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August 29, 2017
Nature of Science (NOS) and Common Core Mathematics Practice (CCMP)
Analysis

Science is often seen as an attempt to see the truth about natural world that uses a single determined method in order to prove scientific concepts and facts. However, science is much more complicated and interesting, has its limitations and depends on scientific investigation that requires various steps including finding a question or phenomenon to formulate a hypothesis, creating an experiment, making observations and/or collecting qualitative or quantitative data, analyzing that data, and making a valid conclusion to either prove or disprove previously formulated prediction. Thus, the article “Global Water Resources: Vulnerability from Climate Change and Population Growth” by Vorosmarty et al. (2000) addresses the question about greenhouse warming that continues to influence the condition of the terrestrial water cycle that plays a key role in shaping our planet’s climate, ecology and biochemistry, and might lead many parts of the developing world towards experiencing large increases in relative water demand.

The article also highlights science as the way of knowing by tracking, identifying and informing how climate change, human development and combination of both previously mentioned factors influence future state of global water supplies (Vorosmarty et al. 2000). It also shows that scientific investigations use the variety of methods including identifying the problem, asking a questions, using various methods to collect and analyze qualitative

and quantitative data such as mapping the distribution of world's population, CGCM/ WBM models to identify contemporary world's population that lives under progressive levels of total water demand and imprinting to predict potential scenarios of water supply distribution in areas of high demand. Lastly, after analyzing data and taking factors such as climate change, human development, population growth, and combination of all them together into a consideration, the authors look for resolution for future water vulnerabilities and highlight the necessity to consider interactions between climate change and variability, groundwater hydrology and land surface, water engineering methods, human systems and societal adaptations to water shortage (Vorosmarty et al. 2000). This aspect of the article allows us to think of science as human endeavor since it takes curiosity of a certain group of researchers to question scientific phenomenon of greenhouse effect on global water supply, involves human logical process that allows identification of the proper ways to collect and analyze data in order to understand and solve one of the most frequent real- world problems on water shortage in areas of high population concentrations in the future (Vorosmarty et al. 2000).

From the perspective of the Common Core Mathematical Practices, the article "Global Water Resources: Vulnerability from Climate Change and Population Growth" by Vorosmarty et al. (2000) meets the following categories for math. This article makes sense of problems by solving them, describes how scientists and researchers reason abstractly and

quantitatively when collecting and analyzing data, and leaves the space for expressing regularity in repeated reasoning.

As mentioned previously, the article by Vorosmarty et al. (2000) focuses on the problem of the impact of greenhouse gases in the atmosphere and population growth on climate change and global water resources. Researchers look for the main factors such as human impact on terrestrial water cycle, rapid population growth and migration due to economic development, and climate change, that influences the topology of river systems worldwide. These factors become the main reason for questioning the future of proper water distribution and access in areas of concern where the population grows drastically such as Southern part of North America, Western Europe, Central and East Asia. The researchers use various statistical methods to analyze numerical data such as mapping the distribution of population with respect to relative water demand (RWD), identifying the aggregation of total water stress within domestic and industrial sectors, using CGCM1/WBM models to highlight and predict cumulative distribution of worldwide population repeatedly over long periods of time (period, set up for this particular study starts in 1985 and finishes in 2025). This factor shows that scientists that are involved in the climate study have the space for repeated reasoning to prove their prediction for future deficit of water supplies (Vorosmarty et al. 2000).

Lastly, the main purpose of a study is to highlight the issue with water deficiency in the future and find perspective preventive methods to reduce

the impact of changes in population and economic development on planet's climate (Vorosmarty et al. 2000). Thus, to secure a better future for our planet, it is necessary according to the researchers to take into consideration interactions between variability and climate change, land surface and groundwater hydrology, human systems and water engineering techniques, and also our societies' adaptations to water shortage (Vorosmarty et al. 2000). The study clearly shows identification of the problem and scientists' attempt to solve it.

References:

<http://www.eko.uj.edu.pl/stat/II/V%C3%B6r%C3%B6smarty%20et%20al%202000.pdf>