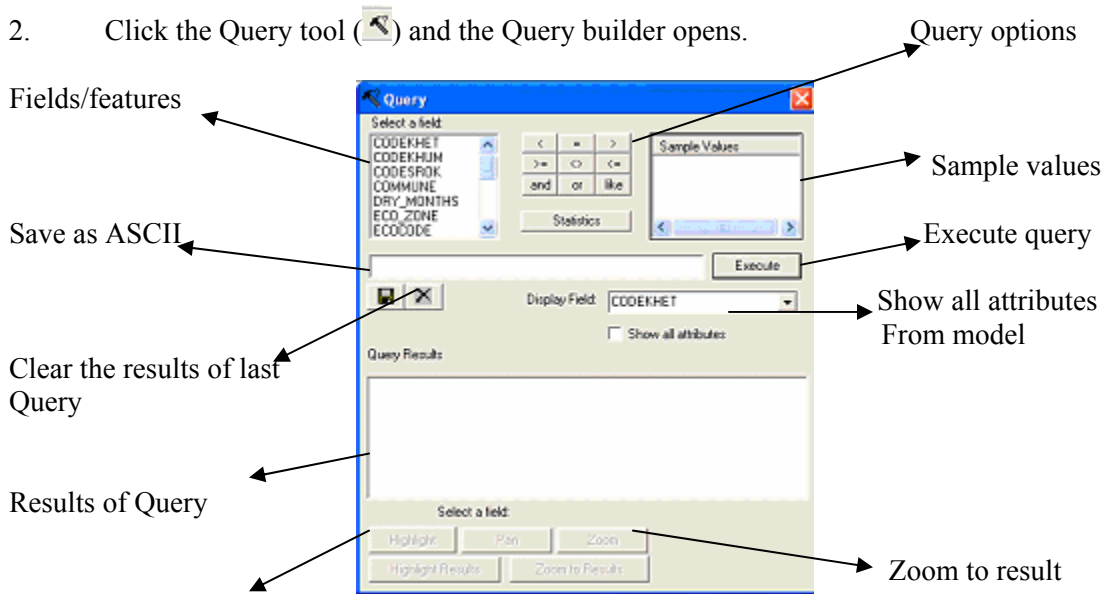
RAINFINE	200 mm rain classes	
RAINAV	Average rainfall	(used for < and > query)
MINTEMP	Temperature (average/month) (lower/higher than 16.5 °C).	
HECTARES	Area size in ha.	Area of smallest part

6.1 Selecting an area by using the Query tool (🔍)

Sample Question: Where are the areas with high fertility soils, high rainfall (> 2100 mm) with evergreen forest? And how does one calculate the cover area (by hectares) of this selected region?

1. Make sure that the theme (map layer) you wish to query is activated (see right corner). For this model, “Forest Gene-ecological Zones” should be active.

2. Click the Query tool (🔍) and the Query builder opens.



Highlight result on map **The Query builder dialog**

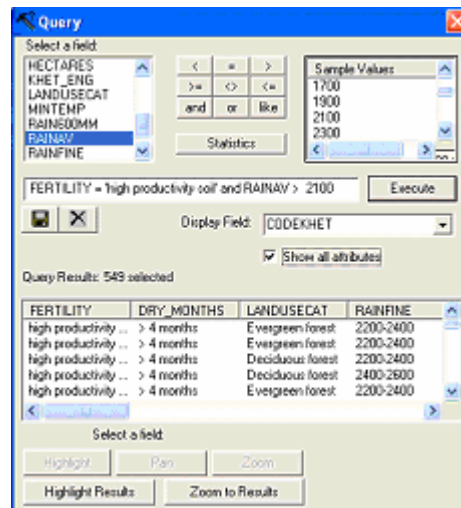
The Query Builder dialog lets you build the query expression by either clicking on fields, operators, or values. One may also type in these specific queries.

3. From the list of fields, click **FERTILITY** to enter it into the expression.
4. Click the Equal button and enter the ‘=’ operator into the expression.

5. Click “**high productive soils**” from the Sample Values list.
6. Click the Execute button. Features that meet the query definition appear in the Query Results panel.
7. Click the Execute button. Press **Show all attributes** if you want to see the content of all selected areas.

Now you want to select areas with an average rainfall higher than 2100 mm within this high productive soil.

8. Adjust the query definition and add **and RAINAV > 2100**; click the **Execute** button again.



Result of query FERTITY = ‘high productivity soil’ and RAINFALL > 2100 mm

9. Press Highlight results and the selected areas will be shown on the map (→Some areas in the coastal zone and Ratanakiri/Mondulkiri)
10. Adjust the query definition and add **and RAINAV > 2100** and click the **Execute** button again.
11. Press Highlight results again and the selected areas will be shown on the map (→Some areas in the coastal zone and Ratanakiri/Mondulkiri, but area is smaller than under step 9).
12. Map with selected areas (color dark red) of query: **FERTILITY** = ‘high productivity soil’ and RAINFALL > ‘2100 mm’ and LANDUSECAT = ‘Evergreen forest’ (map exported).

Final table prepared in Excel

Overview of Query options in ArcExplorer

- Boolean (Logical) Operators:

AND (only areas which are in both),

OR (both areas are includes),

- Relational (Conditional) Operators:

=, >, <, <> (not equal to)

More examples illustrating the syntax of query expressions

· **Strings** such as names are always single quoted in query expressions. Strings are case sensitive, so if a string field's value is 'c. Redlands', you can select this record with:

```
ECO_ZONE = 'c. Redlands'
```

· When querying strings, you can use % as a single or multiple character wildcard in conjunction with the like operator. For example, to select commune Kruos you could use this expression:

```
COMMUNE like 'Kru%'
```


· Use the And operator when **both expressions** must be true. For example, to find features with an area where the geology is basalt and the dry period is less than 4 months.

```
GEOLOGY = 'Basalt' and DRY_PERIOD = '< 4 months'
```

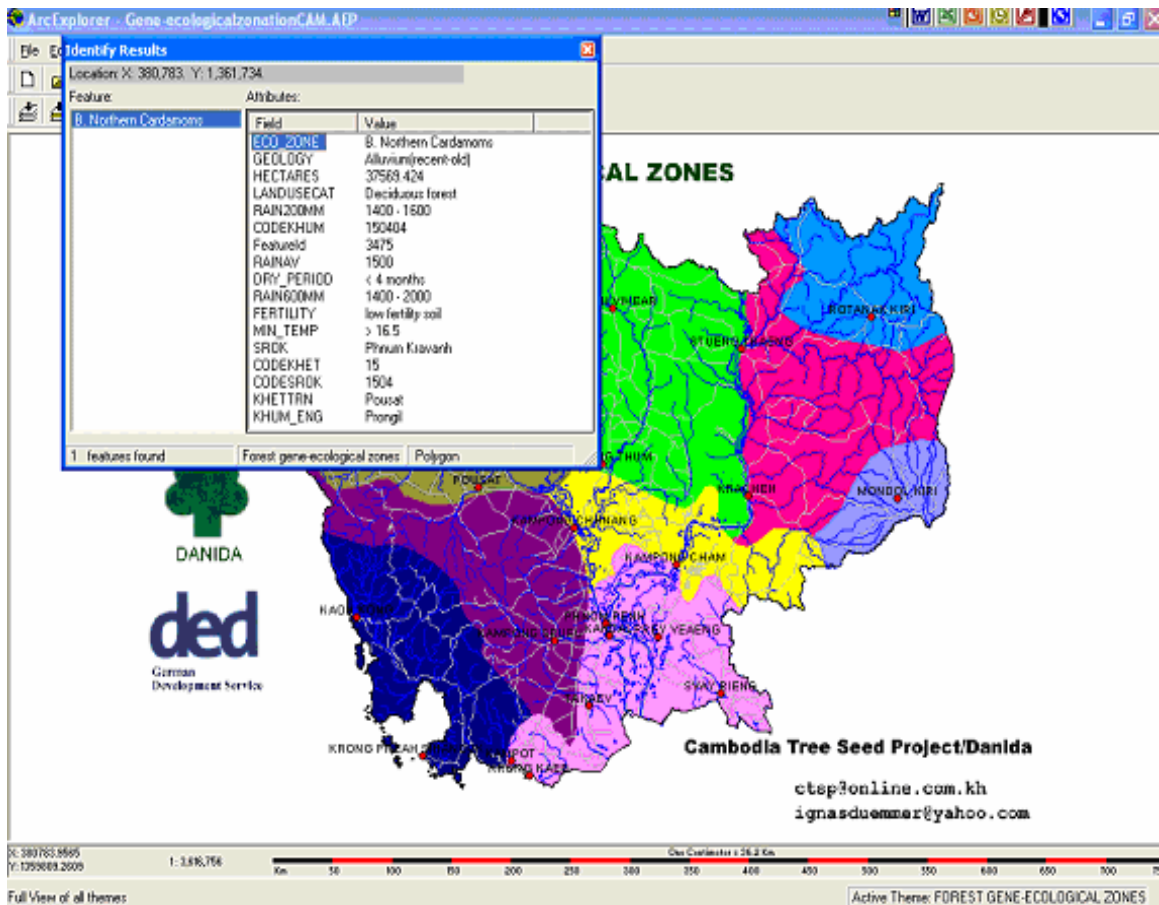
· Use the Or operator when **at least one expression** must be true:

```
HECTARES > '900' or RAINAV < '2100'
```

B. Selection of areas based on coordinates.

If you have coordinates of a specific location and you want to investigate specific parameters of this region, you can find this location in the model by using the mouse and scroll over the map until the coordinates in the left corner are matched. By clicking on the map (using the identify bottom, ) , an identify results table will appear with the information.

The model uses Indian Thailand as map datum and UTM as coordinate system. Your coordinates must have the same setting for collecting to use this model. Other settings need to be converted (use converter software/ArcView). Based on the identify result, it is now possible to find areas in Cambodia with same/similar conditions using the query builder.



Result of using the identify option on location x: 380,783 and y: 1,361,734

C. Selection of areas based on tree specific characteristics.

If you have the growth/site conditions of a specific tree based on literature, you can find these locations in Cambodia by using the Query builder directly. See section A on the use the query builder.