MAP-PACK

A HANDS-ON GUIDE TO
DIGITAL MAPPING
USING
ATLAS GIS (v. 3.0) FOR WINDOWS

MAPPING IN THE CONTEXT OF
PROJECT DEVELOPMENT

Sandra L. Arlinghaus

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MAPPING IN THE CONTEXT OF
PROJECT DEVELOPMENT

THIS PACK INCLUDES:

PROJECT DEVELOPMENT BY
COMMUNITY SYSTEMS FOUNDATION
(W. Drake and S. Arlinghaus)

ORIGINAL MAPS AND MAP-PACK BY
S. Arlinghaus

SOLD AT ULRICH'S
TABLE OF CONTENTS

SAMPLE 1: OPENING ATLAS GIS
SAMPLE 2: THE TOOL-BOX WINDOW
SAMPLE 3: SAVING WORK
SAMPLE 4: FINDING DATA AND NAMES IN ATLAS
SAMPLE 5: ATLAS GIS DATABASE
SAMPLE 6: MAP PROJECTION
SAMPLE 7: CREATING A THEMATIC MAP
SAMPLE 8: WORLD RESOURCES INSTITUTE DATABASE
SAMPLE 9: LINKING AN EXTERNAL DATABASE TO ATLAS GIS
SAMPLE 10: PRELIMINARY PROJECT SAMPLE
SAMPLE #1.
OPENING ATLAS GIS

There are a number of computing sites that are available on the campus of The University of Michigan at which Atlas GIS is available: the basement of the Dana Building is one site; office 2044 in the Dana Building is another site which is available on a limited basis to students electing specific courses in the School of Natural Resources and Environment.

Atlas GIS is a program that runs through Windows on Pcs. Once an installation has been located, proceed as follows.

1. Turn on the computer; in some installations, it may also be necessary to turn on the monitor. In 2044, try turning on the switch on the surge protector (power strip on the bottom shelf of the computer cart) first. On that machine, it is recommended that you just use the single switch on the surge protector, to turn the entire apparatus on and off, in order to save wear and tear on the switches on the computer and monitor (surge protectors are cheaper to replace than are computers).

2. On some machines, once you have turned the machine on, you will next see a dark screen with only a "c-prompt" (c:\). In order to enter the Windows environment, you need to do some typing. At the c-prompt type in from the keyboard the following sequence:

cd\windows -- then hit the enter key.

At the next c-prompt, type:

win -- then hit the enter key.

3. The Windows Program Manager should now appear on the screen. It looks something like the sample below; the individual icons represent different software packages. The icon for Atlas GIS is highlighted in the sample below. Double-click using the left mouse button on an icon to open the software.
4. Open up the Atlas GIS program by double-clicking the left mouse button on the icon. The default window that will appear any time you open the program is shown below.

5. Using the mouse, move the cursor to “File” at the left edge of the bar near the top (containing words, “File,” “Edit,” “View,” and so forth). Click once on the word “File”—use the left mouse button—that is, “left-click.” From the pull-down menu, choose “open”—left-click on it. A new window will appear; a copy of it is shown below.
6. In the "Open" window in step 5, notice the following parts—the "File Name" part; the "List Files of Type" part; the "Directories" part; and the "Drives" part. This basic pattern will appear in a number of other windows, too. Now, notice the Directories part. In the figure in step 5, the agisw folder is highlighted. This is the subdirectory that contains Atlas GIS for Windows—hence, AGISW. Under AGISW there are other file folders. Left-click on the one next to the word "data"—but, before doing so, notice the set of words that appears in the box just to the left of the Directories category—the files in that box all have names that end in (have file extension of) *.pj. Now Left-click on data. The window should change to appear somewhat as below. Now the files in the left box are also of the general form * .pj, but there is a different set of files. Files of the form * .pj can be stored in either location.

![Open dialog box with file names and directories]

7. Left-click on the file named "World1 .pj." That file should now be highlighted. Then left-click on the ok button near the lower right-hand corner of the window. A map of the world should now appear—see below. The projection is the Robinson projection. It is a compromise projection—neither a true equal-area projection nor a conformal projection (shape maintained in local areas). It does "look" good, however; that is, the shapes and relative sizes of the landmasses look close to what they might on a globe.
8. Look at the window in step 7 that contains this outline map of the world (a so-called base map from which other maps can be built). There is a window containing the map—the window says PageWORLD1.PRJ in the top bar of that window—the top bar is likely colored blue. There are other windows, too. There is tool bar window to the right. It is long and thin. Click (if not specified, "click" = "left-click") on the top bar of the tool bar window. Now it should turn blue and the top bar of the Page window should not be blue. There is a third window also—a window containing the database that comes with Atlas—a corner of the database is showing in the lower right corner of the figure above. Click on the top bar of that window—it should turn blue. Whichever window has the top bar blue is the "active" window. When a window is active, you can alter, move it around, save it, or move its contents to another software application. Practice making the various windows become active.
SAMPLE 2
THE TOOL-BOX WINDOW

1. The tool-box window is depicted in the figure below. The buttons that are clearly visible are the ones that are active and may be selected—they are the top six buttons in the left column. This sample will illustrate simple ways to use four of these buttons on the map in World1.prj. Play around with them and get comfortable with using them.
2. The Zoom-In button. Click on the zoom-in button. Now move the cursor over onto the map. Notice that its shape is now that of a little magnifying glass with a plus shape inside. Move to northwest of Australia—click and drag a box around Australia, from upper left to lower right corner. When you let go, the map will be zoomed in on and the result should look something like the map below.

3. Notice that the interior of Australia in the figure above is striped; on your screen, it probably is not. Place the cursor in the interior of Australia—click once—now the interior should be striped. This is called "selecting" a region for further analysis. Selected regions are striped. To remove the selection, click on the water—try it.

4. Notice that there is latitude and longitude read-out in the lower right-hand corner. Place the cursor on the map—click and look at the Lon/Lat read-out. Now move the cursor somewhere else on the map—click again, and notice the change in the Lon/Lat read-out—try this in a number of locations to get a feel for this feature.

5. To return to the previous map, pull down the menu from the top bar that says "View"—click on "previous map view" and you will return to the global view.
6. The zoom-out tool. Zoom-in again on Australia. This time, instead of returning to the previous view using the "View" menu, try using the zoom-out tool—the magnifying glass with the minus sign in it. Click on it, and then move it over to the map—experiment with clicking on it and learn how to return to the previous view this way, as well.

7. The grabber tool. Click on the grabber tool. Now move the cursor into the map area. The cursor is shaped like a hand. Click and drag—the map will move around—try to move a zoomed-in on map of Australia to become a map of China—challenge a friend to name the next country to west (and so forth).

8. The ruler tool—finding distances between locations. Click on the ruler tool. Move the cursor into the map—the cursor has become a crosshair. Click on Ann Arbor—then click on Libya—notice that the distance of this segment of your trip, and a running total, is being tallied in the window in the lower left. Now click on China, then on Australia, then on South Africa—keep your eye on the distance window as you do so. To end this feature, double click.
9. The Page Layer. The map has various elements. If this were a paper map, you might imagine having various pieces of paper to layout on a table and glue together to make a nice presentation—one piece would be the map itself; another might be a box with a title in it, another might be a box with a legend in it, and another might be a box with the scale in it. These separate pieces are viewed, in Atlas, as elements of the "page" (as opposed to "map") layer. The map layer is the default layer and is the layer in which almost all of your work will take place. To turn on the page layer (and turn off the map layer) click on the upper right button (with a page on it) on the tool bar—indicated in the figure below.

10. Notice that new buttons on the tool bar become active. Try some of them.

11. Click on the scale bar; the box now has handles on it; drag the box and move it to a new location, stretch and shrink the box.
12. Return to the map layer. Click on the long bar below the page and map layer buttons. The is the layer bar. A window will pop up. The default is highlighted, as below. Move the highlighting so that the Map Freehand layer is the one that is highlighted. The tool bar will once again change and appear as below. In the Map Freehand Layer it is possible to draw on top of the map, as if a layer of transparent material were placed on top of the map. Try some of the buttons on the active tool bar.

13. If you have a map you wish to trace into the computer, use a copier to make an 8.5 by 11 inch transparency of it. Then tape the transparency to the monitor and copy the map in the Map Freehand Layer using the zig-zag or other tools. Consult with the instructor for more detail and to develop a strategy tailored to your own project.
SAMPLE 3
SAVING WORK

1. Atlas files are called *.prj files. The prj file extension is short for "project." It is an easy matter to save a file on a computer to which you will return to do future work on that file. A project file is composed of a number of different files—of a map and a database. For the most part, you will not see the components from which the project file is composed. The map file has the file extension .agf (Atlas Graphics File). The database file has the extension .dbf—for database file (of the sort made by many other pieces of software).

2. To save a file to the hard drive of the computer you are using. Pull down the window that says file, and click on "Save As." A new window will come up. Click on the space with *.prj—here, the cursor has been placed between the asterisk and the period just before prj. Backspace to erase the asterisk and replace it with your name or some other name of eight or fewer letters and no blank spaces. Then say ok. The file will now be saved on the c-drive in the data folder of agisw—the path is given to you just under the word "Directories" as c:\agisw\data.

3. If instead you wish to save a file on a diskette, in drive a, proceed as above, but under the "Drives" box, pull down the menu to select drive a and then say ok (after naming the file as above). See the figure below.
4. To move your work to a different computer requires a bit more effort. Ask for help to do this—it's not hard, but instructions for doing so require knowing the level of computer literacy of the reader. Just generally, go to the Windows file manager and copy every file of the form "Yourname.*" on one or more diskettes. Notice the path in which they appear. Then load all of them on to the new computer and your prj file should open—it may prompt you to name the path, if the path taken on the two computers are not identical.
SAMPLE 4

FINDING DATA AND NAMES IN ATLAS

1. You may wish to find out data about a particular location. If so, "select" the country by clicking on it. A selected region is striped.

2. Then click on the "I" (for information) button on the right end of the horizontal tool bar. An information window will pop-up displaying whatever is available in the Atlas database about that region. In the figure below, assume Australia has been selected—if you have trouble selecting it at the global scale, zoom in on it. Notice the information window—scroll down in it to see what else is available.

![Information Window Example]

3. This set of data is selected from the underlying data base. To view the data base as a table, pull down the window menu from the top bar and select "table". Then, another window pops up. There is likely to be only one choice that is reasonable (not grid). Highlight it and say ok. Then a window similar to the one below will appear, displaying data for every country in the data base. Scroll through it, both horizontally and vertically to get a full view of what is available. Notice that the table is arranged, by default, according to alphabetical order on the column "ID" and not on the column of country names.

4. To move this window out of the way, or to move any other, make sure the window you wish to move is active, and then click on the top blue bar and drag the window to where you want it. It is not easy to display the entire content of the Atlas GIS database as it appears on the screen; thus, it is downloaded into a spreadsheet and printed out for you in the next sample.
5. To find out where a particular country is on the map, whose name you know but whose location you do not know, click in the "select" column of the Table next to its name. Then drag the table out of the way and look for the "selected" (lined) country on the map.
SAMPLE 5
ATLAS GIS DATABASE

1. The Atlas database is quite extensive; it deals mainly with population variables. To display it all as on-screen shots is not practical. In this sample, it was downloaded to a spreadsheet—Excel for Windows, v. 5.0—and printed out from there. The database begins on the next page. It is often helpful to consider the kinds of variables that are already available within Atlas, as one considers a project. International projects are particularly useful; not only do they serve to broaden the horizons of those who share in them (such as students) but they also serve to do so for those who create them (instructors/research scholars). Global thinking is often easy to “zoom-in” on—it is easier to specialize from the general than it is to generalize from the particular. If one masters doing an international study, the concepts learned will generally serve very well to guide a more local project. Please consider this database both for what it does offer and what it does not offer that might be supplemented with data from elsewhere.
| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U |
| 1 | ID | NAME | PLACE | SHORT | AREA | LENGTH | POPULATION | BIRTH RATE | BIRTHS | DEATH RATE | DEATHS | INCR | RRA | HHA | NCR | NCR |双方 | POP 201 | POP 202 | INF DTH | INF DHA | FERT | YOUNG | YOUNG |
| 234 | YU | Yugoslavia | Jugoslovija | Yugoslavia | 13992 | 11810.5 | 4965 | 14.6 | 143509 | 9.3 | 9766 | 5.5 | 25724 | 100.67 | 109701 | 20893 | 24.4 | 3541 | 2.077 | 24.9 | 24.2 |
| 235 | YL | Macedonia | Maacedonia | Macedonia | 3497 | 6001.0 | 4949 | 16.3 | 32089 | 7 | 13463 | 9.6 | 19228 | 70.01 | 22208 | 2347 | 35.2 | 11.63 | 2.09 | 29.2 | 25.9 |
| 236 | ZA | South Africa | Suid-Afrika | South Africa | 1352 | 7481.3 | 4188 | 34.4 | 143406 | 6 | 33350 | 2.64 | 1100063 | 26.26 | 66006 | 91987 | 52.6 | 75805 | 4.47 | 38.3 | 16582 |
| 237 | ZM | Zambia | Zambia | Zambia | 8300 | 9402.8 | 8385 | 50.7 | 42512 | 13 | 109005 | 3.77 | 318115 | 18.39 | 15515 | 24185 | 76 | 33390 | 1.72 | 48.3 | 4100 |
| 238 | ZW | Zimbabwe | Zimbabwe | Zimbabwe | 4833 | 3907.9 | 10339 | 40.8 | 421831 | 9.8 | 98254 | 3.12 | 322677 | 22.22 | 189741 | 22816 | 60.6 | 25521 | 5.8 | 44.8 | 16323 |

| 239 | ZW | Zimbabwe | Zimbabwe | Zimbabwe | 4833 | 3907.9 | 10339 | 40.8 | 421831 | 9.8 | 98254 | 3.12 | 322677 | 22.22 | 189741 | 22816 | 60.6 | 25521 | 5.8 | 44.8 | 16323 |
| ID | ID | OLD_PCT | OLD_PCP | MATE_LIF | FEM_LIFE | URBAN_P | URBAN_P | DATA_AV | CONTRA | MODERN | GOVT_VI | GNP_PER | STATUS | SOC_TYP | UN_MEM | US_CIP | CONTINE | ISO_ALP | ISO_ALPHA |
|----|----|---------|--------|----------|----------|---------|---------|--------|--------|--------|---------|---------|---------|---------|---------|--------|---------|---------|---------|----------|
| 235 | YU | 9.45 | 942 | 69.73 | 73.83 | 46.51 | 4094 | A | - | - | - | - | - | - | - | - | - | - |
| 236 | YU-05 | 7.1 | 136 | 59.7 | 73.5 | 51.5 | 109 | A | - | - | - | - | - | - | - | - | - | - | - |
| 237 | ZA | 2.9 | 1626 | 61 | 67 | 58.9 | 23364 | B | 48 | 48 | H | 252 | 154 | NATION | 1945 | Y | AF | ZA | ZAF |
| 238 | ZM | 2.3 | 190 | 51 | 54 | 49.3 | 4124 | B | 48 | 48 | H | 420 | 1994 | NATION | Y | AF | ZM | ZMB |
| 239 | ZH | 3.6 | 1366 | 50 | 54 | 39.6 | 15018 | C | H | 230 | 1 | NATION | NA | N | AF | ZR | ZAR |
| 240 | ZW | 2.7 | 279 | 58 | 61 | 35 | 2686 | B | 43 | 38 | H | 640 | 1980 | NATION | Y | AF | ZW | ZWE |
SAMPLE 6
MAP PROJECTION

1. It is not possible to unwrap a globe a put it in a plane—consider flattening out an orange peel. The branch of mathematics that has a theorem that illustrates this is called "topology." The theorem is the "one-point compactification" theorem—if one point is removed from a sphere, then it is possible—otherwise, not.

2. Thus, no map of the globe in the plane is "accurate." Different characteristics are preserved by different projections. One class of projections is "equal area" projections. On these, a unit square of paper placed on the map represents the same amount of land wherever that square is placed on the map—be it in Greenland or in Brazil. On equal area maps, however, the shape of the landmasses is distorted. If it is desired to preserve shape locally, then a conformal projection should be used. In addition, there are compromise projections—ones, such as the default Robinson projection in Atlas GIS—in which the "look" of the map is close to the appearance of the landmasses on the globe.

3. In this sample, a few of the map projections available in Atlas are printed out.

4. To change a projection, pull down the Map menu from the top bar and click on Change Projection. A long list will appear of available projections. Consult with the instructor to determine which sorts of projections might be best suited to your needs. Often, for a global view, the Robinson projection is fine.
ROBINSON PROJECTION

A compromise projection
GRID CELLS OF EQUAL SIZE THROUGHOUT EXTREME DISTORTION OF LANDMASSES, GLOBALLY
MERCATOR PROJECTION, CYLINDRICAL, CONFORMAL
TRUNCATION FAVORING NEITHER HEMISPHERE
DISTORTION OF LANDMASSES, POLEWARD
MERCATOR PROJECTION, CYLINDRICAL, CONFORMAL TRUNCATION SHOWING MORE OF NORTHERN HEMISPHERE DISTORTION OF LANDMASSES, POLEWARD
MERCATOR PROJECTION, CYLINDRICAL, CONFORMAL
TRUNCATION SHOWING MORE OF SOUTHERN HEMISPHERE
DISTORTION OF LANDMASSES, POLEWARD
SAMPLE 7
CREATING A THEMATIC MAP

1. A thematic map is one that is shaded to show different ranges of a given variable. Pull up the file WORLD1 PRJ—shown below, once again, for ease in reference. In this Sample, directions will be given visually to create a map, using the base map below, that depicts ranges of data in two different ways.

2. Pull down the Map menu from the horizontal menu bar at the top. Click on Layers and Themes—the window below will emerge. Note that there are five layers, which may be turned on or off (indicated as yes or no in the Layer On column). In this example, the layers Grid and Countries are turned on. No labels are turned on, but they may be turned on from this menu. Highlight the Countries layer by clicking on the word “countries.”
3. Notice the column of buttons below the OK bar. Click on the “Theme” button—shown below.
4. Then, in the box to the right of the column of buttons, click on the Theme On box—a small x will appear in it as below, and much of the writing will become active. Then go to the button with the set of three dots to the right of the expression box for variable 1—click on it—a menu of choices will pop-up, shown below in the “Expression Builder” box. Click on area and then click OK. Now the layers and themes box should be as below.
5. Now click on the bar in the Variable 1 box that says "Ranges"—doing so will pop-up another menu, shown below. The purpose of this menu is to enable you to customize your map—colors and size of ranges. When the Ranged Fill window comes up, notice that the data is partitioned into four ranges—the size of the range is shown in the Min/Max columns; the number of entries in each range is shown in the # column. The value in the fourth range of 2.8e+07 is scientific notation—2.8 times 10 to the seventh. The Method of Ranging is by quantiles (as default). This means that the size of the interval is not uniform—what is uniform, insofar as is feasible, is the number of entries in each range.

6. After the color sequence—click on the Color column, on the top color. A new window will appear—a "Color" window. Click on any color you would like.
7. Once you have selected the colors you would like, click OK in the Ranged Fill window. Then click OK in the Layers and Themes window. A colored map of the world will appear. There may be a legend box, too. Right click inside it—another window will popup—turn the legend off in the upper left corner of this box. Then the map should appear to be similar to the sample below, colored by quantiles.

8. Now, consider making a map with ranges of equal size, instead of with equal numbers of entries in each. Go back to Map and pull down. Then to Layers and Themes. Then to Ranges. Then, in the Ranged Fill window, pull down the Method of ranging menu, which by default says Quantiles. See figure below.

9. Choose equal area from the menu. Then click on the "Calculate" button. The Ranged Fill box should now look like the second one below. Notice that now the ranges are about the same size but contain vastly different numbers of entries. Clearly the method chosen to establish ranges is critical in determining the final product.

10. Then click on OK and you will go back to the Layers and Themes window. Then click on OK there and a different map will emerge similar to the one below (third figure down). This one is colored differently from the previous one because a different ranging method was chosen.
SAMPLE 8
WORLD RESOURCES INSTITUTE
DATABASE

1. The database of the World Resources Institute is a database that is more comprehensive than that of
Atlas GIS. There are over 500 variables in the database for a wide range of the world’s countries. Many
of these variables cover a span of time ranging anywhere from 1950 to projections to 2025.

2. In looking at projected data, consider how the projections might have been made.

3. There is documentation to accompany this database; a copy of it is in 2044 Dana Building.

4. The database is largely self-explanatory. To gain access to it, double click on the icon, WRD—that
acronym stands for World Resources (Institute) Database. Perhaps one reason the database is not
abbreviated as “wri” is that those letters form the file extension for Windows “Write” files.

5. Open the database, follow the on-screen instructions to create a set of variables for a number of
countries. For the purposes of learning, keep the number of variables small—say, one. The database does
not support a mouse; you will need to use the cursor movement keys and other keys on the keyboard to
move around.

6. The only place where problems seem to arise, as with most software, is in the interfaces between
software packages.

7. Here is a sequence to create a particular file and export it to Excel.

Open WRD and move through the opening comments to the menu as per on-screen instructions.

Then, hit the following sequence of commands:

New—enter
Retrieve—enter
Variables—enter

A set of categories will pop up—economic, population and health, land cover and settlements, food and
agriculture, forests and rangelands, biodiversity, energy and materials, water, atmosphere and climate.

Economic—enter
Select—enter

Use the down cursor movement key; when GNP—current $US is highlighted hit enter, then escape
(ESC)

Countries—enter
Select—enter; move down, Algeria, enter; Argentina, enter; Armenia, enter; Australia, enter; escape.
Go—enter... forms four series—a series is formed by associating a variable with a country
Export—enter
Choose—enter, enter. Then, put a check mark next to each series to select it with a sequence of four
“enters.” ESC

Type—enter
WK1—enter
Go enter.
The pattern C:\WRD:... will appear on the screen. Backspace to erase C:\WRD: and type it to read C:\EXCEL\ATLASDAT enter
The export will take place and a file called ATLASDAT.WK1 will be placed in the EXCEL subdirectory.

[The name ATLASDAT is just a file name chosen for the purpose of example—choose any name of 8 or fewer letters that you wish]

Quit—enter
Discard—enter
Quit

Now you should be back in Windows; open Excel to make sure the file is there.

8. Spend some time browsing through the database and the documentation to see what sorts of variables are available.
SAMPLE 9
LINKING AN EXTERNAL DATABASE TO
ATLAS GIS

1. There are a number of ways to link data to Atlas GIS. In this sample, instructions will be given for a very simple procedure. Work with the instructor to determine which of several ways might work best for your project. The idea in this one sample is to introduce a new column into the Atlas GIS database and then to use the Windows clipboard to move data from Excel into Atlas and paste the content of the clipboard into the new column.

2. Open Atlas-get into file World1.prj. Display the underlying table prominently on the screen; make it the active window.

3. Pull down Table from the horizontal menu bar at the top.

4. Choose "Define Columns" from the list.

5. Choose Insert. Then, in the box for "Name" type in "newdata" and for Type, pull down and choose "float." The box under Dec indicates the number of decimal positions you wish to have in the data. Anchor -- place a check mark in this column using the enter key--this will keep your new column to the left side of the table, making it more readily visible.

6. Then, choose OK, the "yes" when prompted to the restructuring of the file.

7. Fold up Atlas (using the down arrow in the upper right corner). This will keep everything active--just shrink, so that you can use other software.

8. Go to Excel and open up Atlasdata.wk1. Put the cursor on the 1970 entry for Australia. Then copy it to the Windows Clipboard using Edit, Copy.

9. Then fold up Excel into an icon.

10. Go back to Atlas; place the cursor in the table in the new column in the row for Australia.

11. Use Edit, Paste Cells to enter the data.

12. The new data could now be used in a thematic map.

13. Entries need not be brought in one at a time; to bring in whole sets of data, it is necessary to ensure that the order of the data in the Excel spreadsheet matches the order of the data in the Atlas database. Considerable time and effort can be devoted to this effort of "cleaning" data so that all matches up correctly. However, for the resulting maps to make sense, this effort is critical.

14. Data bases saved as .dbf files, such as census data, may sometimes be directly linked to the Atlas database. Again, consult with the instructor to determine which methods to employ.
SAMPLE 10
PRELIMINARY PROJECT SAMPLE

Maps can be used at various stages of project development to motivate directions for analysis. In the sample that follows, a series of maps were created to respond to an actual population-environment dynamics study that is on-going in the country of Russia. It is being done by Community Systems Foundation; William D. Drake is the principal investigator. What is enclosed here is the work of S. Artinghaus—a preliminary approach using the ESP strategy of Assessment, Analysis, and Action.

Consider the set of maps, and the guide outline, as one way to start on a new project. The set of global maps set the stage for an international project; they put the country under consideration in perspective. In this case, the global maps were made using the data available in Atlas GIS. Regional maps were made in Atlas, using only the various tools available on the toolbar. It does not take long to produce this entire set.

One way to test your current flexibility with Atlas is to see if you can re-create these maps on screen. Give it a try!
POPULATION-ENVIRONMENT DYNAMICS
MAP SERIES

This series of maps is intended to suggest one type of approach to managing complicated sets of
information. The actual data used to illustrate the strategy is taken only from global data bases. Local
data bases can be used instead, with local maps. It is not a difficult matter to make a computer map from
a paper map (latitude/longitude "flat" map, in which the grid of parallels and meridians is a square
tessellation, is preferred to any projection). Local maps, used with local data, can be used to create sets of
maps assessing local resources. Spatial analysis, performed using these maps, can suggest directions for
action.

1. POPULATION VARIABLES
   A. GLOBAL VIEW
      i. Assessment—data availability/reliability map
         Crude birth rate, births per 1000 population
         Annual number of births
         Contraception use: % of in-union women using
         Crude death rate: deaths per 1000 population
         Annual number of deaths
         Population doubling time at current rate (years)
         Life expectancy of females at birth (years)
         Total fertility rate: avg. # of children a woman will ever bear
         Gross national product: [current?] US $ per capita
         Government view of fertility
         Rate of natural increase: annual %
         Annual natural increase
         Infant deaths under age one year
         Infant mortality rate: deaths per 1000 live births
         Life expectancy of males at birth (years)
         Population age 65 and over (%)
         Population age 65 and over (thousands)
         Population (thousands), mid-1991
         Population (thousands), projected to 2010
         Population (thousands), projected to 2025
         Political status
         United Nations membership (year)
         Urban population (%)
         Urban population (thousands)
         Diplomatic relations with U.S.A.
         Population under age 15 (%)
         Population under age 15 (thousands)

      ii. Analysis
          Population density
          Birthrate minus deathrate, per thousand
          Education of women and fertility rates

45
iii. *Action*
iv. *Feedback*

B. REGIONAL VIEW
i. *Assessment*—Place names—countries
   Crude birth rate; births per 1000 population
   Annual number of births
ii. *Analysis*
   Population density
   Distance—cities within 1000 km of Syktyvkar
   Distance—cities within 325, 650, and 1000 km of Syktyvkar
   Distance—cities within 325, 650, and 1000 km of Moscow
   Distance—cities within 325, 650, and 1000 km of Syktyvkar and Moscow
iii. *Action*
iv. *Feedback*

C. LOCAL VIEW
i. *Assessment*—data availability/reliability map
ii. *Analysis*
iii. *Action*
iv. *Feedback*

II. ENVIRONMENT VARIABLES
A. GLOBAL VIEW
i. *Assessment*
ii. *Analysis*
iii. *Action*
iv. *Feedback*

B. REGIONAL VIEW
i. *Assessment*
   Oil reserves, million MT
   Raw natural gas reserves, billion MT
   Hard coal reserves, terajoules
   Soft coal reserves, terajoules
   Bauxite production, thousand MT
   Bauxite reserves, million MT
   Bauxite reserves (value), million $ US
   Methane emissions—coal mining, thousand MT
   Sulfur emissions, thousand MT
ii. *Analysis*—includes temporal component in addition to the spatial
   Forest and woodland, 1991 WRD data—use as baseline study
   Deforestation—1981-1990, Annual Average, Thousand HA
iii. *Action*
iv. *Feedback*

C. LOCAL VIEW
i. *Assessment*
ii. *Analysis*
III. POPULATION ENVIRONMENT DYNAMICS

A. GLOBAL VIEW
   i. Assessment
   ii. Analysis
   iii. Action
   iv. Feedback

B. REGIONAL VIEW
   i. Assessment
   ii. Analysis
      Environmental stress--acid rain plume approaches Syktyvkar
      Population density and acid rain
      Population over 65 and acid rain
   iii. Action
      Target area for regional action--in advance of the plume
   iv. Feedback

C. LOCAL VIEW
   i. Assessment
   ii. Analysis
   iii. Action
   iv. Feedback

IV. TRANSITION THEORY
ASSESSMENT: GLOBAL VIEW

Data availability: A = reliable, B = usually reliable, C = unreliable

Source: Data base of Atlas GIS v. 3.0, for Windows, 1995, Strategic Mapping.
ASSESSMENT: GLOBAL VIEW--POPULATION VARIABLES

Crude birth rate; births per 1000 population.

ASSESSMENT: GLOBAL VIEW--POPULATION VARIABLES

Annual number of births

ASSESSMENT: GLOBAL VIEW--POPULATION VARIABLES

Crude death rate: deaths per 1000 population

ASSESSMENT: GLOBAL VIEW--POPULATION VARIABLES

Annual number of deaths

ASSESSMENT: GLOBAL VIEW--POPULATION VARIABLES

Population doubling time at current rate (years)

ASSESSMENT: GLOBAL VIEW--POPULATION VARIABLES

Life expectancy of females at birth (years)

ASSESSMENT: GLOBAL VIEW--POPULATION VARIABLES

Total fertility rate: avg. # children a woman will ever bear.

ASSESSMENT: GLOBAL VIEW--POPULATION VARIABLES

Gross national product: [current?] US $ per capita.

ASSESSMENT: GLOBAL VIEW--POPULATION VARIABLES

Government view of fertility

ASSESSMENT: GLOBAL VIEW--POPULATION VARIABLES

Rate of natural increase: annual %


INCR_RATE

- 42 to 82
82 to 2.07
2.07 to 3.31
3.31 to 4.56
Missing

Robinson projection

KM

0 2000 4000
ASSESSMENT: GLOBAL VIEW--POPULATION VARIABLES

Annual natural increase


INCREASE

- 0.0 to 3223.00
- 3223.00 to 4035.00
- 4035.00 to 239904.00
- 239904.00 to ******
- Missing

Robinson projection

KM

0 2000 4000
ASSESSMENT: GLOBAL VIEW--POPULATION VARIABLES

Infant deaths: under age one year.

ASSESSMENT: GLOBAL VIEW - POPULATION VARIABLES

Infant mortality rate: deaths per 1000 live births

ASSESSMENT: GLOBAL VIEW--POPULATION VARIABLES

Population age 65 and over (%)  

ASSESSMENT: GLOBAL VIEW--POPULATION VARIABLES
Population age 65 and over (thousands)
ASSESSMENT: GLOBAL VIEW...POPULATION VARIABLES

Population (thousands), mid-1991

ASSESSMENT: GLOBAL VIEW--POPULATION VARIABLES
Population (thousands), projected to 2010
ASSESSMENT: GLOBAL VIEW--POPULATION VARIABLES

Population (thousands), projected to 2025.

Source: Data base of Atlas GIS v.3.0, for Windows, 1995.
 Strategic Mapping.
ASSESSMENT: GLOBAL VIEW--POPULATION VARIABLES

Political status.

ASSESSMENT: GLOBAL VIEW -- POPULATION VARIABLES

United Nations membership (year)

Source: Data base of Atlas GIS v. 3.0, for Windows, 1995, Strategic Mapping.
ASSESSMENT: GLOBAL VIEW--POPULATION VARIABLES

Urban population (%)

ASSESSMENT: GLOBAL VIEW--POPULATION VARIABLES

Urban population (thousands)


URBAN_POP

<table>
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<tr>
<th>Range</th>
<th>Color</th>
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<tbody>
<tr>
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<td>Light gray</td>
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<tr>
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<tr>
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Robinson projection

KM

<table>
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<tr>
<th>Distance</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 2000 4000</td>
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</tbody>
</table>
ASSESSMENT: GLOBAL VIEW--POPULATION VARIABLES

Diplomatic relations with U.S.A.

ASSESSMENT: GLOBAL VIEW--POPULATION VARIABLES

Population under age 15 (thousands)

ANALYSIS: GLOBAL VIEW

[Map showing birthrates minus death rates, per thousand, with different shades indicating various rates.]
ASSESSMENT: REGIONAL VIEW

Place names--countries.

ASSESSMENT: REGIONAL VIEW--POPULATION VARIABLES
Crude birth rate; births per 1000 population.

ANALYSIS: REGIONAL VIEW--DISTANCE
Cities within 325, 650, and 1000 km of Syktyvkar and Moscow
Elliptical shape reflects Robinson projection
ENIRONMENT: OIL RESERVES, MILLION MT

Right circle: region within 1000 km of Syktyvkar
RAW NATURAL GAS RESERVES, BILLION MT


Right circle: region within 1000 km of Syktyvkar
SOFT COAL RESERVES, TERAJOULES

Right circle: region within 1000 km of Syktyvkar
BAUXITE RESERVES (VALUE), MILLION $ US

Right circle: region within 1000 km of Syktyvkar
METHANE EMISSIONS—COAL MINING, THOUSAND MT

Right circle: region within 1000 km of Syktyvkar

METHANE

0.0 to 3500.0
3500.0 to 7000.0
7000.0 to 10000.0
10000.0 to 13000.0

Legend:

Logging

SULFUR EMISSIONS, THOUSAND MT


Right circle: region within 1000 km of Syktyvkar
NATURAL FOREST, 1991 WRD DATA—BASELINE STUDY


Right circle: region within 1000 km of Syktyvkar.
DEFORESTATION, 1981-1990, ANNUAL AVE., THOUSAND HA


Right circle: region within 1000 km of Syktyvkar.
ACTION: TARGET AREA FOR REGIONAL ACTION—IN ADVANCE OF THE PLUME


Right circle: region within 1000 km of Syktyvkar

Syktyvka