

Population, vulnerability and humanitarian crises

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Abstract: The study of population is at the forefront of many different aspects of geography. Following an overview of the key demographic variables and their significance, this paper examines the role which an understanding of population plays in relation to the outcomes of humanitarian crises, particularly natural disasters. The concept of vulnerable populations is considered, with specific reference to gender differences and to the likely future impact of climate change.

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Introduction: why population matters

Understanding population patterns is central to our understanding of many different geographical phenomena, a fact which is recognised in the second level curriculum. While it is clear that a thorough exploration, and deeper understanding, of the nature of populations can help us to explain aspects of economic and social geography, particularly in relation to persistent global inequalities, the value of population study to aspects of the discipline more closely associated with physical and environmental geography is being recognised more fully in recent years. In this paper, the importance of understanding population, and more particularly vulnerable populations, as a way of responding to humanitarian disasters is discussed. The case studies which are presented will, it is hoped, suggest new ways of engaging pupils in the study of population. The discussion begins with a brief overview of population rudiments, before turning to the nature of vulnerable populations and how we can begin to understand them more fully.

Measuring Population and understanding the basic variables

Although the different aspects of population interact in various intricate ways to give rise to the complex diversity of the world's population, in fact there are only three basic factors which underlie this complexity. Births (fertility), deaths (mortality) and movement (migration) combine to give rise to a host of possible variations within any given population. Although the author has considered population basics previously (McManus, 2007), it is perhaps worth reiterating some of the essentials here for completeness.

Demographic variables are most commonly expressed as rates, a measure that reflects the frequency of an event (such as a birth or death) relative to the population that may experience that event. These rates are easily measured and make it possible to directly compare data across time and space. For example, the 4.6 million population of Ireland might be very different in size to that of Brazil (202.8 million) or Bahrain (1.3 million), but all three countries share a common birth rate of 15 per thousand according to the most recent data (WPDS, 2014).

The use of population data in the classroom can be hampered by the fact that textbooks quickly become outdated. However, the ready availability of reliable data online ensures that topical material can now be included in lesson planning. The US-based Population Reference Bureau produces its 'World Population Data Sheet' annually which is available for free download from its website (www.prb.org). Also available at the site are resources including an interactive world map illustrating key demographic variables by country and region, a world population clock which continuously updates the world population total, and a range of digital visualizations and videos which highlight key findings from the data sheet.

Crude birth and death rates will be familiar to students from the demographic transition model. They represent the annual number of births and deaths per 1,000 total population, without taking a population's age structure into account. The difference between these two rates gives the rate of natural increase, which is generally expressed as a percentage. Where deaths exceed than births, as is currently the case in Japan, Estonia, Belarus, Bulgaria and a number of other countries, natural *decrease* is experienced. This annual rate of population change does not take account of migration, which is generally measured separately.

In addition to the rates outlined above, three further aspects of population are commonly considered, particularly in development geography. These are the infant mortality rate, total fertility rate, and life expectancy at birth. These are not just important in their own right, but are often seen as surrogates, representing 'how well' a country is doing, with infant mortality considered to be a good indicator of the health status of a population. Infant mortality is the annual number of deaths of infants aged under one year for every 1,000 live births. Despite recent well-reported cases, Ireland has one of the world's lowest infant mortality rates, at 3.3 per 1,000. This can be contrasted with typical infant mortality among sub-Saharan countries of 67 per 1,000 (WPDS, 2014). Sometimes an alternative measure, the under-five mortality, is preferred. This measures the number of children per thousand born who die before reaching their fifth birthday. It gives a good indication of the health and nutritional status of the overall population, as well as of social progress through programmes of health-care and education. The total fertility rate indicates the average number of children a woman would have during her child-

bearing years (assuming that current age-specific birth rates remain constant). This measure is readily understood, as pupils can easily imagine the number of children in a given sized family. Life expectancy is a hypothetical measure based on current death rates. Thus life expectancy at birth represents the average number of years a new-born infant can expect to live under current mortality levels. It is often sub-divided by gender, as the global pattern is for women to live longer on average than men.

Unsurprisingly, infant mortality levels have an important influence on both the crude death rate and on life expectancy. With significant declines in infant mortality in the twentieth century, life expectancy worldwide increased dramatically. Whereas in the 1950s the United Nations estimated that the world life expectancy at birth was just 46.4 years, the most recent estimates suggest that current world life expectancy at birth is 71 years; clearly this is a striking improvement.

Natural disasters and vulnerable populations

Understanding the composition of a population is not just useful for day-to-day planning of services and facilities, but can be of particular assistance in preparing for, and reacting to, humanitarian crises. In the year 2013, some 330 reported natural disasters worldwide cause the death of more than 21,610 people, affected a total of 96.5 million individuals and caused a record US\$ 118.6 billion in damage. While 108 countries were hit, the five countries that were hit most often (China, the USA, Indonesia, the Philippines, India) accounted for over one-third of total disaster occurrence in 2013 (ASDR 2013, p. 13).

The label 'natural' disaster is generally applied to emergencies which are caused by the earth's physical processes, such as earthquakes, volcanoes or floods. However, increasingly researchers have pointed out that extreme natural events are not actually 'disasters' until a vulnerable group of people is exposed (Blaikie *et al*, 2004). Neumayer and Plümpfer (2007, p. 561) highlight the fact that 'there is little that is natural about the impact of natural disasters on affected people... instead, the disaster impact is contingent on the vulnerability of affected people, which can and often does systematically differ across economic class, ethnicity, gender, and other factors'. In examining both human and economic losses from natural disasters over time, researchers have found that such losses are reduced as economies develop (Toya and Skidmore, 2007). Countries with higher incomes and higher levels of educational attainment generally experience fewer losses from earthquakes, floods, slides, volcanic eruptions, extreme winds and waves. In the same way that different countries have different experiences of natural disasters, so too do different regions and individuals within those countries.

In the context of humanitarian action, vulnerability has been defined as 'the degree to which a population, individual or organization is unable to anticipate, cope with, resist and recover from the

impacts of disasters' (WHO, 2002). A disaster, whether caused by the forces of nature, by humans or by a combination of the two (see O'Reilly, 2013), will not affect all people equally. This fact should not be surprising to geographers, as we frequently concern ourselves with patterns of inequality and the uneven distribution of resources. Reid (2013) has reviewed recent research on the relationship between social inequalities and disasters, focusing on the areas of social vulnerability to disaster and social inequalities in disaster recovery. She highlights how race, class, and gender structure the disaster experience such that marginalized populations are most vulnerable to the negative consequences of a disaster and face significant challenges in recovery.

Children, pregnant women, elderly people, malnourished people, and people who are ill or immune-compromised, are particularly vulnerable when a disaster strikes, and are more likely to be impacted by the diseases which are often associated with emergencies. Vulnerability can be made up of a number of different factors and is not simply explained. For example, studies of the 2004 tsunami in Aceh have shown that two-thirds of those who died were female, while those who died were primarily aged 9 years and younger, or 60 years and over. The differences in impact are not just related to physical strength, although this played a part as differences in upper body strength affected peoples' ability to pull themselves free of the waves. Other social and cultural factors include the fact that women and children were more likely to be indoors, whereas men were outside in open spaces when the tsunami hit. Women's attempts to rescue their children were also found to tire them out more quickly.

Poverty – and its common consequences such as malnutrition, homelessness, poor housing and destitution – is a major contributor to vulnerability. In their analysis of the impacts of Hurricane Mitch, Martine and Guzman (1999) argued that poverty is a central component of vulnerability to tropical storms. It is estimated that developing countries contain 90 percent of the victims from natural disasters and bear 75 percent of their economic damages (Thouret and D'Ercole, 1996, cited in Martine and Guzman, 1999).

Even among the wealthiest countries in the world, the experience of disasters will vary depending on a number of factors, generally linked to inequality. This may refer to unequal access to resources and opportunities, as well as unequal exposure to risk. Fothergill *et al* (1999) demonstrated that certain racial and ethnic groups in the US were more vulnerable to natural disasters. The reasons are complex, but include factors such as language, housing patterns, building construction, community isolation and cultural insensitivities. This fact hit home with the devastation caused by Hurricane Katrina in 2005, where race and class factors were heavily implicated in the differential impacts of the disaster (Hartman and Squires, 2006).

Gender and vulnerability

For many years, the focus on reducing the impact of natural hazards was on technological solutions, with disasters seen as physical events which only required physical prevention and recovery. Increasingly, however, a vulnerability approach is being taken, which recognises the ways in which socioeconomic conditions magnify the threat of natural hazards and further recognises that development efforts need to address these issues.

Vulnerability is linked to cultural norms and to the inequitable distribution of power and resources. As women make up most of the world's poor, are more likely to be economically dependent, and typically have less access to education and information in the Developing world, they are more vulnerable to natural hazards. Indeed, this applies more generally to humanitarian disasters, where women constitute up to 80% of refugee and displaced populations, while in emergency situations women and children comprise between 70% and 80% of those needing assistance. This vulnerability is due to a combination of biological, social and economic differences. 'In general, women tend to have more limited access to assets — physical, financial, human, social, and natural capital such as land, credit, decision-making bodies, agricultural inputs, technology, extension and training services which would all enhance their capacity to adapt' (IUCN 2014). Neumayer and Plumper (2008) suggest that there are three main interdependent causes for the gender gap in life expectancy following natural disasters: biological and physiological differences; social norms and role behaviours; and discrimination in access to resources and the breakdown of social order.

The gendered nature of vulnerability was brought home to the humanitarian aid community in a series of studies following a natural disaster in Bangladesh, outlined by Eklund and Tellier (2012). A powerful tropical cyclone hit Bangladesh in April 1991 and caused somewhere between 68,000 and 138,000 deaths. Strikingly, when the mortality data were disaggregated by sex and age, it was shown that for the 20-44 year old age group, women were four times more likely than men to have died in the disaster (i.e. a death rate of 71 per 1,000 for women, compared with 15 per 1,000 for men). Biological and physiological factors would not, alone, explain the difference between men and women. Instead, studies showed that the increased vulnerability of women was linked to gender norms and stereotypes (Ikeda, 1995). For example, women had limited mobility, many had not learned to swim, while their dress code made it more difficult for them to escape. Further, women needed to find their children before leaving for safer ground, and leaving home without being accompanied by a male relative was seen as inappropriate. Finally, the cyclone warnings had been transmitted mainly in public places to which women did not have access.

In a study which sampled up to 141 countries over the period from 1981 to 2002, Neumayer and Plümpner (2007) observed a systematic effect of disaster strength on the gender gap in life expectancy, if the disaster affected societies in which the socioeconomic status of women was low. In such cases, they found that natural disasters would kill directly, and indirectly via related postdisaster events, more women than men or would kill women at a younger age than men. Their findings therefore support the vulnerability approach to natural disasters and suggest that such disasters exacerbate previously existing patterns of discrimination. In the case of women, these patterns are ones which result in them being more vulnerable than men to the fatal impact of disasters. It is noteworthy that the adverse impact of disasters on females relative to men vanishes with rising socioeconomic status of women. The gender aspect of natural disaster vulnerability is now increasingly recognised, indeed the UN's Office for Disaster Risk Reduction (www.unisdr.org) has incorporated 'gender mainstreaming guidelines' for disaster management programmes, with recent publications including 'Making disaster risk reduction gender-sensitive: policy and practical guidelines' (2009) and 'Disaster risk reduction and gender: post 2015 gender equality in the future we want' (2013).

The future – the ongoing importance of population data in disaster management

Knowledge about population is very important in responding to emergencies. The US National Academies have pointed out that 'more accurate population data... are needed to better plan for and respond to humanitarian crises' (2007, p. 1). Disaster responses, as well as development and reconstruction programmes, can be greatly enhanced by the availability of population data and the tools and people who are trained to analyse them. Indeed, in the aftermath of the 2004 tsunami, Indonesia has recognised the need to create a more comprehensive system for disaster preparedness and management, part of which involves a collaboration between the United Nations Population Fund (UNFPA), Indonesia's National Disaster Management Agency (BNPB) and BPS–Statistics Indonesia to provide population data for the national disaster management programme (<http://indonesia.unfpa.org/news/2014/09/UNFPA-Supports-BNPB-BPS-Collaboration-on-Population-Data-for-Disaster-Management>).

Benelli *et al* (2012) have made a similar point to that argued by the US National Academies, but go further by highlighting the need to collect sex- and age- disaggregated data (SADD) to assist in response planning. Information on population density, its age and sex breakdown is of vital importance during all phases of a humanitarian crisis. Accurate data are the cornerstone of effective emergency preparedness, and can be applied towards conflict prevention, emergency relief, and the rehabilitation and reconstruction process. At a deeper level, such information can also help to improve the quality of the humanitarian response in an emergency. Benelli *et al* (2012) use a number of case

studies to show the impact of SADD collection and analysis (or lack thereof) on humanitarian assistance. One example relates to the aid efforts which followed the 2010 Haiti earthquake. A study found that 33% of latrines which had been provided for survivors were not used, while 57% were only occasionally used. It was discovered that a failure to understand aspects of gender and culture had resulted in poor planning of facilities. The latrines were not separated by gender, there was insufficient privacy for females, they were too far from living areas, they were not lit, and they lacked locks, giving rise to fears of sexual violence. Overall, the authors found that SADD are not systematically collected, analysed, or used to their full potential to inform humanitarian response. For humanitarian assistance to recognise and address real needs on the ground, this must change.

However, things are slowly changing as disaster risk reduction strategies address the issue of vulnerable populations. For example, learning from the negative outcomes of the 1991 Bangladesh cyclone, subsequent prevention and preparedness work through the Bangladesh Cyclone Preparedness Programme has incorporated gender analysis. An extensive warning system was set up by distributing radios to households, while both men and women extension worker teams were deployed to gain acceptance that everyone should leave the house in case of warning announcements, regardless of sex and whether there was a male relative at home. Although it is difficult to assess the impact of prevention measures, subsequent cyclones of similar magnitude in Bangladesh have resulted in much lower fatalities. The prevention work in Bangladesh, including its gender-sensitive approach, and general attention to the use of analysis in response, is widely seen as a model for disaster prevention.

In order to more effectively reduce disaster risks, the IUCN has argued that an awareness of gender is of great importance. This is not simply about being aware of, and reducing, women's vulnerability to disasters. The IUCN argues that the actual and potential roles of women in disaster risk reduction have often been overlooked. For example, the village of La Masica in Honduras, which was the only community to register no deaths in the wake of the 1998 Hurricane Mitch, had received gender-sensitive community education on early warning systems and hazard management six months before the disaster. Because women took on the abandoned task of continuously monitoring the warning system, the municipality was able to evacuate the area promptly when the hurricane struck. UN Women is now advocating greater involvement of women in disaster prevention. For example, 'Lives saved in Viet Nam by involving women in disaster planning' is a typical recent headline (UN Women, 2014).

While the international community grapples with the on-going issue of humanitarian disasters, it is now becoming clear that climate change will lead to increases in extreme weather conditions worldwide, such as floods, droughts and storms. In the same way that different groups experience

different degrees of vulnerability to existing risks, it is also being recognised that the impacts of climate change are not evenly distributed (RIA, 2012). Variations in physical geography, such as height above sea-level or existing conditions of aridity, make some areas more vulnerable than others to the effects of climate change. Typically the less-developed countries which have contributed least to the creation of current climate change because of historically low emissions of greenhouse gases, are often the most vulnerable to the effects of changes. The uneven development which exists both within and between countries and which results in vulnerability to other natural hazards will be equally important in the case of climate change. The adaptive capacity – the ability to adapt to change – is lower for less developed countries. Furthermore, the poorest sectors of society in all countries tend to have the lowest adaptive capacity and therefore are the people most at risk from climate change. Vulnerability to climate change will be determined by the ability of a community or individual to adapt. As we have seen, women disproportionately suffer from the negative impacts of disasters, particularly in developing countries, and this is also expected to be the case with climate change (Yavinsky, 2012).

As policy makers turn to long-range prevention of natural disasters, and begin to recognise the increasing pressures caused by climate change, the role of population dynamics needs to come to the fore. Population studies could help in the mitigation of disaster impacts in a number of ways, addressing spatial organisation, information systems and reproductive health. However, in order to fully benefit from these population tools, policy makers must integrate them into a broader approach to tackling vulnerable populations, by addressing the development process and the struggle against poverty.

Resources

Centre for Refugee and Disaster Response: Human Vulnerability to Natural Disasters project:

http://www.jhsph.edu/research/centers-and-institutes/center-for-refugee-and-disaster-response/natural_disasters/

Includes provide resources and tools for students, researchers, aid agencies and policy makers to aid in the understanding of human vulnerability in natural disasters and the assessment of vulnerability across populations affected by earthquakes, floods, storms, tsunamis, and volcanoes. Features the following:

- Historical event review: A compilation of natural disaster events, organized by event type, affecting human populations throughout history
- Publications database
- Field Assessments & Publications
- Geographic Information System (GIS) Modeling: An overview of GIS modeling techniques and findings from analyses performed to assess geographic vulnerability to natural disasters

EM-DAT: http://www.emdat.be/disaster_list/index.html.

EM-DAT is a global database on natural and technological disasters that contains essential core data on the occurrence and effects of more than 17,000 disasters in the world from 1900 to present. **EM-DAT** is maintained by the **Centre for Research on the Epidemiology of Disasters (CRED)** at the School of Public Health of the Université catholique de Louvain. Its main objectives are to assist humanitarian action at both national and international levels; to rationalize decision-making for disaster preparedness; and to provide an objective basis for vulnerability assessment and priority setting. Its resources include an Annual Disaster Statistical Review.

Geography of Climate Justice: <http://www.ria.ie/climatejustice.aspx>

This resource aimed at transition year students explains why the geography of climate justice is important using existing research reports and maps. It also outlines how climate change is already affecting people differently across the globe by looking at climate change vulnerability in Africa. Some potential ways in which climate justice might be achieved through the transfer of technology and finance from the wealthiest to those who are most vulnerable to climate change are then detailed. Case studies are also provided to illustrate ways in which vulnerable groups are responding to the challenges of climate change. Exercises and actions are included to help students think about their contribution to climate change and how they might support the development of a more just approach to climate change mitigation and adaptation. Finally references and further resources are provided for students and educators who might wish to develop more extensive lesson plans around climate change, development and justice.

Population Reference Bureau: <http://www.prb.org>.

US based organisation which produces a range of resources, especially the annual World Population Data Sheet (WPDS).

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