Determining the Development Status of United States Counties Based on Comparative and Spatial Analyses of Multivariate Criteria Using Geographic Information Systems

Lauren B. Wheeler[1] & Eric C. Pappas[1]

[1] School of Integrated Sciences, James Madison University, Harrisonburg, Virginia, USA

Correspondence: Eric Pappas, ISAT/CS Building 107, MSC 4102, James Madison University, Harrisonburg, Virginia 22807, USA. E-mail: pappasec@jmu.edu

Abstract

The United States ranked 8th in 2015 according to the United Nations' Human Development Index, but empirical evidence shows that there are regions *within* the U.S. that would not classify as having "very high human development." We know about domestic poverty and hardship, but there are regions in the United States that are starting to look developmentally more like Albania or Kenya. Using multivariate quantitative data (health statistics, education levels, and income) to replicate international development indices like that of United Nations on the national level, U.S. counties were ranked according to their development status. In this way, widely recognized scales of development were translationally applied to the United States to fully understand the state of development, or rather regression, in the U.S. The results were displayed cartographically to show the geographic distribution of regression across the U.S., mainly the Mississippi River Delta and the Appalachian Region. In total, there were 66 counties that fell into fourth class, or the "low development" category, for all three development criteria.

Keywords: development geography, geographic information systems, GIS, human geography

1. Introduction

This project transposed the Human Development Index (HDI) onto U.S. counties to expose the growing socio-economic disparity within its borders. According to the Organization for Economic Cooperation and Development (OECD), of the 35 wealthiest countries in the world, the United States has the following: the highest rate of poverty, both generally and for children; the greatest inequality of incomes; the lowest government spending as a percentage of GDP on social programs for the disadvantaged; the highest infant mortality rate, prevalence of mental health problems, and obesity rate; and the highest high school dropout rate (except for Spain) (Hedges & Sacco 2014). For example, the Appalachia Region subculture, marked by poor economic development, healthcare, and literacy rates, sheds light on the increasingly poor standards of living in some areas of the United States (Billings 1974). In conventional terms, however, no part of the U.S. has been considered anything less than First World. ("First World" here being the formerly used yet widely recognized term for highly developed countries. More modern terms used are "developed," being of "high human development," and "The Global North," but the rankings of First, Second, Third, and Fourth World are used here for the sake of clarity and consistency.) By applying international classifications to counties in the United States based on statistical analyses and spatial visualization, the severity of developmental problems is revealed.

The results, therefore, show the geographic distribution of developmental issues and provide a visual representation of the U.S. on international scales. The results of this research, then, are similar to the maps and studies that categorize states by the country with the most similar GDP—like saying the GDP of West Virginia is similar to that of the Dominican Republic (Hododny 2016). Using a more refined scale—counties rather than states—reveals the regional disparities in the United States that go unexamined under national or state averages. The sheer geographic size of the U.S. explains the extreme variances in education, income, and health across the nation, as well as variations in other components of human life like culture, values, and goals, which are not noticeable in smaller, Western European countries. Colin Woodward (2011), in his fourth book, *American Nations: A History of the Eleven Rival Regional Cultures in North America*, identifies eleven sub-cultures within the United States that function as separate nations. Because these regions are so distinct, a national average for any statistical measure is not fine enough for an accurate depiction of the United States. Applying international classifications then, to counties, especially in a visual representation of development, is both shocking and revealing.

Because the Human Development Index (HDI) is the most widely accepted international development index, the same methods for creating it were applied to this project.   Counties in the U.S. are compared to countries that fall into one of four HDI classifications: Very High Human Development, High Human Development, Medium Human Development, and Low Human Development. These classifications correspond laterally with the post-World War II terms of First, Second, Third, and Fourth World, as well as the World Bank's classifications of high, upper-middle, lower-middle, and low economies.   Counties are compared not just on income, but on education and health outcomes, too, as a way of reflecting the holistic human development approach of the HDI.

While addressing development from a single dimension like income is not enough, it is still an integral factor in a multi-dimensional study.   Because income is arguably the most important factor in determining development status internationally, it is equally important to understand the spread of income within the United States.   Income plays a large role in an individual's ability to meet basic individual, as well as family, needs.   Additionally, income determines a person's comfort level and stability.   According to the Brookings Institute, "The United States is known for having higher inequality and a less generous social safety net than many affluent countries in Europe" (Smith & Chandy 2016).   In fact, according to the Organization of Economic Cooperation and Development (OECD), among the 35 wealthiest countries in the world, the United States has the highest poverty rate, both generally and for children—the greatest inequality of incomes—and the lowest government spending as a percentage of GDP on social programs for the disadvantaged.   Thus, income in the form of poverty percentages per county will be assessed.

The second dimension for determining development is education.   Among the 34 OECD countries, the United States performed below average in 2012 in mathematics, putting it on par with Hungary, Italy, Lithuania, Norway, Portugal, the Russian Federation, the Slovak Republic, Spain, and Sweden.   In reading, the United States performed around the average, comparable with Austria, the Czech Republic, Denmark, France, Hungary, Israel, Italy, Norway, Portugal, the United Kingdom, and Vietnam. The performance of the United States in science was also close to the OECD average and comparable with that of Austria, Belgium, and Croatia (OECD 2015).   These rankings are an average for the United States and do not reflect areas of high or low achievement.   In order to reflect educational outcomes at a more refined scale, this project maps the literacy rates of U.S. *counties*.

The final dimension important to human well-being is, of course, health.   Health is not just the absence of disease, but also the presence of physical fitness and mental wellness.   These three factors contribute to an individual's ability to lead a long, productive, and healthy life.   Without meeting basic needs, a person cannot be healthy and, therefore, cannot fulfill his or her purpose in life.   When the developmental paradigm shifted from the economy to the people, health became an important contributing factor to human development.   As such, food security is assessed in this project as a measure of health because access to reliable, nutritious food is basic to an individual's health, both mentally and physically.

The results of this study show that despite high-levels of presumed development and power, the United States is falling behind other First World— or very highly developed—countries.   While the United States may have been at the forefront of economic development at the height of the Industrial Revolution and post-World War II, the quest for profit over people is causing development to regress in health, income, and education.   In particular, the areas most affected by these developments are the Appalachian Region, The Black Belt, Mississippi River Delta, and Indian Reservations with some regressive counties in large metropolitan areas like New York City and Los Angeles.

1.1 Objectives

With these three dimensions (poverty rates, food insecurity, and literacy rates) in mind, the objective of this research was to assess U.S. counties based on the Human Development Index and to explore domestic development in relation to global standards.   The counties were presented on a map according to how they rank globally.   This assessment then applied well-known development terminology, like First World versus Second World or high development versus low development, to U.S. counties to expose the severity of development issues and standard of living disparities within the United States.

2. Literature Review / Theoretical Background

The reputation of the United States as the world's most prosperous nation has been fading for at least two decades. At the center of this phenomenon is the unabated increasing centralization of wealth in the country.   The decline of some counties in the U.S. to Third and sometimes Fourth World status had been continual, especially since the 1980s. At the same time, we continue to claim First World status for our entire nation.   Current predictions suggest that the nation is in a state of increasing decline across a variety of contexts…social, economic, and political.   According to declinist literature are the "images of a nation winding down economically, living beyond its means, losing its competitive edge to more dynamic peoples, sagging under the burdens of empire, and suffering from a variety of intensifying social, economic and political ills (Huntington 1988,   p.77).

2.1 Poverty, Food Insecurity, and Literacy

The levels of poverty, food insecurity, and illiteracy are linked by economic factors, both those that fund the federal and state governments, as well economic conditions that support job opportunities and reasonable wages available to workers.   According to the Census Bureau (2017), in 2017, there were 39.7 million people living in poverty, defined as an income of about $24,000 for a family of four.   Researchers maintain, however, that an income of *twice* that amount is necessary to achieve basic financial security (DeNavas-Walt & Proctor 2015).

Lester Thurow, in his renowned 1996 book, *The Future of Capitalism: How Today's Economic Forces Shape Tomorrow's World,* outlines some of the reasons poverty, and inequality in general, have grown so much since the 1950s.   First, capitalism has strongly favored the upper economic classes, and its consequences—income inequality— has become increasingly large (and even more so since 1996).   In the 1980s, 64% of all earning increases were paid to the top 1% of the workforce, a trend that has continued to this day (Rothwell 2016).   Second, workers' real income decreased throughout the 70s and 80s.   Finally, and most importantly, it's clear that capitalism won't collapse by itself; something will need to be done to address its shortcomings (Thurow 1996).

At the center of economic influences on poverty (as well as related to food and education), we find the economic and educational elite pitted against the less educated and less wealthy (Collier 2018).   Collier continues, noting that as the economic divide deepens, a sense of ethical obligation to others diminishes.   Finally, the author notes that the U.S. is   "facing a dystopia" (p. 5) from social and economic factors favoring the wealthy, more specifically what he calls the "corrosion of social democracy" (p.8).

The decline is much the same for literacy, according to Coulson (1996):   "In reality, the ability of the average student to handle simple reading and writing tasks has stagnated for a hundred years, while the number of high achievers has declined in recent decades" (pg. 311).   Rutenberg (2009) agrees, noting that U.S. high schools are failing great numbers of students, leaving them without the resources they need to earn a reasonable living.   About 70% of high school students need some form of remediation, according to Biancarosa & Snow (2004), the most common problem being that students cannot *comprehend* the words they read—not that they cannot simply read them.   Over the last 15 years, 15 million students have graduated from high school reading at below the basic level (Bottoms 2004).

The reality of conditions in the U.S. goes far beyond what is publicly visible, especially in many rural and inner-city urban areas.   The most troubling thought is that conditions in these sensitive areas continues to decline.

2.2 Theoretical Background

Global organizations like the United Nations and World Bank have been ranking countries based on economic development for decades.   The United States has historically been, and continues to be, at the top of the list with the largest Gross Domestic Product (GDP).   Considering GDP as the most prominent measure of wealth and power, the United States sits atop the pedestal of economic success, positioned such that other countries strive to emulate the practices of this great nation.   But GDP fails to measure the many factors that contribute to the health of a nation—most notably the health and well-being of its people.

Personal wellness refers to optimal health and vitality, not just the absence of disease, in nine integrated contexts: physical, emotional, intellectual, social, cultural, spiritual, environmental, financial, and occupational (Fahey, Insel, Roth, & Insel 2015).   A healthy and well person, therefore, is able to meet the needs of these contexts and strike a balance that sustains her or him personally.   Income is not the sole factor in determining the wellness of a person and, therefore, is not the only factor influencing the wellness of a country.   If a country's constituents are not well, the country is not well.   The GDP was intended to be used as a marker for national economic progress, but it inadvertently became the marker for well-being, though it was not intended to do so.   Haq (1995) noted that GDP is just a "convenient abstraction" (p. 4) of a country's economic progress and neglects many other aspects of human life. From this standpoint, development is about the economy, not the people, and fails to acknowledge markers of human welfare like education, skills, health, goals, values, and equity, to name a few.

Furthermore, this point of view encourages the notion that economic progress is the cause of development, not just one of the many factors that could contribute to it, which is an insidious notion for developing countries.   When economic status is the primary basis of a country's rank (e.g. developing, an emerging market, the Third World, etc.), it is under the assumption of globalized economic trends and is, therefore, determined by a country's participation in a capitalist world market (Shenming 2000).   Thus, countries designated as "Third World " or "emerging" strive for economic development in accordance with Western capitalism—though the economic and social sustainability of capitalism, especially when it becomes extremist, is largely ignored.   In fact, Haq (1995) notes that "in many societies GDP can increase while human lives shrivel" (p. 4).   For this reason, assessing the sustainability of this development theory is necessary.

In the 1970s and 1980s, a development debate began in the social sciences that considered expanding the measures of development beyond GDP. The development conversation began to change from "How much is the nation producing?" to "How are its people faring?" (Haq 1995, p. 25). By the 1990s, a paradigm shift was underway: economic production was no longer the sole marker of human welfare, and a more holistic approach to human development was rediscovered from ancient and modern philosophers like Aristotle (384-322 B.C.) and Immanuel Kant (1724-1804)—both of who saw wealth as merely a tool for human well-being. On May 24, 1990, the United Nations released the *Human Development Report* (HDR), which challenged conventional wisdom about the relationship between economic growth and human development. This Report sparked the search for a new composite index under the United Nations Development Program (UNDP) to rank countries based on multi-dimensional socio-economic progress, rather than GDP alone (Haq 1995, p. 47). This index, the United Nations Human Development Index (HDI) ranks countries based on a composite score of three factors: a long and healthy life, knowledge, and a decent standard of living (Human Development Reports 2016).

The HDI has become the most widely used and accepted method for comparatively ranking countries. Countries can fall into one of four categories: very high human development, high human development, medium human development, and low human development. As of 2015, the United States ranked 8th globally, in the very high human development category with 49 other countries. Increasingly, however, the United States is falling behind other First World countries in some categories. The Social Progress Index (2015) ranks the U.S. 21st in meeting basic human needs, 37th in providing the foundations for well-being, and sixth for offering opportunity. The Programme for International Student Assessment found that, in 2012, the United States ranked 27th in mathematics, 20th in science, and 17th in reading (Organisation for Economic Co-operation and Development-OECD 2015).

An internal look at the United States exposes this. Regions like Appalachia and the Mississippi River Delta are known to have extreme and entrenched poverty, low educational achievement, and poor health but are over shadowed by the economic and social progress of metropolitan areas in development indices like the HDI. This is because the HDI and other indices rank countries based on the *national average of varying measures* that hide statistical outliers like the aforementioned regions. In order to fully understand how capitalism has affected the United States, it is important to look at development measures at a more granular scale, like at the state or county level, in order to understand the factors contributing to the national average.

3. Methodology

In order to apply international development classifications to U.S. counties, this study utilized the same accepted measures of those of the United Nations Human Development Index (See Figure 1). This is modeled on the HDI because it is a globally accepted way to compare counties and because "the Human Development Index (HDI) is a summary measure of average achievement in key dimensions of human development: a long and healthy life, being knowledgeable, and having a decent standard of living" (United Nations Development Programme 2016). These three criteria offer a more holistic approach to determining development than economic progress alone. The HDI uses life expectancy at birth as the chosen measure for a long and healthy life, an average of expected years of schooling and mean years of schooling as the measure for knowledge, and Gross National Product (GNP) per capita as the measure for a decent standard of living.
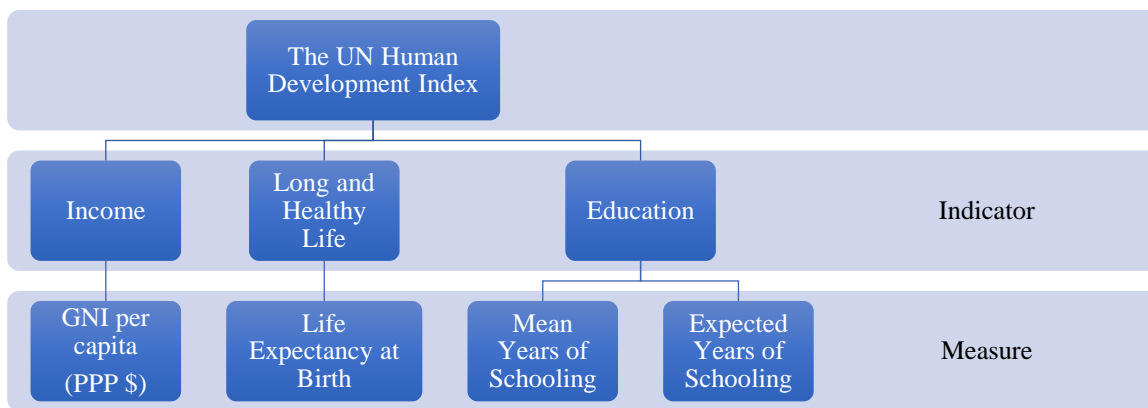

Figure 1. Diagram of the development indicators and the measures used to create the UN Human Development Index. PPP=Purchasing Power Parity.

The indicators in this study—health, education, and income—mirrored indicators from the HDI in order to produce a similar socio-economic approach to development. The measures used to represent these indicators, therefore, were food insecurity, literary rates, and poverty percentages, respectively. For multiple reasons, the same exact measures could not be used in this study as in the HDI, and those explanations will be given in the sub-sections about each measure used (See Figure 2).
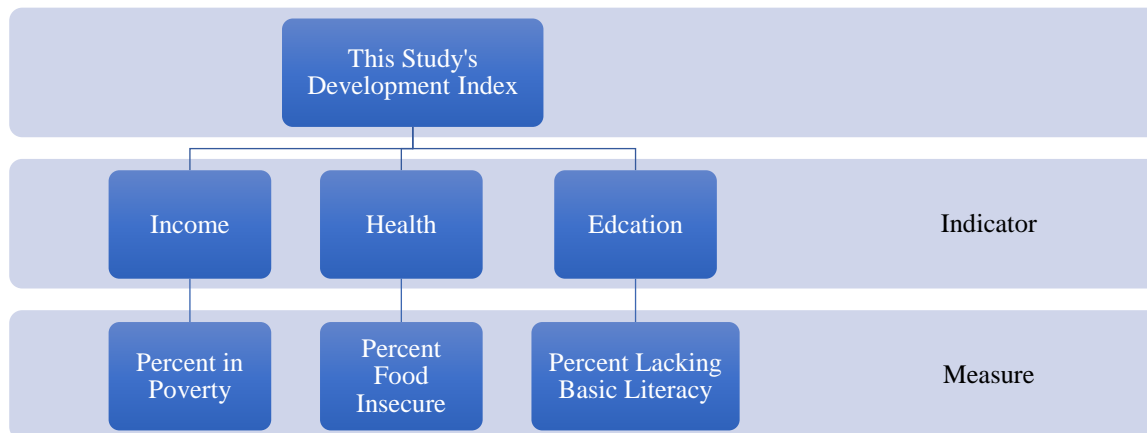

Figure 2. Diagram of the indicators and measures used to create schema used in this research.

Merely approaching development from the perspective of the economic output of a county ignores the many other factors contributing to human well-being. Because this study is modeled after the HDI, it is subject to the same limitations. It focuses only on basic dimensions of human development and does not consider a number of other important dimensions of human development, like infrastructure and access to healthcare, or the effects of human agency.

County-level data were used because they allow for enough granularity to see regional patterns without obscuring outliers, like national- or state-level data may. Specific data sources and methods of comparison are stated below in the "measures" subsection, followed by the methodology for making the maps and then comparing them to representative countries abroad. By relating counties to countries of similar development status for each measure, international development terminology (e.g. First World, Second World, etc.) was applied and will be explained in the final subsection of the methodology.

3.1 Measures

3.1.1 Income

According to Smith and Chandy (2016), "methods for measuring poverty differ widely both within and across countries, so comparisons and their interpretation demand extreme care" (p. 143). This project heeded that advice. It is obvious that living on *x* number of U.S. dollars (USD) per year in the U.S is very different than living on *x* number per year in rural Nigeria, where the costs of living are radically different. For this reason, basic income data could not be used to make the comparison. Instead, this project used poverty data relative to the U.S. poverty line ($24,600 per year, for a four person family) and compared those percentages to representative countries from each of the four development classifications and their percent of the population impoverished relative to their poverty line.

Using poverty percentages relative to each country avoided the necessary adjustment to purchasing power parity that would be required if average incomes were used. This approach is supported by Smeeding, Rainwater, and Burtles (2001), who suggest that "for international comparison, poverty is almost always a relative concept" (p. 3). The data used in this project, therefore, come from the United States Census Bureau's 2015 Small Area Income and Poverty Estimates (SAIPE) at the county level. The data given include the total number of people in poverty in a county as well as the total population of the county for that year. With these data, the total percent of people in poverty per county was determined.

3.1.2 Education / Illiteracy

With laws keeping children in the United States in school until a certain age, using data on mean years of schooling in the United States to compare to international standards would have been skewed. Just because U.S. children are attending school, does not mean they are well-educated. In 2015, the National Assessment of Education Progress,

also known as the Nation's Report Card, recorded that 45% and 37% of elementary and middle school students performed at above math proficiency and only 37% in reading. For the purposes of comparison to international education standards, then, this project used basic prose literacy as the measure of education.

The data were sourced from the National Center for Education Statistics (NCES) and are supported by the U.S. Department of Education.   The NCES is the primary federal entity for collecting, analyzing, and reporting data related to education in the United States and other nations (Greenberg & Jin 2007).   The National Assessment of Adult Literacy (NAAL) is the survey conducted by NCES to assess the English Literacy of adults (ages 16 and older) in the United States.   Literacy is assessed on three scales: prose, document, and quantitative literacy.   The data used in this project come from the NAAL on basic prose literacy.

Basic prose literacy is defined as having the knowledge and skills needed to perform prose tasks, like reading brochures and instructional materials (Greenberg & Jin 2007).   The data used in this project are from the most recent available survey data in 2003.   The data were given as the percent lacking basic literacy in each county.

International literacy rates were sourced from the CIA World Fact Book and UN Educational, Scientific, and Cultural Organization (UNESCO) and represent the literacy rate of that country in its official language.   The rates were given as the percent of the population with basic literacy, and because the data for the U.S. were "percent lacking basic literacy," the reverse was found in order to make lateral comparisons.

3.1.3 Health

Measuring health in the United States and other Western, industrialized countries is very different from measuring health elsewhere.   People in the U.S. do not die of the same communicable diseases, like cholera and malaria, at the same rate as those in less developed countries.   Instead, Americans die of life lifestyle diseases like heart disease and lower respiratory disease.   While life expectancy is high (about 79 years on average), this does not consider the quality of life.   Americans might be living longer because of modern medicine, but that is not to say the last decade or so is easy.   It is likely that many Americans are in significant pain—in fact, about 80% of the global opioid supply is consumed by the United States (Gusovky 2016).   Despite this, life expectancy in the U.S. is two years lower than the average of the other 34 OECD countries for several reasons, including poor health-related behaviors and a highly fragmented health-care system.   These discrepancies in the causes of death and quality of life made using average life expectancy at birth a difficult measure by which to assess health.   Instead, food security was chosen as the measure for health because food is fundamental to life and health.   Due to a lack of data, other comparable and important health measures could not be used.

Food insecurity data came from County Health Rankings and Roadmaps and is defined as the percentage of people in a county who did not have access to a reliable source of food in the past year.   The data were compared to the Food and Agriculture Organization (FAO) State of Food Insecurity in the World 2015 data.   The FAO defines undernourishment as not being able to "acquire enough food to meet the daily minimum dietary energy requirements, over a period of one year"—so, in other words, the same way as the County Health Rankings and Roadmaps define food insecurity.   Because both data sources defined food insecurity the same way, the comparisons were made laterally and without adjustment.

3.2 Making the Maps

The spatial and statistical analysis for this project was performed using ArcGIS.   All the data—income, health, and education—came from programs recording data at the county level.   Counties include all United States incorporated cities, boroughs, parishes, and the District of Columbia for a total of 3,144 counties and county-equivalents.   Three maps were created, each displaying a development measure: health, income, or education.

3.3 Making the Comparisons

Labeling counties with international development designations is the most poignant part of this project.   To do this, careful comparisons were made based on cross-referenced statistics for each measure.   In order to make comparisons, representative countries were necessary for each class.   These countries were chosen because they consistently fall into the same classification, no matter the index used. For example, Japan and Canada are widely recognized as First World countries, therefore falling into "Class 1" for this project.   Kazakhstan falls into the second class of the HDI and the second class according to the World Bank—making it a part of "Class 2."   Table 1 shows all the countries chosen to represent ideal countries—in the sense that each country consistently falls into that rank according to the HDI and World Bank—for each class. Representative countries were also chosen for their geographic spread across the world for each class.

The average percent for each measure was then found for every representative country. These averages for percent food insecure, percent in poverty, and percent illiterate relative to each country were cross-referenced using data sources like the CIA World Fact Book, UNESCO, Food and Agriculture Organization, and the World Health Organization (WHO) as well as country-specific studies (2013, 2015, 2016). Ranges were determined for each classification based on the national average of each measure for the representative countries. For the most part, the classification ranges did not overlap with the exception of food security and literacy rates for the first two classes (see Table 1). This did not have an effect on the literacy rates map because there are no counties in the U.S. that correlate with literacy rates of the other First World countries; this will be further explained in the literacy rates sub-section. The overlap of ranges did influence the map of food insecurity and will be addressed in the Results.

The established data ranges for each class were applied to United States counties in its respective measure. To display this cartographically, the data layer of each measure was given a Natural (Jenks) break with four classes. The classes for each measure lined up almost exactly with the international data ranges, so no further data manipulation was necessary. Each international classification was assigned a color (see Table 1), and counties were displayed accordingly. Accordingly, a county falling into the first class for literacy, for example, would be displayed as royal blue, representing that it has a similar average in that measure to First World countries.

Table 1. Classifications levels and their corresponding definition according to formerly used terminology and the HDI, respectively, and the representative countries used for comparison and their relative measures in each of the three chosen development indicators.

Class	HDI	GDP (rank)	Country	%Food Insecure	%in Poverty	% Illiterate
1	Very High	3	Japan	24.1	16.1	1
	Very High	4	Germany	17.1	15.5	1
	Very High	10	Canada	13.1	9.4	5.6
2	High	11	Russia	12	11.2	0.3
	High	55	Kazakhstan	5.5	5.3	0.2
	High	126	Albania	6	14.3	2.8
3	Medium	6	India	15.2	29.8	27.9
	Medium	70	Kenya	21.1	43.3	22
	Medium	86	Ghana	5	24.2	23.4
	Medium	123	Nicaragua	16.6	29.5	17.2
4	Low	101	Afghanistan	26.8	35.8	61.8
	Low	140	Rwanda	31.6	39.1	29.5
	Low	142	Haiti	53.4	58.5	39.3
	Low	144	Niger	29	63	80.9

4. Results

The results show the geographic distribution of development classifications in the United States according to each of the three indicators: income, health, and education. Three individual maps display the results by county: 1) percent poverty for income, 2) percent food insecure for health and 3) percent lacking basic literacy for knowledge (see Figures 3, 4, and 5). The color of each county symbolizes the development (First, Second, Third, or Fourth World) level of that county in that specific measure.

Overall, there is a similar geographic distribution in all three maps, where the Black Belt—described to be a swath of Virginia, the Carolinas, and Gulf Coast states by Tullos (1970)—is categorized in the fourth class for all three measures. The same is true of the Mississippi River Delta region. The Appalachian Region, particularly in West Virginia and Kentucky, falls into the fourth class for poverty rates, and varies between third and fourth classes for literacy rates and food security, despite the original predication that this region would fall into the lowest development class.

While metropolitan areas might be expected to be the lowest in development, they are not doing as poorly as counties in the Black Belt and Mississippi River Delta region. In fact, only one borough in New York City, The Bronx, falls into the fourth class for literacy. Otherwise, it falls into the third class for poverty and food insecurity. The same results are true for the Los Angeles metropolitan area, with Kern County to the north, falling in the third class for income and health, and the fourth class for literacy rates. Los Angeles county itself is well-developed in comparison, falling into the first class for income and health, but third for literacy, suggesting that the growing divide is not only developmental but also geographical.

There was, however, one predominant result that was not predicted: the low development classification of Native American Reservations. States with a high concentration of Native American populations and large reservation lands include Oklahoma, Arizona, New Mexico, South Dakota, North Dakota, Wyoming, and Montana. Oklahoma, while home to a large population of Native Americans, lacks reservation lands like the other states. An interesting result noticed is that the counties in eastern Oklahoma where Native Americans populations are heavy, tends to be in the second or third class of development for all three measures. This is a stark contrast among Arizona, New Mexico, and South Dakota, where Native American populations with reservation land fall into the fourth class for income, a mixture of third and fourth classes for food insecurity, and a mixture of second and third classes for literacy.

Other notable geographic results include the distinction between the North and South. On all three maps, there is a smooth curve that delineates higher development from lower development between the 35th and 40th parallels, despite a few exceptions like Appalachia and Native American Reservations.

Making comparisons of food insecurity here versus elsewhere in the world was a challenge because there was some overlap in the data ranges for the first and second classes. All of the representative first class countries had a greater food insecurity than those of the second class, so while the map symbols are consistent with the representative counties, it is important to note that maybe highly industrialized economies are not the model countries for food security and that countries traditionally classified as Second World are better off in this measure.

Finally, it is important to note the apparent short coming of literacy in the United States. The map of education shows that not a single county falls into the first class for literacy, making this measure the worst for domestic development overall, with a total of 479 counties with literacy rates comparable to the Fourth World. Not a single U.S. county is on par with other First World countries, whose literacy rates are 99% and above. The U.S. on average has a literacy rate of 86%, equivalent to that of Jamaica. The literacy rates, however, are so poor because the survey data used to create the maps includes the people who couldn't respond due a language barrier. This explains the extremely low literacy rates in the border lands to the South. These people, however, are not illiterate completely, but rather just illiterate in English. For example, when Broward County, Florida started using non-verbal placement tests for second graders in 2005, the proportion of black and Latino students identified as gifted tripled (Temin, p. 118). Literacy rates are so high in Western Europe because language is highly valued, and literacy is determined by fluency in any of the common languages, not just one.

Overall, 66 counties fall into fourth class for all three measures, making them comparable to low development or Fourth World countries.
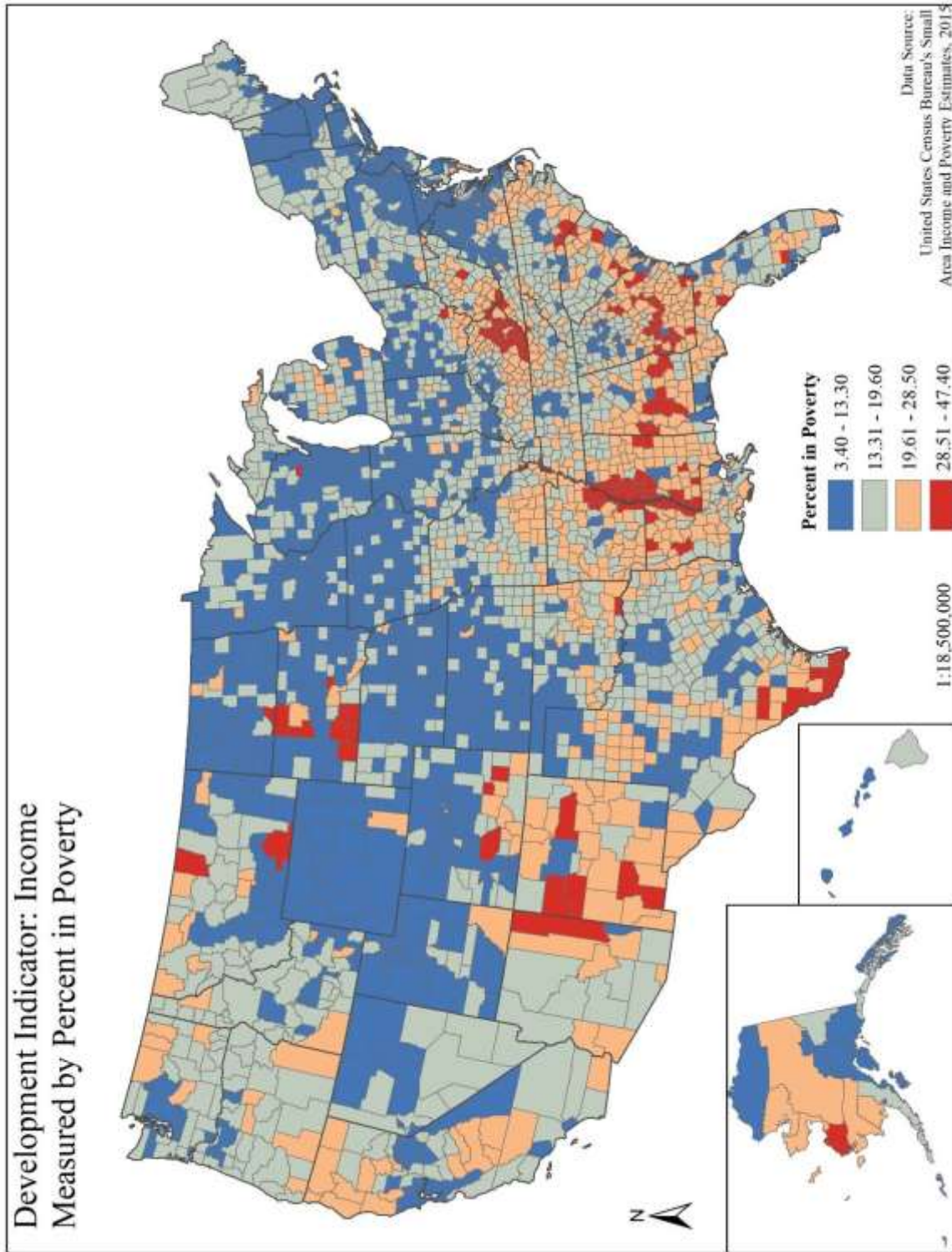
Figure 3. Map displaying U.S. counties according to the percent of population in poverty, symbolized relative to the international classifications in Table 1.
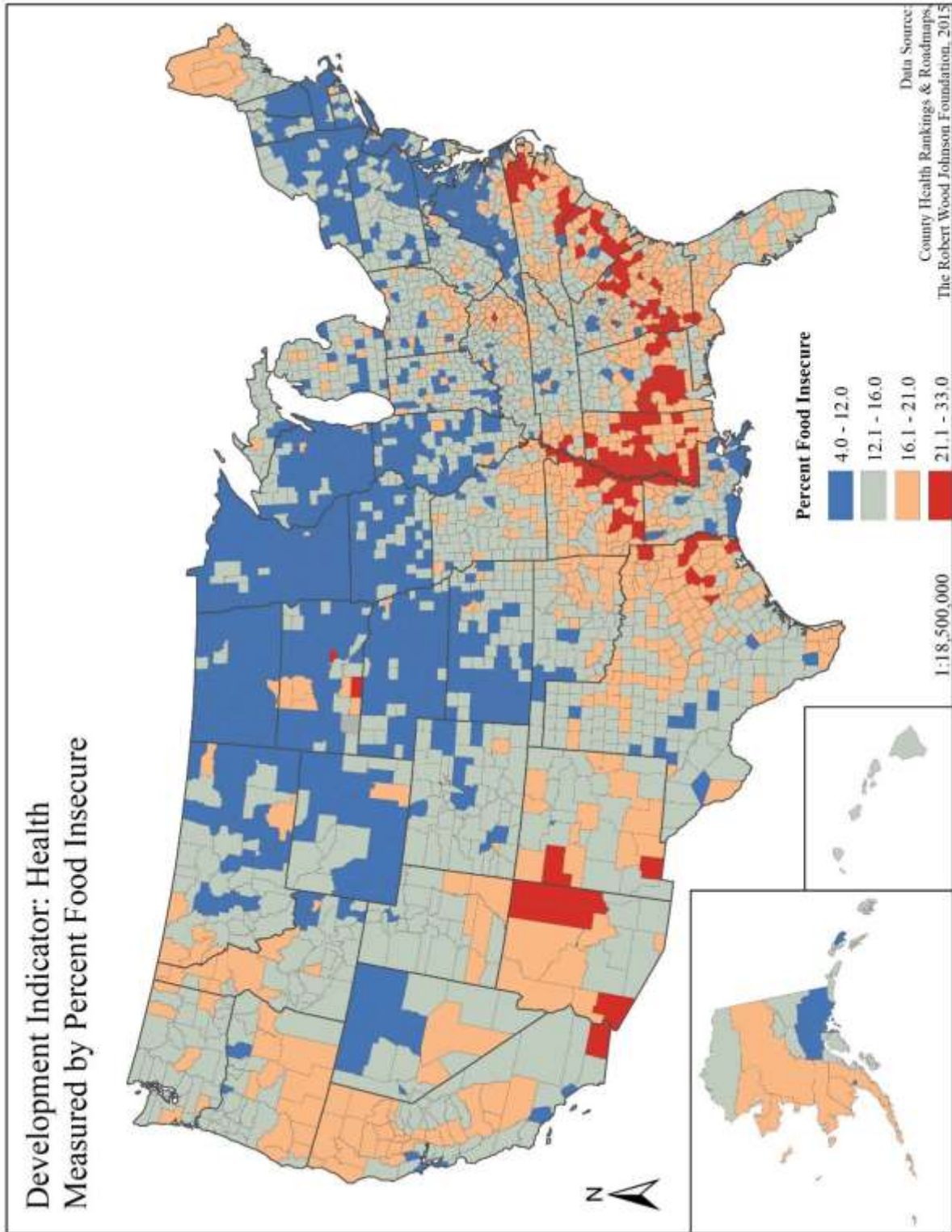
Figure 4. Map displaying U.S. counties according to the percent of the population that is food insecure, symbolized relative to the international classifications in Table 1.
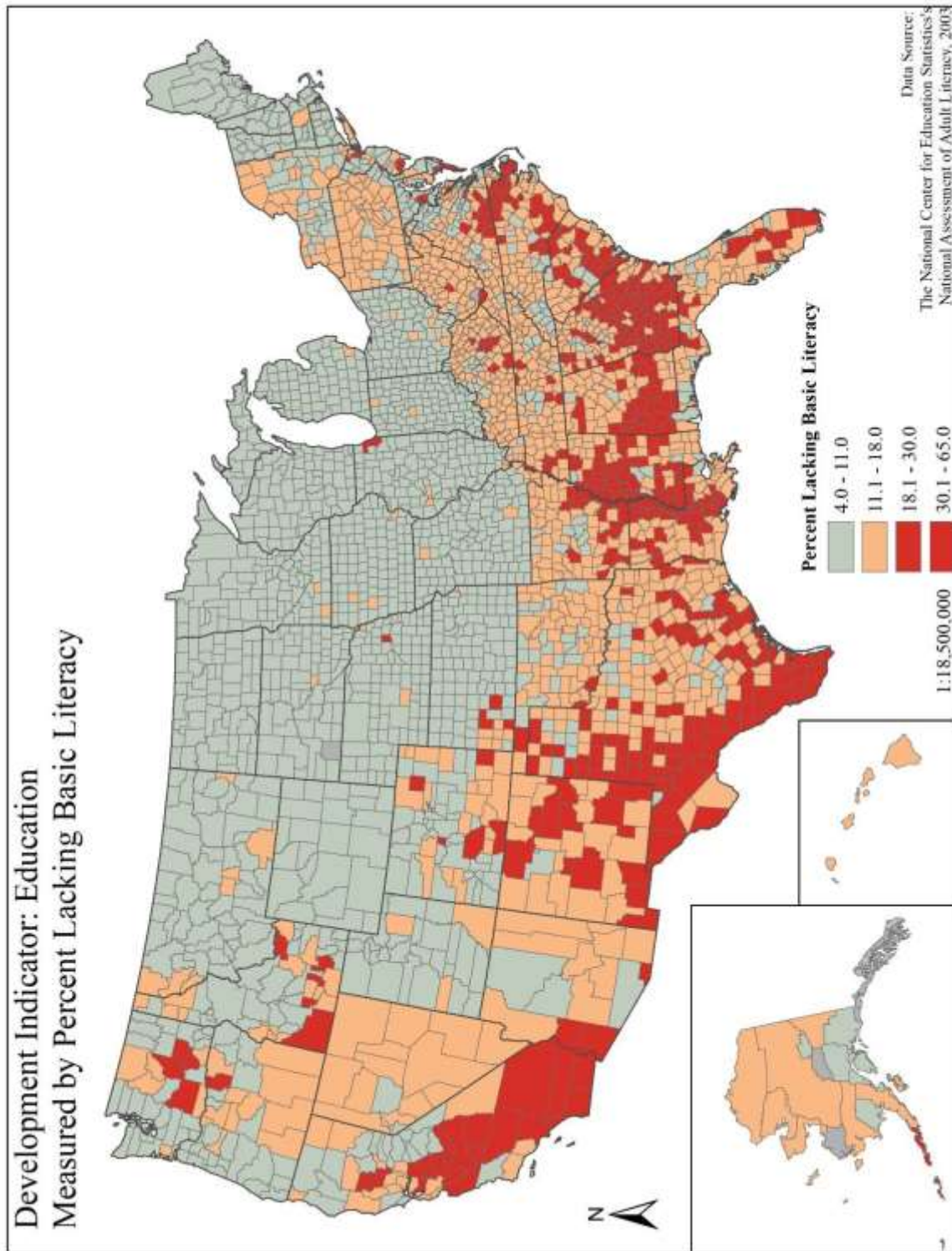
Figure 5. Map displaying U.S. counties according to the percent of the population that lacks basic literacy, symbolized relative to the international classifications in Table 1.

5. Discussion

The results show, that with stark clarity, the United States is not the country it is touted to be, nor is it the hallmark of prosperity many have come to believe. It is easy to be fooled when the United States has the world's third largest GDP and has been one of the top models for economic growth for over 150 years. But, walk around any city and notice areas with failing infrastructure, a lack of grocery stores, and an overall sense of poverty like that of a developing nation (Parramore 2017). The people living in these neighborhoods are not fooled—they know that the GDP is not an accurate snapshot of this country, just as teachers know that one test in a single subject does not define a student's intellect. So, as far as GDP goes, the results of this study prove that a single statistic, inclusive of all fifty states, paints an extremely inaccurate picture. While the Human Development Index's three factor approach to rating development is more encompassing, it still does not offer a granular picture of development that Americans live every day. The divides between poverty and prosperity are distinct and sudden, with streets, rivers, or county lines often being the geographical border between the two, as shown in the results.

The results, while not unexpected, were still a surprise. People know of the woes many of their fellow Americans face, but unless confronted with the numbers graphically, it is hard to comprehend the state of this once great nation. The maps illustrate the vastly different worlds in which fellow Americans live, where some regions experience poverty rates near 50%, and close to a third of people wonder when their next meal will be. While this study is only a cross-section in time, the longitudinal implications are hard to ignore. Less than century ago, the wealth in the U.S. was less concentrated and jobs, both skilled and unskilled, that paid a living wage were plentiful, a period time-after-time described as the "golden age" (Sommeiller & Price 2018). These are the pillars of the American Dream. Today, 38.6% of wealth is concentrated to the top one percent of population (Bricker 2016). United States is a country in decline, likely due to the centralization of wealth, illicit connections between government and industry, and a remarkable malaise among far too many Americans. Whether this is a decline in values or simple apathy is also unclear. In his recent book, *The Vanishing Middle Class: Prejudice and Power in a Dual Economy,* Peter Temin (2017) shares the notion that the United States' economy is regressing to that of a developing country, where two sides of the economy exist: the affluent minority that is politically in control, and the impoverished, socio-economically immobile majority.

Large metropolitan areas are population hubs for wealthy people, while their neighboring counties are burdened with high rates of poverty, food insecurity, and illiteracy. The maps show where urban sprawl has resulted in poor development in the New York City and Los Angeles areas, for example. People are migrating to the hubs in search of work but are finding that without education—another financial burden—they cannot achieve the touted "American Dream." The gap between the wealthiest top 1% of the nation and the shrinking middle class has grown so rapidly in the past few decades that crossing this socio-economic divide is increasingly difficult. The jobs offered by the 1% are far fewer due to mechanization and outsourcing in the quest for profit. For many, the American Dream is quite literally a fantasy, rather than an attainable reality.

Some populations are starkly underserved according to these maps. In all three development indicators, the Black Belt, the Appalachian Region, the Mississippi River Delta, and Native American reservations are the worse off. Entrenched poverty and systematic racial inequality in these regions are large factors contributing to the status of these populations. Severe poverty, as high as 47% in some counties, contributes to the low rates of literacy and high rates of food insecurity in these areas. Many students drop out of school in search of unskilled work because the educational system is failing them. If they can find work, low wages prevent access to a reliable source of food. Furthermore, many of these underserved populations live in food deserts and cannot feasibly access nutritionally dense food, causing the food insecurity rates to skyrocket in these regions.

These conditions speak volumes to the lack of domestic social support and funding for chronically underserved populations. Systematic discrimination, like the mass and forced exodus of Native Americans from their lands or school segregation, are not past events for history textbooks, but rather the present reality for people of color and tribal ancestry in the United States.

While the middle class across the U.S. is shrinking and regressing to Second World status, the historically underserved populations in these regions are falling into even lower categories of development, classifying them as Third World, sometimes even Fourth World, status. The jobs that have historically served these areas are vanishing or have been gone for a decade or more. This is particularly noticeable in the Mississippi Delta and the Appalachian regions that are likely regressing due to economic and environmental issues, like the pollution of waterways that historically offered people a livelihood, and the elimination of coal mining jobs, respectively. People who migrate to cities in search of labor (as has historically been the case, especially during the Industrial Revolution and the Depression) find

that the blue-collar work previously available to their parents and grandparents has now moved oversees or been replaced by robotic technology and machines.

It is obvious then, that a development model based on unbridled capitalism encourages countries to focus on the growth of their economy, not the growth of their populations. While it produced jobs and an economic boom in the mid-twentieth century, this economic model is now proving to fail most Americans, causing significant areas of the U.S. to look more like a developing nation than the once great nation. A change to the economic and development paradigm domestically is necessary for the sustainable development of all people.

6. Data Sources

Counting Health Rankings and Roadmaps. (2015). "2015 County Health Rankings National Data." [Data File]. *The Robert Wood Johnson Foundation and the University of Wisconsin Population Health Institute.* Retrieved September 2016 from http://www.countyhealthrankings.org/rankings/data

National Center for Education Studies (NCES). (2003). "National Assessment of Adult Literacy (NAAL)." [Data Files]. Retrieved February 2017 from https://nces.ed.gov/naal/estimates/StateEstimates.aspx

United States Census Bureau. (2016, December). Model-based Small Area Income & Poverty Estimates (SAIPE) for School Districts, Counties, and States. [Data File]. Retrieved November 2016 from https://www.census.gov/did/www/saipe/

References

Biancarosa, G. & Snow, C. (2004). *Reading next: A vision for action and research in middle and high school literacy—A report to Carnegie Corporation of New York.* Washington, D.C.: Alliance for Excellent Education. Retrieved from http://www.all4ed.org/files/ReadingNext.pdf.

Billings, D. (1974). Culture and poverty in Appalachia: A theoretical discussion and empirical analysis. *Social Forces, 53*(2), 315-323. https://doi.org/10.2307/2576025

Bottoms, G., Presson, A., & Han, L. (2004). Rigor, Relevance and Relationships Improve Achievement in Rural High Schools: High School Reform Works When Schools Do the Right Things. Challenge to Lead. *Southern Regional Education Board, 592 10th St. N.W., Atlanta, GA 30318-5776.* https://eric.ed.gov/?id=ED486508

Bricker, J. et al. (2017, September). *Changes in the U.S. Family Finances from 2013 to 2016: Evidence from the Survey of Consumer Finances.* Volume 103, No. 3. Federal Reserve Bulletin. Retrieved on January 14, 2019 from https://www.federalreserve.gov/publications/files/scf17.pdf

Central Intelligence Agency. (2013). *The World Factbook.* Retrieved April 2016 from https://www.cia.gov/library/publications/the-world-factbook/index.html

Collier, P. (2018). *The future of capitalism: Facing the new anxieties*. New York: Harper.

Coulson, A. (1996). Schooling and literacy over time: The rising cost of stagnation and decline. *Research in the Teaching of English*, Vol. 30, No. 3, pp. 311-327

County Health Rankings and Roadmaps (n.d.). *Food Insecurity*. University of Wisconsin Public Health Institute. Retrieved April 30, 2017, from http://www.countyhealthrankings.org/measure/food-insecurity

DeNavas-Walt, C. & Proctor, B.D. (2015). Income and Poverty in the United States: 2014 Current Population Reports. U.S. Department of Commerce Economics and Statistics Administration / U.S. Census Bureau. https://www.census.gov/content/dam/Census/library/publications/2015/demo/p60-252.pdf

Fahey, T. D., Roth, W. T., Insel, P. M., & Insel, C. (2015). *Fit & well: Core concepts and labs in physical fitness and wellness.* Eleventh edition. New York: McGraw Hill Education.

Food and Agriculture Organization. (2015). *The State of Food Insecurity in the World 2015.* United Nations. Retrieved April 30, 2017, from http://www.fao.org/hunger/en/

Gusovky, D. (2016, April 27). *Americans Consume Vast Majority of the World's Opioids.* CNBC. Retrieved April 30, 2017, from http://www.cnbc.com/2016/04/27/americans-consume-almost-all-of-the-global-opioid-supply.html

Haq, M.U. (1995). *Reflections on human development*. Oxford: Oxford University Press.

Hedges, C. & Sacco, J. (2014). *Days of destruction, days of revolt.* New York: Nation Books.

Hododny, E. (2016, June 15). This brilliant map renames each U.S. state with a country generating the same GDP. *Business Insider.* Retrieved April 16, 2017 from http://www.businessinsider.com/map-renames-us-states-with-country-generating-same-gdp-2016-6

Huntington, S.P. (1988). The U.S.—Decline or renewal. *Foreign Affairs 67.* https://doi.org/10.2307/20043774

Organisation for Economic Co-operation and Development (OECD). (2012). *Country Note—United States—Results from PISA 2012*. Retrieved April 29, 2017 from https://www.oecd.org/unitedstates/PISA-2012-results-US.pdf

Organisation for Economic Co-operation and Development (OECD). (2015). *Health at Glance 2015: How Does the U.S. Compare?* Retrieved April 30, 2017 from https://www.oecd.org/unitedstates/Health-at-a-Glance-2015-Key-Findings-UNITED-STATES.pdf

Parramore, L. (2017, April 20). *America is Regressing into a Developing Nation for Most People*. Institute for New Economic Thinking. Retrieved 1 May 2017 from https://www.ineteconomics.org/perspectives/blog/america-is-regressing-into-a-developing-nation-for-most-people

Rothwell, J. (2016). Make elites compete: Why the 1% earn so much and what to do about it. Brookings Institute.https://www.brookings.edu/research/make-elites-compete-why-the-1-earn-so-much-and-what-to-do-about-it/

Rutenberg, D. (2009). High School Literacy: A Quick Stats Fact Sheet. National High School Center at AIR. https://files.eric.ed.gov/fulltext/ED507600.pdf

Shenming, L. (2000, March). *Globalization and the Third World*. Retrieved April 29, 2017 from http://en.cnki.com.cn/Article_en/CJFDTOTAL-ZSHK200003000.htm

Smith, C. & Chandy, L. (2016, August 11). *How Poor Are America's Poorest? U.S. $2 A Day Poverty In A Global Context*. Brookings Institution. Retrieved February 22, 2017 from https://www.brookings.edu/research/how-poor-are-americas-poorest-u-s-2-a-day-poverty-in-a-global-context/

Social Progress Index 2015. (2016). Retrieved April 20, 2016 from http://www.socialprogressimperative.org/data/spi

Sommeiller, E. & Price, Mark. (2018). *The new gilded age: Income inequality in the U.S. by state, metropolitan area and county.* Economic Policy Institute. Retrieved January 14, 2019 from https://www.epi.org/files/pdf/147963.pdf

Temin, Peter. (2017). *The vanishing middle class: Prejudice and power in a dual economy.* Cambridge, Mass.: MIT Press. https://doi.org/10.7551/mitpress/11044.001.0001

The World Bank. (2016). *World Bank Country and Lending Groups*. Retrieved March 4, 2017 from https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups

Thurow, L. (1996). *The future of capitalism: How today's economic forces shape tomorrow's world*. New York: Penguin Books.

Tullos, A. (1970, January 01). *The Black Belt*. https://doi.org/10.18737/M70K6P

United Nations Development Programme. (2016). *Human Development Reports.* Retrieved April 2016 from http://hdr.undp.org/en/content/human-development-index-hdi

United Nations Education, Scientific and Cultural Organization. (2016). *UNESCO eAtlas of Literacy*. Retrieved April 2016 from https://tellmaps.com/uis/literacy/#!/tellmap/-601865091

U.S. Census Bureau (2017). https://www.census.gov/library/publications/2018/demo/p60-263.html

Woodard, Colin. (2011). *American nations: A history of the eleven rival regional cultures of North America.* New York: Viking Press.

World Health Organization. (2016). *Global Health Observatory Data Repository: Probability of Dying Per 1000 Live Births, Data by Country.* Retrieved April 2016 from http://apps.who.int/gho/data/view.main.182?lang=en