

# Chapter 3 Telling Stories with Digital Maps

One of the first things you will learn is that the appearance of a map makes a big difference to its perception. Each dot, line or area on a map represents something in the real world—a city, a road, a district. You can draw them any way you like but there are some traditions in map symbology that you probably already know about without thinking about them: a bold red line is usually a major highway, etc. Even colours are traditional: green denotes vegetation, blue denotes water, etc. These symbols need to be consistent throughout the map. If you keep these principles in mind, your maps will communicate effectively.

## Exploration 6—A trip to Kirtipur municipality

Imagine you are participating in a training programme. Your training coordinator announces that there will be an excursion on the coming Sunday around Kirtipur municipality. The object of the excursion will be to visit some important cultural heritage sites within the municipality. There will be a car but, if the roads are not good, you might have to walk to visit each of the sites.

For proper planning for the excursion, you will need to create a map of the Kirtipur municipality that shows the cultural heritage sites, roads, parks and other relevant features. When finished, you will print the map.

### Step 1

Start ArcExplorer, if necessary.

### Step 2

Click the Open Project button. Navigate to the *GIS Basics\Exercise\Data\Kirtipur* directory.

### Step 3

Select the project file called *Exercise\_3.AEP* and click Open. When you open the project, you see a map view of the Kirtipur municipality with the themes HERITAGES, METAL ROAD, GRAVEL ROAD, RIVER, MARKET, BUILTUP, PONDS, PARKS, FOREST and OUTLINE BOUNDARY. The colours assigned to each theme are not really attractive. ArcExplorer assigns colours at random. So, you will pick a colour for each theme that is more attractive and natural.

First, you will change the FOREST theme to green.

### Step 4

Make the FOREST theme active in the legend.



### Step 5

Click the Theme Properties button or double-click on the name FOREST in the legend.

The theme name box in the Theme Properties dialogue box shows which theme you are working with. Classification Options shows you the way in which the features of this theme are displayed. In this case, the classification option is *Single Symbol*, which means that all the features in the theme are currently symbolised as shown in the dialogue box.



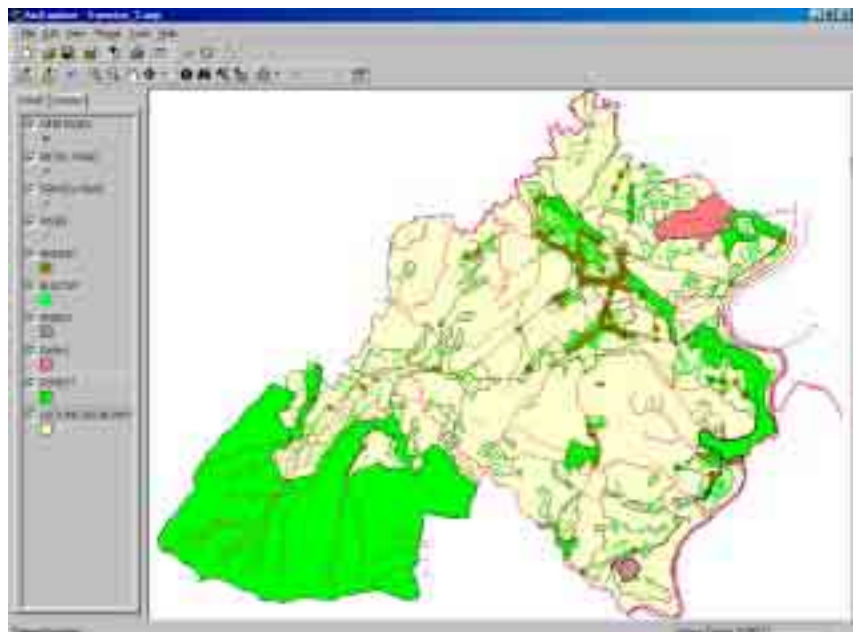
### Step 6

Click the Color box to display the Color dialogue box. Choose light green and click OK.



### Step 7

Click OK in the Theme Properties dialogue box to apply your change.

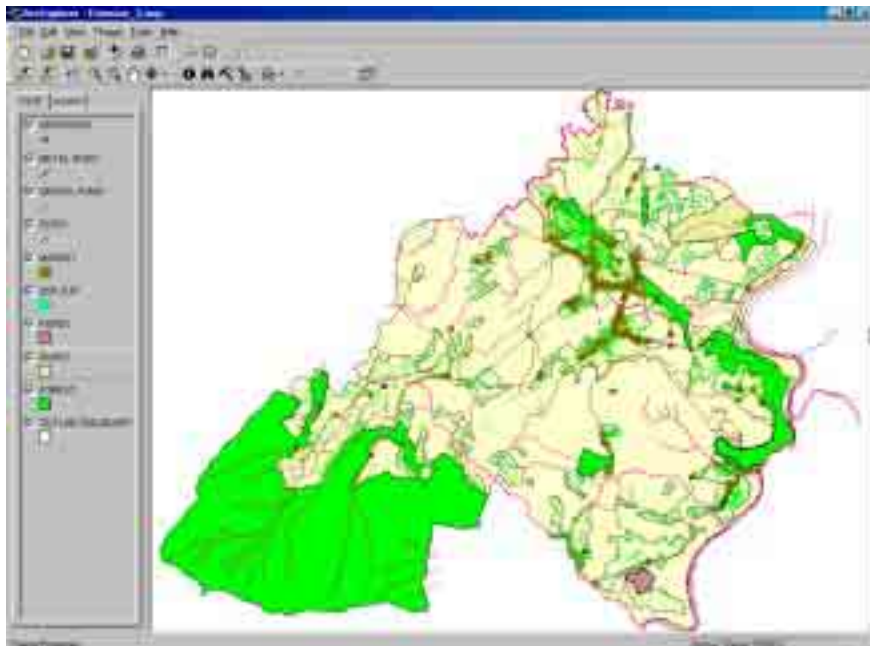


Do the same for the PARKS theme.

### Step 8

Make the PARKS theme active and use Theme Properties to make parks light yellowish green.

Similarly, change PONDS to blue, BUILTUP to light red and MARKET to light green. You can customise the colours by clicking on *Define Custom Colors* » from the Color dialogue box.



Now you will select an appropriate colour and symbols for roads and rivers.

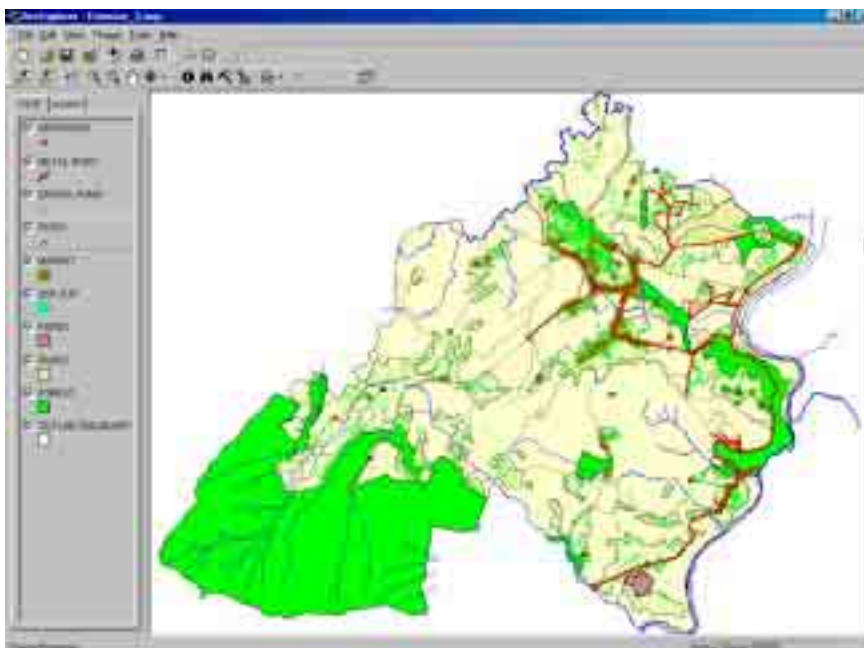


### Step 9

Make the METAL ROAD theme active and click the Theme Properties button. Select the colour red and specify the size as 2.



Similarly make the GRAVEL ROAD dark grey and the RIVER blue with size 1.



Now you will change the heritages symbols.

### Step 10

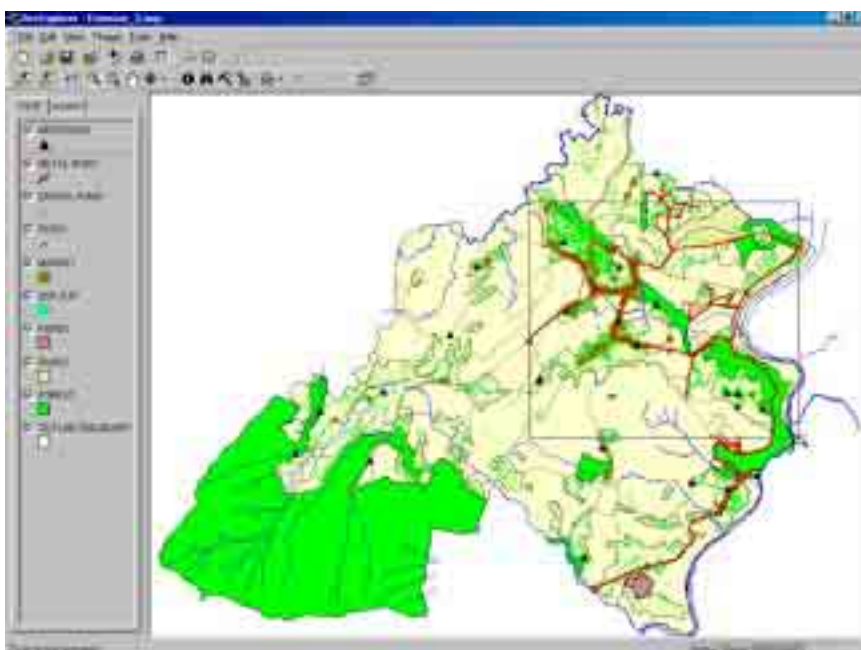
Make the HERITAGES theme active and use the Theme Properties to make heritage sites black. Use the Style pull-down menu to choose Triangle marker. Specify size 6.



Now zoom in on the central part of the municipality where most of the cultural heritage sites are located.

### Step 11

Click the Zoom In tool and create a box as shown below.



Now, you will create labels for each of the cultural heritage sites on your map so that the group will know their names.

### Step 12

Make sure that the HERITAGES theme is active. Click the Theme Properties button to display the Theme Properties dialogue box.

### Step 13

Choose No Overlapping Labels under Classification Options.

Choose Name as the text field. In the label placement box, choose Place on. Click on the Mask labels option.

Click in the Mask Color box and choose White.

Click Apply to check the labels. They may appear too large on the map. If so, adjust the label size slider and then click Apply to check the size. Repeat this procedure until you are satisfied with the size of your labels.



Font: MS Sans Serif

The screenshot shows the 'Font' dialog box in Microsoft Word 2003. The 'Font' tab is selected. The 'Font face' list has 'MS Sans Serif' chosen. The 'Size' list has '12' chosen. The 'Style' list has 'Bold' chosen. In the 'Effects' section, the 'Bold' checkbox is checked. The 'Preview' section displays the text 'AaBbCcDd' in the selected font and size. The 'OK' button is highlighted.

Select the Map Display properties from the View menu. The Map Display Properties dialogue box displays.

Under Map Colors, click Background to display the Color dialogue box. Choose blue and then click OK to close the dialogue box.

Click OK to close the Map Display Properties dialogue box.



Now add a scale bar so the group can see how large this area is.

### Step 17

Choose Display Scale Bar from the View menu. A scale bar appears below the map view.

### Step 18

Right click the scale bar and set the map units to Meters. Set scale units to Meters and the screen units to Inches.



Your map is now ready to print.

### Step 19



Click the Print tool. The Print Map dialogue box displays. This is where you choose a printer and where you give your map a title.



### Step 20

Type 'A map of Kirtipur municipality' in the Print Map dialogue box as the title of your map. Click Print.

### Step 21

After you have finished printing your map, close the project without saving.

## Exploration 7-Symbolise a map of Nepal based on attributes

Nepal is a mountainous country. Its landscape varies widely from place to place and it is difficult to travel from one place to another. There are many districts that have no access to roads. In the present context, access to roads is one of the major factors in the development of any area. You will create a map of Nepal showing the districts with different types of roads, so that you can distinguish which districts have good accessibility and poor accessibility to roads.

### Step 1

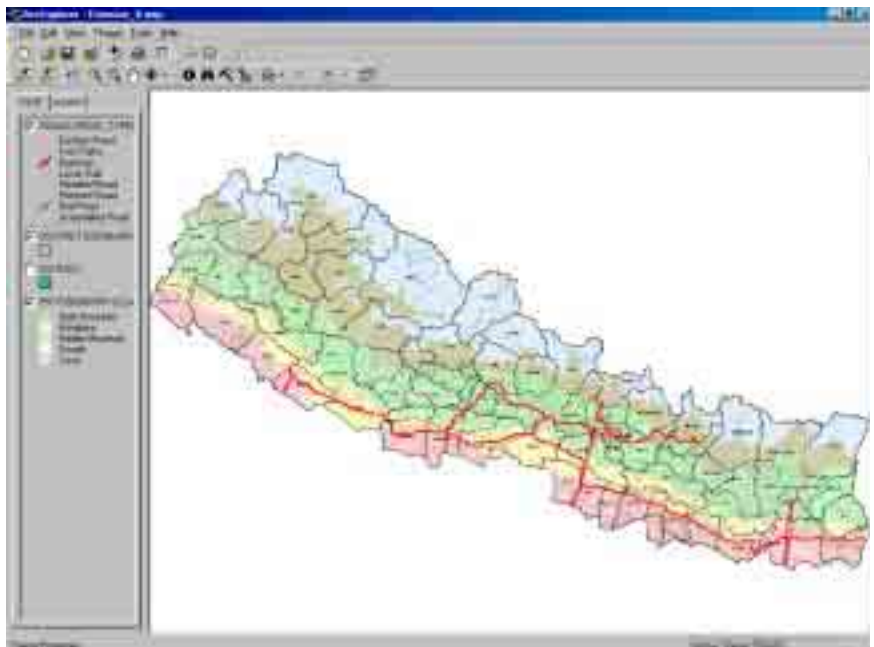
Start Arc Explorer, if necessary.

### Step 2

Click the Open Project button. Navigate to the *GIS Basics\Exercise\Data\Nepal* directory.

### Step 3

Select the project file called *Exercise\_4.AEP* and click Open. When you open the project, you see the themes *PHYSIOGRAPHY*, *DISTRICT*, *DISTRICT BOUNDARY* and *ROADS*. You see all types of roads by physiographic region in your map view.



### Step 4

Make the ROADS themes active. Use the identify tool to click some of the roads.



Notice that each area you click on has road attributes that specifies the road ID and the type of road.

## Step 5

Dismiss the Identify Results dialogue box by clicking 'x' in the upper right-hand corner.

You will assign different symbols to each type of road.

## Step 6

Click the Theme Properties button to display the Theme Properties dialogue box.

## Step 7

To apply a different colour and symbol to each road, choose Unique Values under the Classification options heading.

Choose Road\_Type as the field in the Field pull-down menu.

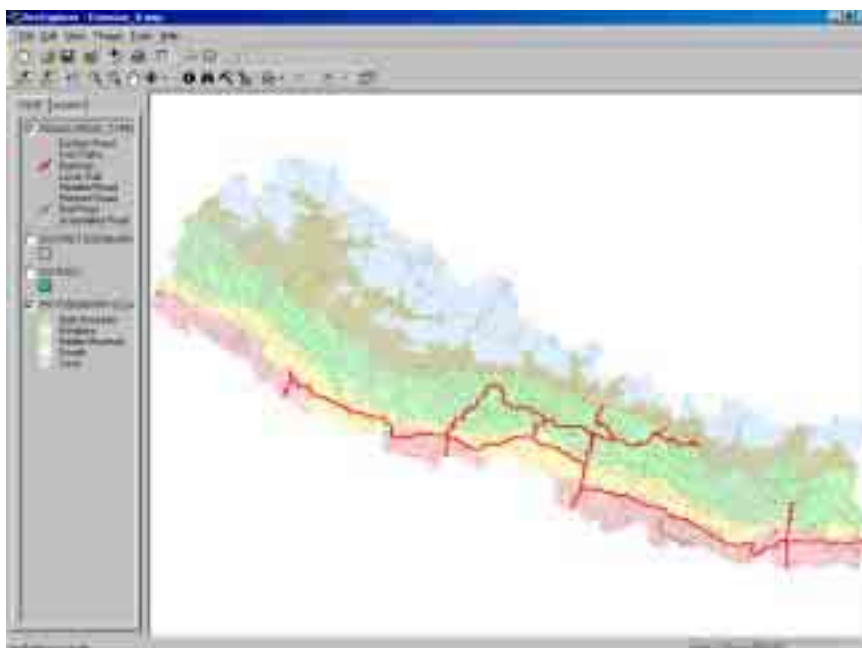


The default colours and symbols are probably not appropriate and attractive.

## Step 8

In the Theme Properties dialogue box, click on the colour to the left of the word Highway. The Symbol Properties dialogue box displays. Choose dark red as the colour and click OK. Since highway roads are generally wider and bigger, assign the line size 2 and click OK.

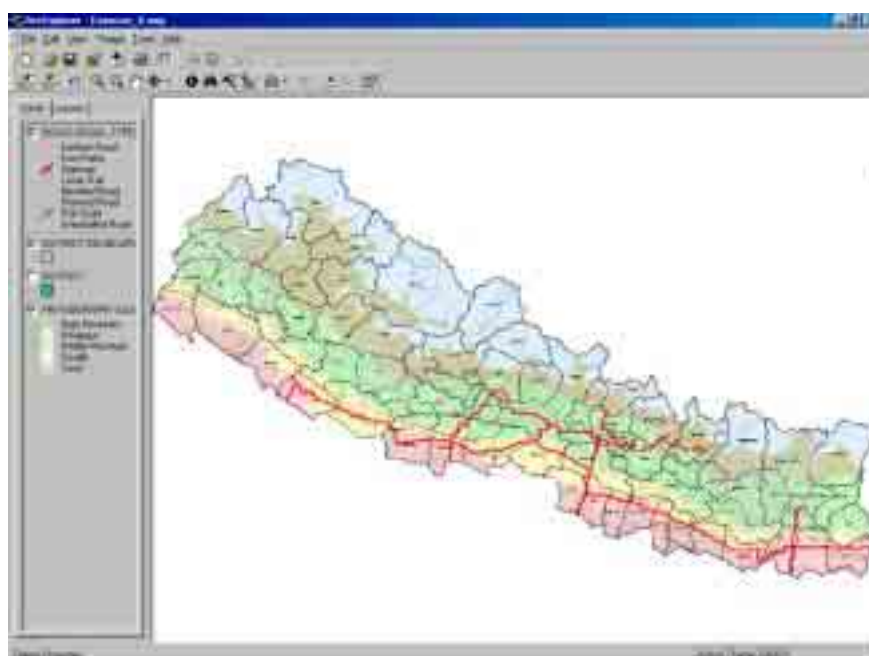
Repeat this procedure for the remaining roads and assign different colours and symbols as shown below. You can distinguish the routes of highways and other roads.



To see which districts have good accessibility to highways, you will draw the district boundaries.

### Step 9

Click on the DISTRICT BOUNDARY theme.



You will see that the east-west highway passes through most of the districts in the Terai region. The districts in the middle mountain and the Himalayan region have less accessibility to roads. Zoom in on the Kathmandu valley area. You will see that Kathmandu, Lalitpur and Bhaktapur districts have good accessibility to roads. So, based on this, planners can prioritise districts for development of road infrastructure.

## Exploration 8-Share your map of Nepal

Suppose you work for the National Planning Commission that plans the budget-ary activities for the development of each district of Nepal. From experience, the Planning Commission has realised that many districts have few educated people. After evaluation, the commission has identified that the main reason for this is that there are either no schools or few schools in these districts. This is mainly because of a lack of budget. So, the Planning Commission wants to reserve more of the budget to establish schools in these districts next year. You will create a map showing the literacy rates in each district and so that planners can identify which districts should be prioritised for more of the budget to establish schools.

### Step 1

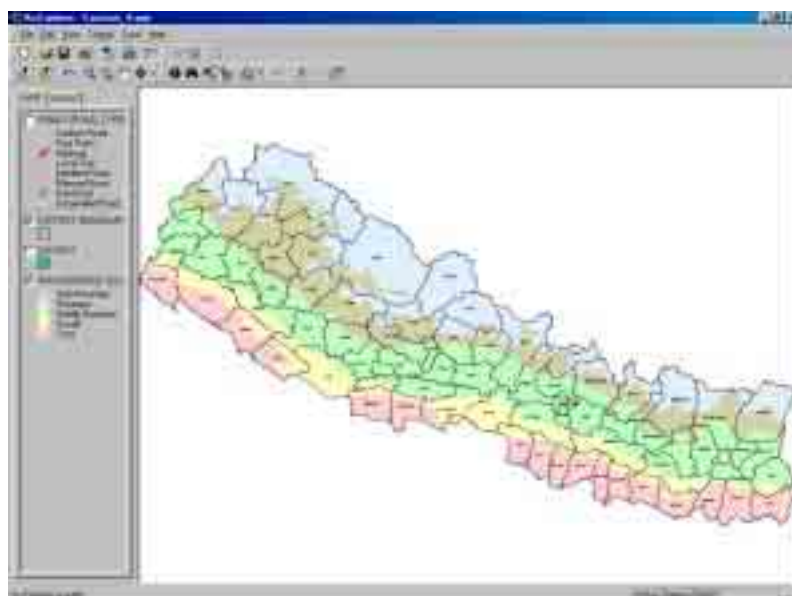
Start ArcExplorer, if necessary.

### Step 2

Click the Open Project button. Navigate to the *GIS Basics\Exercise\Data\Nepal* directory.

### Step 3

Select the project file called *Exercise\_4.AEP* and click Open. When you open the project, you see the themes *PHYSIOGRAPHY*, *DISTRICT*, *DISTRICT BOUNDARY* and *ROADS*. You see all the districts of Nepal by physiographic region.



#### Step 4

Make the DISTRICT theme active. Use the identify tool to click on some of the districts.

Notice each district has information about its population, household numbers, number of schools, and literacy.

You will first use the literacy information (defined by the field LITERAC\_T) to show the level of literacy in each district.



#### Step 5

Dismiss the Identify Results dialogue box by clicking the 'x' in the upper right-hand corner.

#### Step 6

Click on the DISTRICT theme to display it and switch off the PHYSIOGRAPHY theme. Make the DISTRICT theme active.

#### Step 7

Click the Theme Properties button to display the Theme Properties dialogue box. Choose Class Breaks under Classification Options.

The Class Breaks option is used to create a graduated colour map, such as this one, from numeric data. The numeric values are grouped together as ranges or classes. A different colour is applied to each range.



#### Step 8

In the Numeric field pull-down menu, scroll down and choose the field LITERAC-T.

#### Step 9

In the Number of Classes pull-down menu, choose 7.

The more classes you choose, the more you can visually



distinguish classes. However, five classes are usually the most practical limit.

Now you will create a colour ramp to represent the literate population. A colour ramp uses colours to indicate rank or order among classes. The colours progress from light to dark. With numeric data, lower values should use lighter colours and higher values should use darker colours.

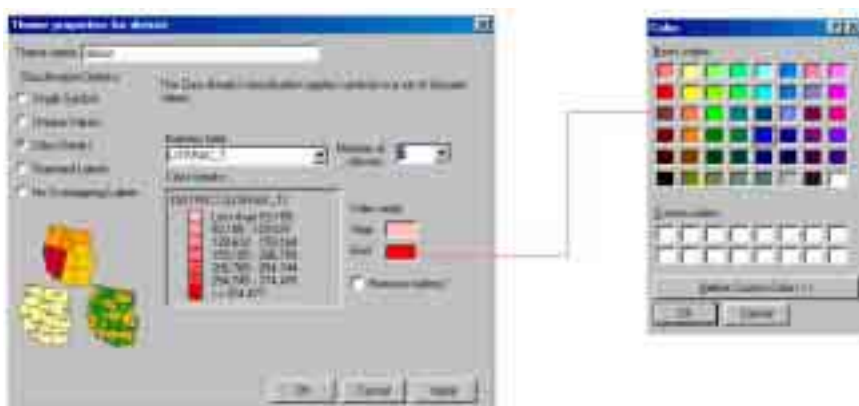
### Step 10

Click the Start colour box to select a starting colour for your colour ramp. The Color dialogue box will display.



### Step 11

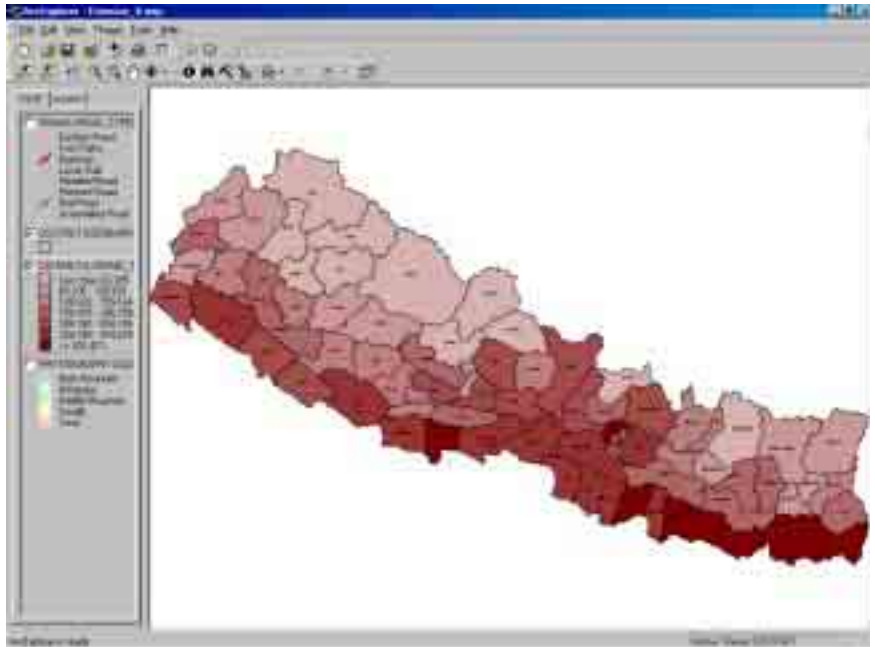
Click the End colour box to select the ending colour for your colour ramp. This time, select a shade of dark red and click OK.



### Step 12

Your map shows the districts with a lower literate population in lighter colours and districts with a higher literate population in darker colours.

Notice that the Kathmandu district and other districts, mostly in the eastern Terai region, have a higher literate population. You can also see that most of the districts in the north-western part of the country have lower literate



populations. So, based on this map, the National Planning Commission can decide which districts should be prioritised in terms of educational development.

You will save this map as an ArcExplorer project. With this, not only can you view the map quickly later, but you can also distribute your map digitally for others to see.

### Step 13

Choose Save As from the File menu. The Save ArcExplorer Project dialogue box is displayed. Specify the file name 'Nepal\_Literate' in the File Name box. Click Save.

