ASA HAYES

INSERT THE TITLE OF YOUR MAP HERE.

Save this document as HayesAsa_FinalExam_Text.pdf.

Instructions

Detailed instructions for all tasks associated with this project are included below:

The project is due via Canvas on **Wednesday, November 24, 2020 at 5:00 pm**.

The project consists of the following components:

Task #1: Draft map	Task #5: Map background
Task #2: Solicit feedback on Draft Map	Task #6: Map evaluation
Task #3: Written response to feedback	Task #7: Map analysis and interpretation
Task #4: Final Map	

Have fun with this project! Let me know if you have questions or want my feedback. Feel free to stop by during office hours or set up an appointment: bbreyer@tamu.edu

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TASK #1: DRAFT MAP (25 POINTS)

Create a quantitative thematic map that is a) functional, b) aesthetically pleasing, and c) **bivariate**

- Bivariate means that either one data frame shows two variables, or there are two data frames with different variables
- Both variables must be quantitative and *correlated* to each other.

Apart from these requirements, what you map and how you map it are entirely up to you. You may draw on data from lab if you wish.

Create a *.pdf version of the map. Save as HayesAsa_DraftMap.pdf.

Done, attached.

TASK #2: FEEDBACK ON DRAFT MAP (25 POINTS)

Solicit feedback on your draft map to help you produce an improved final map.

Ask a minimum of **three** people to provide you with their names, email addresses, as well as three positive remarks ("pros") AND three criticisms ("cons") concerning your Draft Map (Task #1). You are encouraged to find reviewers from within our class, but you are not required to do so. When done, type the reviewer information and reviewer feedback into the appropriate tables below.

> Hint: Ensure that at least one reviewer has some knowledge of cartography to enhance the probability of catching cartographic mistakes.

You are not responsible for the quality of your reviewers' comments and will thus not be graded on it. However, you *are* responsible for ensuring that the comments are substantive (e.g., "the map is great" would not count as a pro while "the color scheme of your map is harmonic" would count as a pro).

Reviewer Feedback

Reviewer	Pros	Cons
1 **Name: Seth Riley** **Email: sethriley@tamu.edu**	1.) I like the amount of detailed coloration there is 2.) Good base map of other countries 3.) Second map has good circle size	1.) the ocean base map seems to not match the texture style used in the map 2.) the ocean seems to try to overshadow your map in certain aspects 3.) The color ramp could be one color with variant versions of that color but I see why you used the color ramp that you did
2 **Name: Edward Cruz** **Email: Cruz_27@tamu.edu**	1. It has a proper visual weight where both data frames are side to side and descriptions are in the same font style. 2. Color qualities or color hues for desertification look great between classes of severity. 3. Projection looks good.	1. For desertification, maybe a transparency of 25% will look great to show country boundaries? 2. Lack of labels such as simple geographic features and such. 3. Try to improve contrasting between population growth.
3 **Name: Ethan Mae** **Email: ethan1.mae@gmail.com**	Separating maps prevents clutter Easily readable color scale Both maps individually fulfill the 3-second rule	Separating maps makes it hard to tell if the data is meant to be related Bubble size scale is mostly general and can be hard to get an accurate estimate just by looking Using maps from 26 years apart may lead to some inaccuracies

TASK #3: RESPONSE TO DRAFT MAP FEEDBACK (25 POINTS)

Respond to the feedback you received on your draft map (Task #2). Thank the reviewers for their positive comments and address each of the reviewers' criticisms. There is no such thing as a perfect map and it may not be possible to make all reviewers happy; however, you should be able to address most of the concerns. In your write-up, explain what you did to improve your map (Task #4) given some criticisms and/or why you did not change your map given other criticisms.

Insert your response to the draft map feedback below and on the next page if necessary.

1.) the ocean base map seems to not match the texture style used in the map

2.) the ocean seems to try to overshadow your map in certain aspects

   To fix both of these issues, I have removed the basemap and changed just to using a blue background for both data frames.

3.) The color ramp could be one color with variant versions of that color but I see why you used the color ramp that you did

   I chose this ramp intentionally, to show relative urgency of the desertification.

1. For desertification, maybe a transparency of 25% will look great to show country boundaries?

   A good idea, but boundaries are less important in regards to the comparison I want to make. Also, more lines intermixed into that area would likely cause further confusion.

2. Lack of labels such as simple geographic features and such.

   Again, only going for the general trends of each area. The places themselves aren't as important, or at least won't be until this topic is looked into with more detail, but that is not the purpose of this map.

3. Try to improve contrasting between population growth.

   I have activated the option to use Flannery appearance compensation. I don't have much of a preference for with or without, and it does not obstruct anything I am trying to show.

Separating maps makes it hard to tell if the data is meant to be related.

   While this is true to some extent, I have done what I can to mitigate this already by having the maps be as similar as possible besides the data layer to tie them together. Additionally, having them be on one map would likely create greater confusion anyway.

Bubble size scale is mostly general and can be hard to get an accurate estimate just by looking.

This is partially covered by the Flannery compensation from earlier, but it is more to the point of proportional symbols (vs graduated) to show relative measure rather than a precise estimate. Relative measures is more to the point of the relationship I'm attempting to show as well.

Using maps from 26 years apart may lead to some inaccuracies

   To start with, the map itself is based on 2020 country shapes. More to the point though, I deliberately selected the start of the population measurement (1990) to coincide with the desertification measurements. This is because just as desertification is a long processes, migration patterns away from it are as well, and I wanted to capture that best I could on the interval possible with the data I had. (No more recent desertification data as comprehensive as this was available.)

TASK #4: FINAL MAP (50 POINTS)

Revise your draft map based on feedback you received in Task #2.

- You must resolve all problems in your map (i.e., turn the cons into pros) unless you disagree with your reviewers (see Task #3).

When done, create a *.pdf version of the map. Save as HayesAsa_FinalMap.pdf.

Revised, attached.

TASK #5: MAP BACKGROUND (25 POINTS)

Complete the following tasks to provide some background on your map that may help the map user better analyze, interpret, and evaluate the quality of your map.

1. *State* the intended purpose of your map.

    The purpose of the map is to examine spatial relationships between desertification in Sub-Saharan Africa and the growth of the populations of the region's major cities.

2. *Describe* the intended audience of your map.

    This map would likely be most useful in relation to environmental anthropology, or any other similar field that needs to study the effect of change in an environment on the people living in it (or no longer living in it, as is the case for many desertified areas.)

3. *Describe* the characteristics of the data (base map and thematic overlay) you used to make your map.

Layer Name	Spatial Reference System	Source	Data Type
World Countries (Generalized)	WGS84	ESRI	Polygon
Desertification (Land Degradation Severity)	WGS84	World Atlas of Desertification, UNEP 1992	Polygon
Population Growth per City (from Urban Agglomerate population)	WGS84	World Urbanization Prospects, 2018, United Nations DESA).	Point

4. *State* what kind of map type (cartogram or choropleth, dot density, flow, proportional symbol and/or isarithmic / surface map) you produced. If you used more than one type, list both. Justify your decision.

    The first frame of my map is a stratified choropleth map. Despite the underlying data only having nominal categories (Very Low to Very High), the process used to determine these categories created a continuous set of values over the survey area, which was classified into the visible result. Having the regions created by desertification area and not just by country allows for a better point of comparison for the cities in those areas.

    Said cities are the focus of the second data frame. I chose to show these as proportional symbols to more show the extent of growth in any given city rather than the exact amount. While I could have overlaid these points directly over the Desertification regions, doing so would have been a visual mess even with proper color distinction, so I placed these on a second frame.

    But, to keep the associations between the two solid, I used the same base layers (basemap and country boundaries), the same extent, and even matched the center point by linking the two frames. Keeping the comparative aspect of this map was one of the highest priorities.

5. *State* the spatial reference system of your map and *explain* why you used this system rather than another one.

All of the layer sources for this map came in the same reference system by default, likely by some

enforcement in the "Add Data from ArcGIS Online" function. Aside from that, the projection looks to fit

Africa well in this context, so I didn't see any need to change it.

6. *Describe* the data you symbolized.

Characteristic	Variable 1: Desertification	Variable 2: Population Growth
Data form: discrete vs. continuous	Continuous when collected, discrete as data (See #4)	Discrete
Data form: total vs. derived	Total	Derived
Data measurement level: ordinal, interval, ratio	Ratio/Ordinal	Ratio
Data collected at: points, lines, or polygon (enumeration unit)	Polygon	Point
Descriptive stats: number of observations	312	185
Descriptive stats: minimum value	0	66827
Descriptive stats: maximum value	4	10659165
Descriptive stats: mean	2.083333	888673.994595
Descriptive stats: standard deviation	1.381927	1347109.587856
Histogram shape: skewness	Very slight left skew	Heavy right skew

7. *Explain* why you made the map the way you did. For example, state which mapping technique (e.g., choropleth or

dot density) you used to represent which variable and why and state how you implemented the mapping technique and

why (color scheme, number of classes, classification scheme, dot size, dot value, etc.).

As I discussed the main reasons for each map technique in #4, I will talk about the smaller elements. My approach

was to start with the desertification frame, as that one would be more difficult to have look decent due to the amount

of shapes. I decided on the green-red color ramp more to show urgency of desertification rather than true color.

Hopefully the grey of the basemap reinforces that green doesn't necessarily mean a green area.

Once I secured a decently pleasing look on that frame, it was simpler to sort out the population symbols. Keeping

them as circles was an easy choice, both for simplicity due to relative scale/area of the map as well as easier size

comparison. I used an online palette generator to arrive at that shade of purple, as it was distinct enough both from the

colors of the desertification regions and from the basemap and wasn't too bright/jarring. The size was fortunately

reasonable for the city symbols by default, so I didn't feel the need to adjust that from 2pt.

8. *Describe* the major challenges you encountered during the bivariate mapping process. *Explain* how you addressed

these challenges.

I only encountered 2 real problems in creating this map: finding suitable, comparable data, and displaying the data that I then found into something less chaotic.

I had decided early on in the search that I was going to stick to desertification as the first variable. We had been covering the Sub-Saharan region in Urban geography under the context of its development, so that put to mind desertification vs economy. I tried to find suitable GDP data for a while, but it either wasn't in a useful format or was too incomplete to display in a way I wanted. Moving on from that, I thought about other things that were mentioned and came to movement. I figured that finding data for migration would be difficult and unwieldy, so I thought around the issue until I came to population. Going by cities came soon after, as that could serve both as an indicator of economic success like I had been trying for earlier as well as an indicator of immigration from more desertified areas.

Just placing the proportional symbols on top of the map didn't go well, but I remembered the use of multiple data frames from one of the previous labs and copied the base layers and the city data over to there. While there is a little more empty space than I'd prefer, it resulted in a much more reasonable, more pleasing product.

TASK #6: MAP EVALUATION (25 POINTS)

Complete the following tasks to evaluate the functionality and beauty of your map.

1. *Summarize* your first at-a-glance impression of the map. Does it pass the three-second test? Would you say it look greats or mediocre? Does it make you want to have a closer look? Would you rather search for another map on the topic? Why?

    I would say that it passes the 3-second test. It is immediately apparent what area is being shown, and that both maps are trying to show related data. While the brightness of the desertification data is a little jarring and complex, looking briefly at the simple categories in the legend settles that down. While the balance may be more immediately drawn to the side due to the color and density of information, hopefully the use of the relatively uncommon purple for each points as well as further context as for why there are two frames should add conceptual weight and interest to the right side. I think this map is good for illustrating the idea that desertification and growth are tied, so it would suit the needs of a presentation. For something more indicative of exactly what that relationship is, however, there are likely better maps that could be made.

2. *Evaluate* the quality (3 = excellent; 2 = good; 1 = poor; 0 = absent) of all map components listed in the table below and *justify* your evaluation.

	3	2	1	0	n/a	Justification
Map composition: all of the following map elements are at their proper visual intellectual level from both a planar and hierarchical organizational perspective (ranked below)						
1. Thematic symbols 1. Title	x					Symbols are easily the most eye-catching elements; Title is present and descriptive.
2. Legend 2. Base map (i.e. political boundaries) 2. Labels	x					Each legend indicates which frame shows what, and has easily understood categories. The base map and country boundaries are helpful for referencing general location, but are otherwise unobtrusive. I deemed labels unnecessary both for simplicity and to emphasize cities in general vs. any one specifically.
3. Scale bar (not for cartograms) 3. North arrow	x					Present; Direction and scale are same for both frames.
4. Source information 4. Author information 4. Date	x					Present
5. Neatline	x					Present
Other potentially important elements (e.g., graticule, ancillary information) Map elements are arranged such that the map composition appears balanced overall Map elements are internally organized The map appears crisp and clean (i.e., not cluttered)		x				As mentioned above, I am unsure about the balance , but otherwise this category seems fulfilled.

	3	2	1	0	n/a	Justification
Spatial reference system						
Projection maintains the properties (conformality, equivalence, etc.) most important to meeting the map purpose Projection is appropriate for the part of the world shown on the map	x					While the Mercator projection is usually not ideal for portraying Africa due to the size distortion near the bottom, keeping the map noticeable and contextually familiar is more important for my intentions. Also, the data represented does not rely on size very much, as the intent is to compare city growth to nearby desertification group, which is little affected by the distortion.
Map Type						
The map type is appropriate given the data and map's purpose	x					Yes; reasoning described in earlier questions.
Data classification						
Number of classes is appropriate Classification scheme is appropriate given the data and map's purpose	x					Yes. Only small thing is that the population data was very right-skewed, which may have overmuch influenced the scaling of

Classification takes into account no data and outliers and does not have empty classes (i.e., classes without observations)						each city. This may be less of an issue than it is in my head, but I'm not completely sure since the reviewers didn't look at the data.

Scale						
The map scale is appropriate given the mapped area	**x**					**Yes, fits the frame well without being cut off or leaving empty space.**
The map scale is appropriate given the features in the map	**x**					**Features are easily distinguishable without much zooming on a .pdf.**
Level of symbolization, simplification (generalization) is appropriate		**x**				**I think so; I'm not full sure on generalization, but nothing seems vague at least. Will err on side of caution.**
Symbolization						
Symbols can be differentiated clearly Symbols stand out visually and intellectually from the background and in relation to other map elements	x					Meets description
Symbolization follows all conventions (this includes color conventions)	x					Yes, even used outside color theory resources to check.
The functional use of color is effective The colors are harmonic		x				I believe so. I'm still unsure about the purple, as I think it looks fine, but I'm biased.
Legend						
Legend title (a) is succinct; (b) is unambiguous; (c) matches the data (i.e., accurate); (d) complements the map title instead of restating it; (e) spells things out (no abbreviations) Legend follows conventions for the map type under consideration		x				It somewhat restates parts of the title, but intentionally to indicate which variable is shown in each frame.

Typography						
The map lettering is legible, discernible and easy to understand The size of lettering reflects the visual and intellectual importance of the map elements The map lettering follows conventions	x					Yes. Font is consistent and differently sized/styled based on usage. Cambria font does not seem out of place (personal pereference)
The north arrow type is appropriate	x					Unobtrusive
The scale bar type is appropriate	x					Matches black/white of north arrow above
Additional map elements are essential to achieve map functionality						n/a

Miscellaneous aspects of map quality that need to be assessed … (add rows as necessary)						n/a	

3. What is the sum of Xs in each of the four assessment categories below?

   - Excellent: _15__   Good: _4__   Poor: __0__   Absent: __0__

4. *Evaluate* the overall quality of the map (3 = excellent; 2 = good; 1 = poor; 0 = absent) and *justify* your evaluation.

Item	3	2	1	0	n/a	Justification
The map is functional. - It meets its intended purpose - It meets its users' needs - It is accurate, presenting information without error, distortions, or misrepresentations (i.e., cartographer was ethical). - It is easy to use (simple, clear, legible) - It is representative of the mapped geographic phenomenon	x					Seems to meet needs, both from my perspective and from reviewers.
The map is aesthetically pleasing. - It is harmonic - It is well composed - It is clear - It uses beautiful shapes, symbols, and type		x				Again, some elements I am unsure of and can't see how to fix even with feedback, so I'll stay with a 2. On the most part, however, I think it does well in this category.

5. What is the sum of scores in each of the four assessment categories (OVERALL MAP QUALITY)?

   - Excellent: _16__   Good: __5__   Poor: __0__   Absent: __0__

6. Any additional comments:

N/A

TASK #7: MAP ANALYSIS AND INTERPRETATION (25 POINTS)

- Analyze (i.e., describe patterns) and interpret (i.e., explain patterns) the major geographic patterns revealed in your map. At least 250 words. Take this task seriously and show your critical thinking skills!

As is to be expected with nearly any location, most of the major population growth occurs around the coasts. There are some examples of larger cities inland, but these are usually only slightly further. There are a decent amount of cities positioned along various rivers, but few of them have exhibited a large degree of growth even so. Despite more access to water in these places, it is likely that the lack of a port still provides a severe limiting factor on the growth of a city and its economy, especially when still otherwise bounded by desertified areas.

While there are cities that seem at first to be thriving in non-desertified areas, comparing these two datasets brings together a somewhat strange pattern: the place of highest growth are almost all aligned with areas that have medium to high levels of desertification. In general regions of low desertification, some cities even sit upon isolated tracts of desert. To see the bottom of this, we need to take into consideration more cause and effect.

Sure, desertification will definitely drive people away (likely to cities) if there is little in the area in question, but what if there is already a city established there? It isn't ideal, but desertification matters less when you don't have to worry overmuch about agriculture in your urban setting. In fact, the opportunities of a city may even cause some from non-desert areas to migrate despite the environment. Also to take into consideration is the fact that some poor decisions in city planning can contribute to desertification. Creating a cycle like this centered on a city where that would be less important seems to be a better idea than spreading desertification in areas without it, which can then be effectively reserved for agriculture. There's certainly more to look into for this relationship, and there may even be regional differences as well based on local policy. That's the fun part of looking at things at this scope, there's always interesting paths inward.