Religious belief and environmental challenges in the 21st century

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Motivation

Global environmental challenges coincide with rapid religious and demographic change. The changes in religious belief can have implications for how environmental risks are perceived and for which policies and responses that are acceptable, efficient and plausible. For example, there is a greater share among those who are more religiously conservative who will attribute environmental change to forces outside their own control (e.g., fate), which could have implications for both mitigation efforts and for adaptive capacity. This suggests that a better description and understanding of how global religious beliefs interrelate with environment and development is needed, which is the aim of the current study. Countries with greater GDP tend to be less religious, to face demographic aging and low population growth but also to have greater emissions and better preparedness for environmental challenges; in contrast, developing countries tend to be have greater religious population shares, to have less adaptive capacity and higher vulnerability to climate change, with higher fertility and younger, growing populations.

Aligning environmental policy with cultural values could increase the likelihood of success. Religious affiliation acts as a central marker of community belonging and as a filter for understanding environmental changes. For instance, in India – where more than 99% stated a religion in the 2011 census round - official equity and sustainability policy goals are often aligned with spiritual and holistic societal aims relating to global sustainability (Dean et al. 2008, Dwivedi 2016). More secular countries, including many Western nations and multilateral organizations commonly lead by these, often advocate technological solutions and policy changes in other countries without taking into account their cultural and religious context. This may hamper the likelihood that such interventions, particularly when requiring behavioural change or collective effort, are effectively implemented. Examples of such interventions range from investing in costly environmentally friendly production facilities (requiring high willingness to pay across the population), or policies intended to lower fertility and thereby curb population growth (which could require a willingness to use family planning measures that could be opposed by religious groups).

The relatively little studied area of the global religion-population-environment nexus is ripe for new insights. Belief systems and values are central to behaviour and actions vis-à-vis the environment and to understand how people perceive and respond to environmental change, risks and crises. Religious views can influence whether one sees human actions as a leading cause of various environmental challenges facing the planet.

Religious affiliation may also be a factor associated with one's susceptibility to natural disasters (Bruno Soares, Gagnon and Doherty 2012, Morrow 1999). In the aftermath of such events, people may turn to religion, find support from religious groups and seek answers from faith to cope with tragedies (Gaillard and Texier 2010). This effect may be stronger in less developed societies, where religion plays a bigger role in the provision of social and health services, and where environmental risks often are greater (Paldam and Gundlach, 2013).

In spite of this, there have been relatively few studies describing the relationship between religion and the human-environment nexus. Here we explore this relationship through an examination of the literature, and by presenting preliminary results of a statistical analysis and mapping exercise of religious affiliation and a variety of environmental stressors, as well as environmental outcomes. The former benefits from a unique, high quality worldwide data set on religious beliefs which was developed in a separate project (Hackett et al. 2014a, Skirbekk et al. 2008, Stonawski et al. 2015a, Stonawski et al. 2016). The global nature of several of the challenges associated with environmental change (especially climate change's mitigation and adaptation) requires a worldwide understanding and description of the relationship between religion and environmental indicators.

We acknowledge that there are important differences in religious views between individuals, groups and regions, where contextual and socioeconomic factors can play a role in affecting whether and how religions affect outcomes and subgroups within each religion can imply different practices. For example, the theology and practice of Christianity is different depending on when one belongs to the Eastern Orthodox tradition, Catholicism, or the many branches of Protestantism. Similarly, Islam is practiced differently in Indonesia, Saudi Arabia, Pakistan, and Iran, where religious traditions, socioeconomic context and the role of religion in influencing policy varies fundamentally. The degree of practice or "religiosity" may also differ among those self-identifying as part of a specific religious group. All of these factors, in turn, may result in greater within-religion differences in environmental attitudes and behaviours than between religions. But as a first order marker, religious affiliation has been found to have important influences on the human-environment relationship.

Furthermore, a number of socioeconomic and health factors that are important for both behaviours and responses to climate change have shown partial convergence in recent years, which potentially could make religion relatively more important. For instance, educational variation has decreased globally in recent decades, with a greater share of the population having secondary or higher education while fewer are illiterate (Barro and Lee 2013, Lee and Lee 2016). Mortality inequalities have declined substantially in recent decades (Currie and Schwandt 2016, Guillot and Canudas-Romo 2016), while access to basic healthcare has risen (Ginsburg et al. 2016, Hsiao, Li and Zhang 2017, Murray et al. 2013). Fewer live in absolute poverty – according to some measures – particularly following substantial economic growth in once poor regions of Asia (Jayadev, Lahoti and Reddy 2015, World Bank and International Monetary Fund 2014). Religious belief, however, does not show signs of disappearing or converging, and the world may see an increasingly polarized development in the years to come, with some parts of the world remaining highly religious and other regions turning increasingly secular (McGrath 2003, Pew research center 2015, Stonawski et al. 2010).

The majority of the world's population is religious (Stonawski et al. 2015b), and although some parts of the world are secularising, the world as a whole is growing increasingly religious (Hackett et al. 2015). Even in Western countries that have experienced rapid shifts away from religion, some groups become more religious over time. For example, the largest immigrant group in Canada, the Chinese, show increasing religiosity with a longer duration of stay in the host country, according to census findings (Skirbekk et al. 2012).

The relevance of religion for demographic behaviour and culture

Cultural and religious views can influence individuals' lifestyles and consumption patterns, and willingness to change them (Adger et al. 2007, Adger et al. 2013, O'Brien et al. 2007). These mechanisms can work both directly, as well as indirectly via various intermediaries including education, income and demographic behaviour. It is important to note that religion includes beliefs, worldviews, practices, and institutions that cross borders, time, and scale from the level of individuals to multinational and transhistorical movements (Haluza-DeLay 2014).

Population growth can be a central driver of a number of environmental outcomes, and religion can be an important determinant of climate change. Religion is a central identity marker that varies less over the life course compared to many other cultural traits and attitudes and therefore has more stability and lower degrees of uncertainty than many other cultural and ideological views (Skirbekk et al. 2016). Religious beliefs are important drivers of demographic behaviours (Leyva et al. 2014, McCullough et al. 2000, Schnall et al. 2010, Stonawski et al. 2016). Important demographic patterns such as fertility significantly relates to religion, also when socioeconomic factors are accounted for (Heaton 2011, Stonawski et al. 2016, Westoff and Frejka 2007). Even after co-existing for centuries in Europe, different religious groups living in Bulgaria have substantial fertility differences net of confounding influences (Stonawski, Potančoková and Skirbekk 2015). Although education is an important determinant of childbearing, variation in childbearing behavior by affiliation exists within educational groups. For instance, even among women with the highest educational attainment - doctoral degrees - large differences in fertility intentions and behaviour by religion exist (Buber-Ennser and Skirbekk 2015).

More religious individuals tend to exhibit higher fertility (Adserà 2005, Berghammer 2012, Heaton 2011). Religion is found to substantially affect fertility (McQuillan 2004; Philipov and Berghammer 2007; Lehrer 1996). Further, religion may influence important determinants of childbearing, including educational or employment activity, which in turn may affect fertility (Lehrer 2004). Religion can also affect determinants of fertility, such as the type and prevalence of contraceptive use or whether one chooses to attain more education or be active in the workforce (Agadjanian, Yabiku, and Fawcett 2009; Hajj and Panizza 2009). Due to the high levels of intergenerational transmission of religion from parents to children, fertility differentials by religions are likely to significantly affect population growth as well as the composition of religious groups over time (Bengtson, Putney, and Silverstein 2009; Patacchini and Zenou 2011; Pyong Gap Min and Kim 2005; Manning 2013).

Cultural convictions may influence how literacy and education and, by extension, scientific knowledge and insights, are valued (Barringer, Gay and Lynxwiler 2013, Kumar 2012, Seguino 2011). One example is how gender roles affects women's cognitive function (Bonsang, Skirbekk and Staudinger 2017). Gender views may also affect climate change concern and relevant behaviours, such as gender-specific consumption patterns and women's economic outcomes (Adger et al. 2011, Dankelman 2010, McCright 2010).

Interactions with Aging and Health

Older individuals in western countries are increasingly wealthy and live longer lives in better health - with greater consumption (Beard, Officer and Cassels 2016, Oecd 2008). In effect, the importance of older individuals' environmental views, consumption patterns, and religious-environmental relations are growing over time.

Older individuals often emphasize different aspects of their belief, and may behave differently than younger ones in terms of environmental behaviours, beliefs and religious views. E.g., older individuals emphasize tradition more, may be less interested in changing their attitudes, while younger followers are more likely to advocate change, including the necessity to alter behaviour to mitigate climate change (Coleman 2013, Heimann 2015, Skirbekk et al. 2016). In effect, it is important to understand age composition change.

Health is a key reason why different religions may differ in terms of their risk perceptions and their degree of fatalism, and there are large differences in both life expectancy and the disease burden by religious groups (Hill, Burdette and Idler 2011, Sullivan 2010). The disease burden varies considerable between the different religious groups, where the share of communicable disease is greater for the Hindus and the Muslim populations (Hotez 2016, Skirbekk and Stonawski 2016), mainly driven by the fact that Hindus and Muslims tend to be concentrated in developing regions with endemic tropical diseases. According to our global estimates, Muslims have a life expectancy at birth of 67 years, Hindus 66, Christians 71, Buddhists 74, the Unaffiliated 75 and Jews 80 years (Pew research center 2015).

The role of religion can change over the life course in the context of fewer remaining years of life and increasing prevalence of disease. For instance religious texts and rituals may become more important for older adults, particularly if they derive a sense of meaning in life from religion (Krause 2003). Religious faith at older ages can also affect risk factors (including how they cope with existential threats such as religion), which in turn could affect important for health outcomes at older ages (Koenig, King and Carson 2012).

Religion and the human-environment nexus

Environmental Behavior

There is a growing consensus that the challenge of tackling climate and environmental change cannot be met solely through technical solutions, and that human behavior, attitudes, and ultimately consumption patterns will play an important role in climate solutions. Appropriate responses can be hampered by societal and psychological barriers (Markowitz and Shariff 2012, Stern 2007), and these may be related to culture and beliefs. A more holistic approach will require that social science also be given a vital role, both in understanding human motivations, but also addressing normative issues, such as social justice and fairness between groups in response to the prospect of global warming (Samson et al. 2011, Vinthagen 2013).

Religious beliefs can affect both perceptions and behaviour relating to environmental challenges (Dougherty et al. 2013, Jiang et al. 2015, Newman and Fernandes 2016). The 2010 US General Social Survey data suggest that among Christians, religiosity relates positively to pro-environmental behaviours but not to pro-environmental attitudes or beliefs (Clements, McCright and Xiao 2014). Individuals who by conviction ascribe environmental change to chance or fate tend to engage less in pro-environmental behaviours (Kalamas, Cleveland and Laroche 2014). People with stronger self-transcendence value orientation, guided by normative goals, are more likely to acknowledge environmental problems and more inclined to assume responsibility in terms of environmentally-friendly behaviours (Liobikienė and Juknys 2016).

Populations that are more diverse may exhibit more cultural variation in terms of behavioral patterns, consumption choices and preferred lifestyles. Religion and culture may affect emission levels, as well as willingness to accept limitations and reduction measures and consumption patterns (Audretsch, Dohse and Niebuhr 2010, Enquist, Ghirlanda and Eriksson 2011, Stahl et al. 2010). The perceived importance of human activity in driving climate change can be deduced, in part, by ones cultural standpoint (Rosa and Dietz 2012). Attitudes are shaped not only by how individuals react to the specific attributes of climate change, but also by information, by the openness of society and by attitudes toward the trustworthiness of government (Tjernström and Tietenberg 2008).

Religion and Environmental Protection

The majority of research on the intersection between religion and environmentally related behavior is concentrated within the Judeo-Christian tradition. This literature finds significant evidence that religious beliefs alter behavior, often through mediating sociological mechanisms such as political orientation. Willingness to make the institutional changes necessary to mitigate climate change can also be influenced by religious belief regarding dominion over the Earth (White 1967). As Sherkat and Ellison (2007) report, in the U.S. conservative Protestant Christians are less likely to be politically or privately involved in behaviors associated with environmental activism, although the authors found that religious factors indirectly work through political conservatism. However, there is a nascent environmental movement among evangelicals.[1]

Acknowledging the absence of a sociological theory accounting for White's (1967) link between belief in a literal interpretation of the Bible and low levels of environmental concern, (Greeley 1993) found that this correlation is driven by denomination-specific beliefs such as belief in a gracious God and shows that this relationship does not hold for Catholics. Thus, it is not necessarily religious belief per se which causes individuals to be less likely to engage in environmentally-friendly behaviour, but a rigid mind set (exemplified by a literal biblical interpretation) characteristic among more conservative Christian traditions which drives these results. Differences in theology also make a significant difference in beliefs vis-à-vis personal responsibility for environmental issues and environmental outcomes (Bookless 2008).[2] Testing White's hypothesis that the Christian tradition breeds a belief in human domination over nature, Chuvieco et al. (2016) find that predominantly Christian countries perform better across a range of environmental indicators when controlling for per capita income and Human Development Index scores. However, it could be argued that more affluent Christian nations "export" their environmental problems by importing goods from more polluting (and secular) countries such as China.

Consistent with game theoretical notions, research has revealed that individuals who adhered to a religion-based belief in doomsday or end-of-times scenarios (and implicit short "shadow of the future" and therefore time horizon) are less likely to support efforts to address climate change (Barker and Bearce 2013). In this respect, diverse conceptions of the shadow of the future among religious and denominational adherents may represent a potential religion-specific indicator of willingness to meet the challenges posed by climate change.

One's religion matters for climate change attitudes and convictions in various ways: An Australian survey (Morrison, Duncan and Parton 2015) found substantial differences across religious groups surveyed (Buddhists, Christian literalists and non-literalists, and Secularists) in terms of their belief in: (a) human

[1] e.g., the Evangelical Environmental Network (http://www.creationcare.org/).

[2] For example, among Christians, views of eschatology (theology on the final events of history) are influenced heavily by differing interpretations of 2 Peter 3:1-18 (Bookless, 2008).

induced climate change, (b) the level of consensus among scientists, (c) their own efficacy, and (d) the need for policy responses.

Responses to environmental risks may differ depending on belief systems – both in terms of consumption and production patterns, and in terms of a sense of agency related to the ability to anticipate and protect oneself from natural hazards. Attitudes and beliefs could affect ones' understanding of environmental behaviours and thereby influence consumption patterns (Büttner and Grübler 1995, Husted et al. 2014, Kahle and Gurel-Atay 2013, Sapci and Considine 2014).

The relation of religion to protecting nature can for some be problematic: the sacred aspect of nature could for some preclude environmental action or lead to the denial of climate change (Sachdeva 2016). Religion also determines whether we think we can/should act to address climate change. Acceptance of carbon capture storage (CCS) for Muslims in the UK is considered problematic due to teachings on stewardship, harmony and the intrinsic value of nature. CCS was considered less problematic for Christian participants, who demonstrated anthropocentric values and evaluated environmental issues and technological solutions in relation to the extent to which they supported human welfare. Secular participants expressed anxiety in relation to environmental issues, especially climate change, where lack of belief in an afterlife or divine intervention led secular participants to focus on human responsibility and the need for action, bolstering the perceived necessity of a range of technologies including CCS (Hope and Jones 2014).

Religion may influence environmentally relevant behavior, including water management (Kahle and Gurel-Atay 2013), attitudes towards renewable energy (Zyadin et al. 2012) and land use decisions (Lim 2014, Watson 2010). Data from the US 2010 Cooperative Congressional Election Study suggest that Judeo-Christian traditions are less concerned about environmental protection than those without religious affiliation - and that degree of religiosity slightly intensifies these relationships (Arbuckle and Konisky 2015).

Polity and Willingness to Pay

Polity has been defined as "a group of people who are collectively united by a self-reflected cohesive force such as identity, who have a capacity to mobilize resources, and are organized by some form of institutionalized hierarchy" (Mansbach and Ferguson 1996).

Differences in the religious beliefs of those who are exposed to adverse environmental changes versus the religious belief of those who contribute more to such changes may influence polity, and therefore the ability to implement effective policies. If there is more cultural similarity between the groups causing environmental degradation and the groups subject to it, this may affect climate mitigation policies (the willingness to pay is affected by the degree of homogeneity between the contributor and the beneficiary) and alter how one behaves (adaptation to environmental challenges may for instance be affected by whether one sees such changes as destiny, or whether such changes could be altered). For instance, the capacity to impose necessary taxes, implement new production technologies and alter consumption patterns can depend on the degree of shared culture or religious conviction.

Collaboration relies on both trust and willingness to pay for measures intended to counter challenges of a global nature. Several studies find that societal cohesion, measured by the willingness to support public transfer systems, is low if the populations concerned are more diverse in terms of religion or value systems. Transfers to address common challenges are less likely if contributors and beneficiaries differ substantially in their value orientations. Generally, findings from this literature on ethno-cultural variation and economic outcomes suggests that greater ethno-linguistic diversity is adversely affecting both collaboration and the willingness to pay taxes (Lee, Lee and Borcherding 2015, Luttmer 2001).

Data and methods

Religious affiliation information from more than 2,500 data sources, including censuses, demographic surveys, general population surveys, and other studies were analysed – the largest project of its kind to date (Stonawski et al. 2015b). Our objective was to estimate religious composition for 5-year age groups separately for men and women for all countries in the world[3]. We collected data on fertility using censuses and surveys to estimate age and religion- specific fertility rates. Further, we included bilateral migration flows by age, sex and religion for almost 200 countries building on a global flow matrix by sex (Abel 2013). We also estimated age trajectories of religious switching using retrospective questions on religion during childhood and current levels from cross-sectional surveys. Details regarding the data sources, the procedures used in gathering the data, carrying out the estimations and harmonizing the data are presented in several technical reports and methodological articles (Hackett et al. 2014b, Skirbekk et al. 2008, Stonawski et al. 2015b).

We built our model for religious population projections based on the demographic method of multistate population projection models. The method is an extension of cohort-component based population projections. Rather than projecting only age and sex, this method includes one or more additional dimensions such as health status, education, political views - or in our case: religion (Rogers 1995, Stonawski et al. 2015c).

Our main projection scenario that we present in this article assumes that fertility levels of all religious groups slowly converge to an identical level by 2110 (100 years from the baseline year of our projections). Fertility for the total population of a country follows the UN medium assumptions from the 2010 Revision (UN 2011). At the same time, the relative differences in fertility between religions gradually diminish. This could occur where specific drivers of fertility differentials, such as education levels, are similar across religious groups. We assume also there are no religion-specific differentials in mortality. In other words, populations of different religious communities have the same life expectancy. However, following the 2010 Revision of UN projection assumptions (UN 2011), we introduce gender-specific differences in mortality based on the UN assumptions of life expectancy by sex. The scenario is based on constant religion-specific outmigration rates by age, sex, and destination matrices by sex and religion calculated for the baseline during the whole period of projection. Moreover, we also assume that religious switching will continue at rates observed at baseline year.

Using our model, we project changes in religious distributions for 198 countries and territories with at least 100,000 people as of 2010, covering 99.8% of the world's population. We present results for the population aged 60 and above aggregated globally and into six regions: Asia-Pacific, Europe, Latin America and Caribbean, Middle East-North Africa, North America, and Sub-Saharan Africa. We account for the effects of international age-specific migration flows in our projections. Global gross migration flows to and

[3] Censuses were the primary source in 90 nations, which together cover 45% of all people in the world. Large-scale demographic surveys were the primary sources for 43 countries. General population surveys were the primary source of data for an additional 42 countries, representing 37% of the global population. Together, censuses or surveys provided estimates for 175 countries representing 95% of the world's population. In the remaining 57 countries, representing 5% of the world's population, the primary sources for the religious-composition estimates include population registers and institutional membership statistics reported in the World Religion Database and other sources.

from all countries in the world are estimated, and we are therefore able to include the effect of migration on religious age structures across the world (Stonawski et al. 2015b). In cases where migration is substantial, the religious affiliation of the migrants can affect the religious affiliation of the region of origin and destination, but only to a modest extent change their age structures (Bernard, Bell and Charles-Edwards 2014). Although migrants tend to be relatively young, the age structures of the sending and destination country tend only to be modestly and temporarily affected by migration flows.

Census, survey, focus group and other demographic data collection methods are central to reveal and understand belief systems as they relate to the demographic makeup of society, including racial and ethnic groups, age and sex distribution, education attainment, and geographic factors. Religion is central for several of the countries that will be most affected by climatic change, e.g., only 0.1% of the Indian population did not have a religion in the 2001 census. 83% of the world had a religion in 2010 according to our estimates, and this proportion is projected to increase to 87% by 2050 (Hackett et al. 2015, Stonawski et al. 2015b). Our unique global collection of data on religious belief allows us to investigate variation in religious belief.

We also carried out projections until 2050. Box 1 gives a brief overview of our projection methodology, which incorporates for the first time the age-dimension by religious belief, age and sex-specific conversion patterns, age- and sex specific fertility rates and global gross migration by religion to and from all countries. (Hackett et al. 2015, Skirbekk et al. 2016, Stonawski, Skirbekk and Potančoková 2015).

Environmental, socioeconomic and demographic data

We use environmental data from a number of different sources. The selected variables aim to capture aspects of environmental outcomes (for example, energy consumption) and impacts (for example, vulnerability and resilience to disasters). In addition, we also included socioeconomic and demographic variables likely to affect the interactions of environment and religion. A detailed list of variables is presented in table A.1

Methods

We conduct statistical analyses and map the variables to better understand the relationship between religion on the one hand, and economic development, greenhouse gas emissions, exposure to environmental stressors, and attitudes, beliefs and environmental performance on the other hand.

Our hypotheses are as follows:

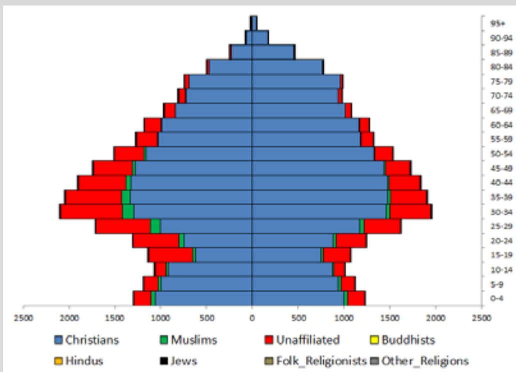
- H1: Religious affiliation relates to drivers of environmental change, including GHG emissions.
- H2: There is a link between religious affiliation and the impacts of environmental change.
- H3: These relations relate to the age structure of the population.

In each case, we test whether we obtain significant results by the majority percent affiliated (meaning the percentage of the population that is affiliated with a religion) (see Tables 1 and 2, as well as Figures 1 and 2) and for countries in which Christian and Muslims constitute the largest share of the total population (even if not a majority). We explore the latter relationship because these two religions comprise the largest number of countries – there are 159 majority Christian and 48 majority Muslim countries – and these nations are a highly diverse group. By comparison, there are only eight Buddhist majority, three Hindu majority (Nepal, India, and Mauritius), three Folk religion majority (Macao, Taiwan and Vietnam), and one Jewish majority country (Israel).

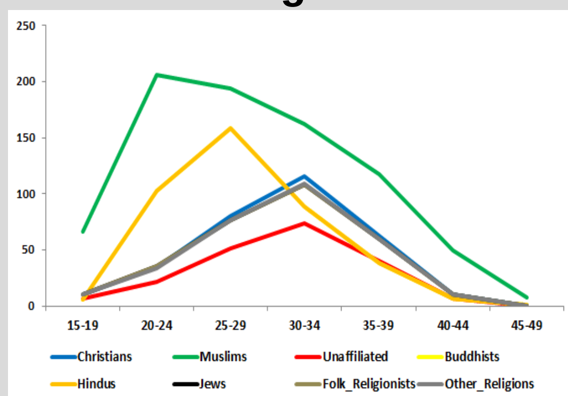
A limitation of our study is that our dependent variables are associated with countries, and countries are composed of numerous religious groups. As a simplifying approach, we analysed countries by majority religion, but ideally we would have all of our indicators broken out by religious group. Furthermore, our data have other biases in common with studies that use countries as units of analysis. For example, the religious composition of Fiji, a majority Christian country with 892,000 inhabitants, counts for the same as India, a majority Hindu country with a population of 1.3 billion. Summary statistics for the variables included in the analysis are presented in table A1.

Box 1: Key components of our projection model.

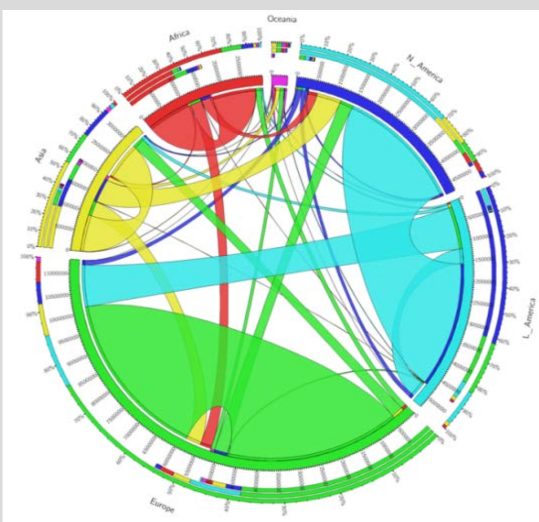
Population by age, sex and religion

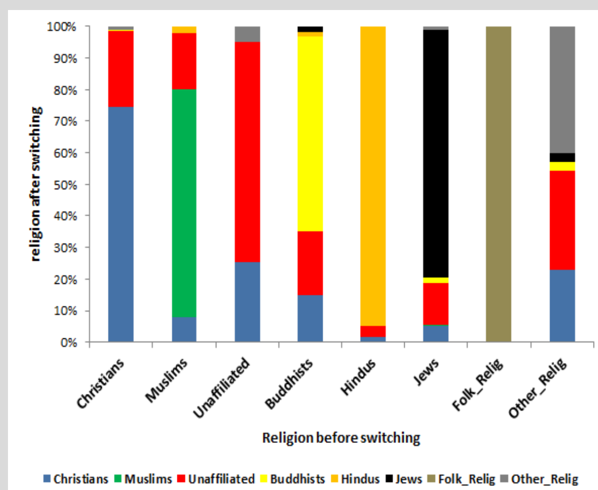


Fertility by religion



Migration by age, sex and religion





Findings

We investigated the differences in the religious distributions for countries that contribute to environmental challenges, e.g., climate change through carbon emissions, compared to those that are subject to the impact of environmental challenges. We also study those countries that neither cause nor are subject to climate change as well as those that do both.

Of particular note here is that the main contributors in the world in 2010 – China, the US, Japan and the European Union (in terms of global CO_2 emissions from fossil-fuel burning, cement production, and gas flaring) – are among the nations that have the greatest population share of religiously unaffiliated in the world. Globally, the religiously unaffiliated share was 16.3% in 2010 (Hackett et al. 2015). The unaffiliated constitute a majority in several nations, including China and the Czech Republic. Between 1972 and 2010 in the US, our estimates suggest that the share without religion increased from 7% to 18%.

In Japan in 2010 the share was 57%, in China 52%, in Europe 18% (Pew 2012, Stonawski et al. 2015b). In poorer nations, particularly those vulnerable to climate change, there tend to be very low shares of religiously unaffiliated. See Figures 1 and 2 show current status of majority religious affiliation and trends in religious affiliation globally. Tables 1 and 2 give additional statistics for the number of countries by largest religious group and descriptive statistics for the average percent share of the population across countries.

Figure 1. Estimates of the global affiliation by religion (2010)

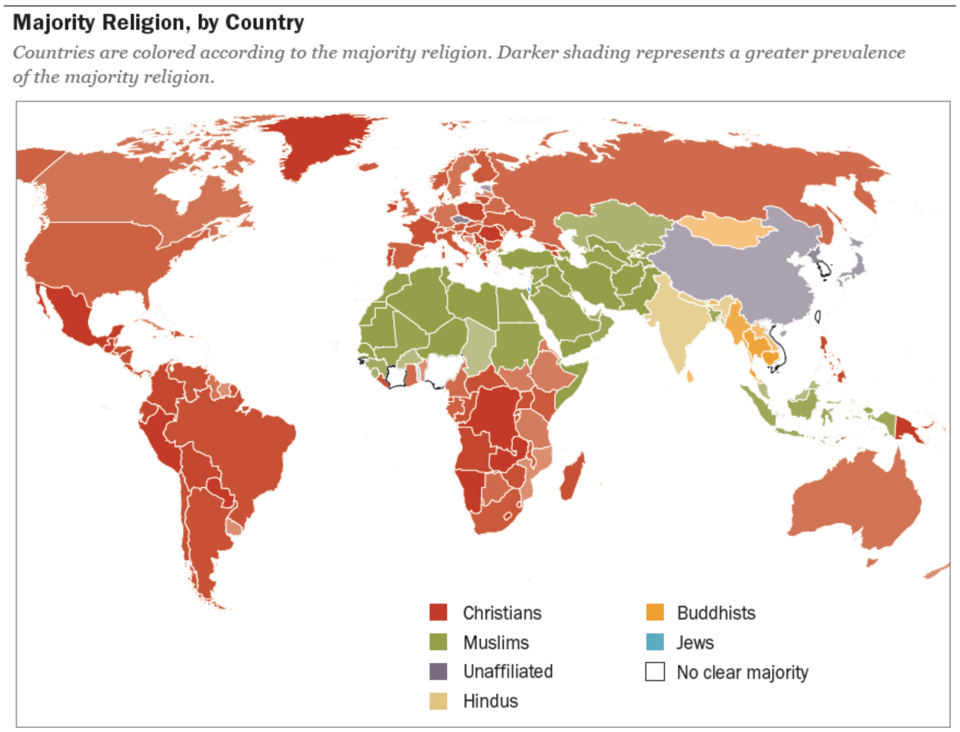


Figure 2. World Population by Religion, 1970-2060

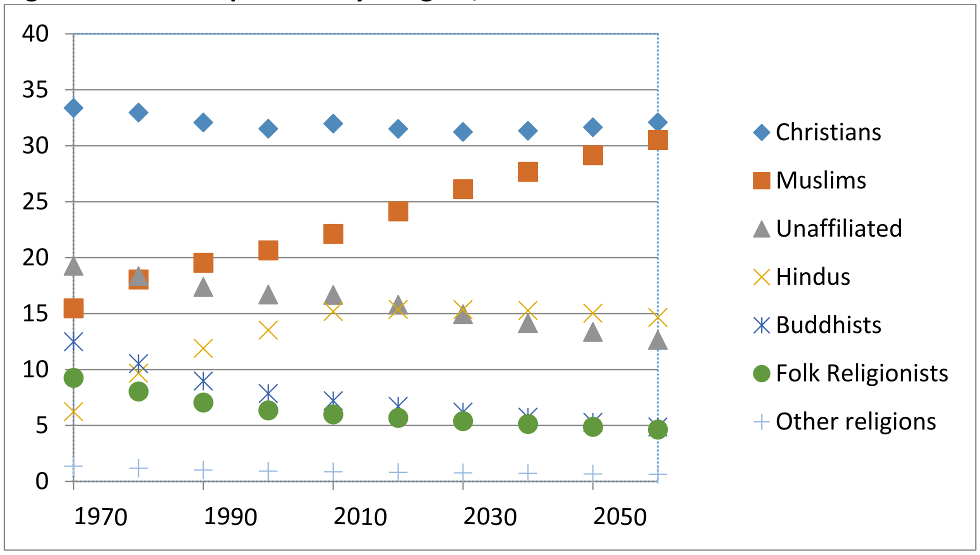


Table 1: Distribution of countries by largest religious group in 2010, and summary of population and land area

Largest religious group in 2010	#	%	Total Population 2015	Total area (Sq km) 2015
Buddhists	8	3.28	174,289,149	3,226,386
Christians	159	65.16	2,701,697,383	84,595,182
Folk Religions	3	1.23	117,416,245	310,100.3
Hindus	3	1.23	1,340,837,439	3,118,570
Jews	1	0.41	8,064,036	21,640
Muslims	48	19.67	1,409,191,047	28,323,442
Unaffiliated	7	2.87	1,597,214,907	10,091,311
No Data/missing	15	6.15		
Total	244	100.00		

Table 2: Largest religious group: descriptive statistics for share (%) of the population in 2010

Largest religious group	**#**	**Mean**	**Median**	**25%**	**75%**	**SD**
Buddhists	8	71.14	71.98	60.55	86.64	20.4
Christians	159	84.06	88.19	78.1	94.42	13.54
Folk Religions	3	49.47	45.25	44.21	58.94	8.22
Hindus	3	69.57	79.51	48.52	80.68	18.24
Jews	1	75.63				
Muslims	48	88.05	95.02	79.19	98.17	14
Unaffiliated	7	59.86	57	52.24	71.27	10.55

Source: Stonawski et al. 2015a

Countries with different major religious groups also show different demographic profiles (table A1). For example, on average unaffiliated countries tend to be older, exhibit lower fertility and population growth, higher life expectancy. The highest fertility rates correspond to Muslims and Jews, the former also displaying the highest population growth and the lower life expectancy.

In particular, different religious majorities are associated with different age structures (figure 3), and age structure is an important factor for understanding the impacts of environmental change as well as the country's environmental outcomes. Correlations between religious affiliation, median age and environmental change indicators are significant and negative overall, but vary by religious group: stronger for Christians and weaker for Muslims, for example. On the other hand, energy consumption appears to increase (figure 4a) and environmental risk, as measured by the World Risk Index (where high scores equate to high risk) (figure 4b) and the Global Adaptation Index (GAIN; where high scores equate to low risk and high adaptive capacity) (figure 4c), tends to rise as median age grows older, and these relationships hold true across religious groups.

Figure 3. Median age and religion

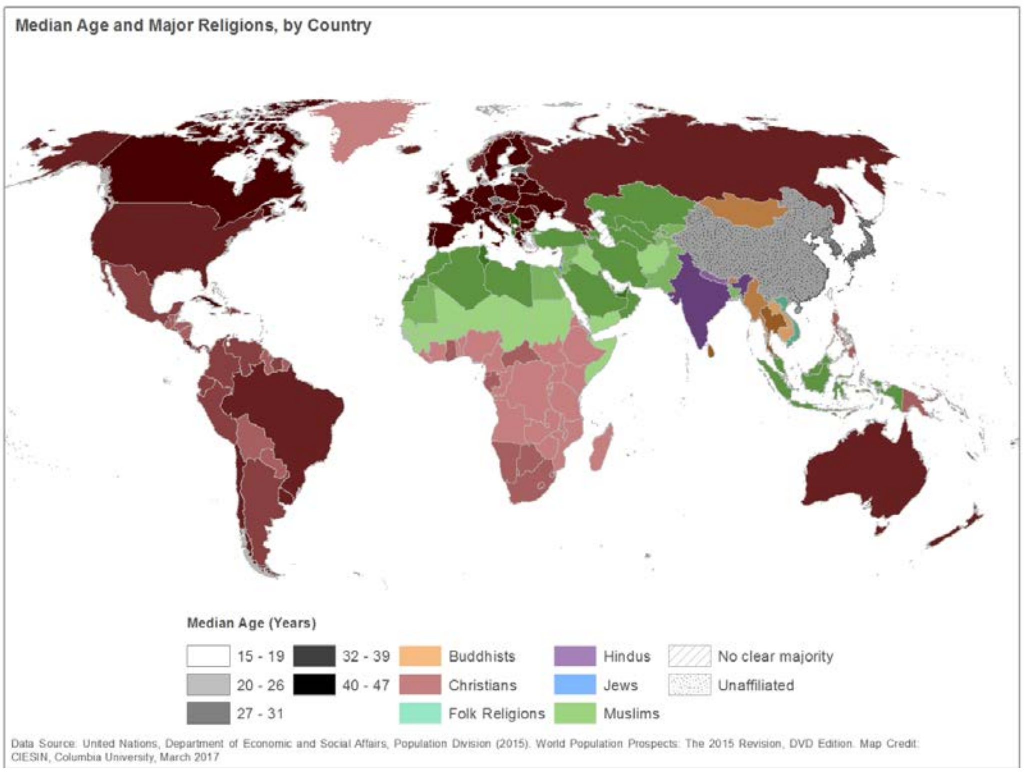
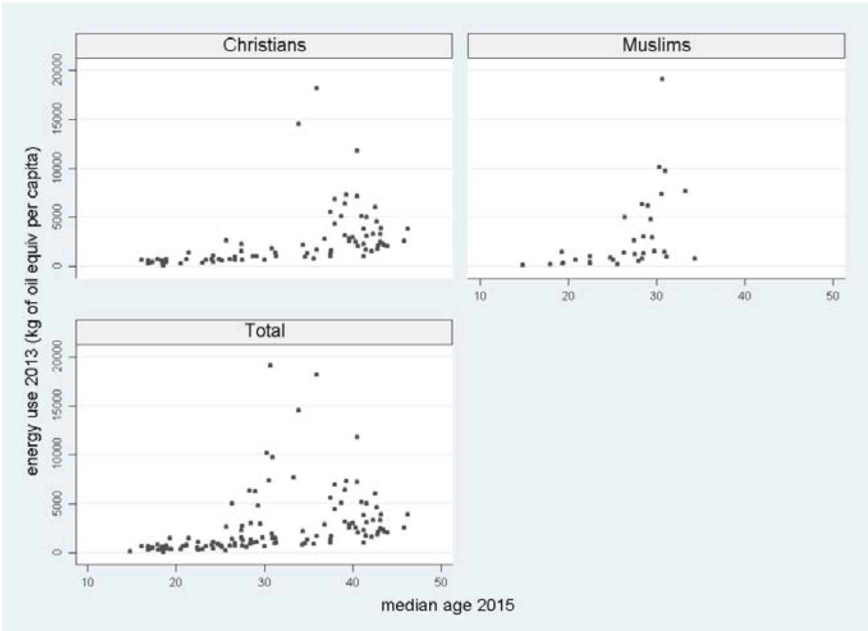
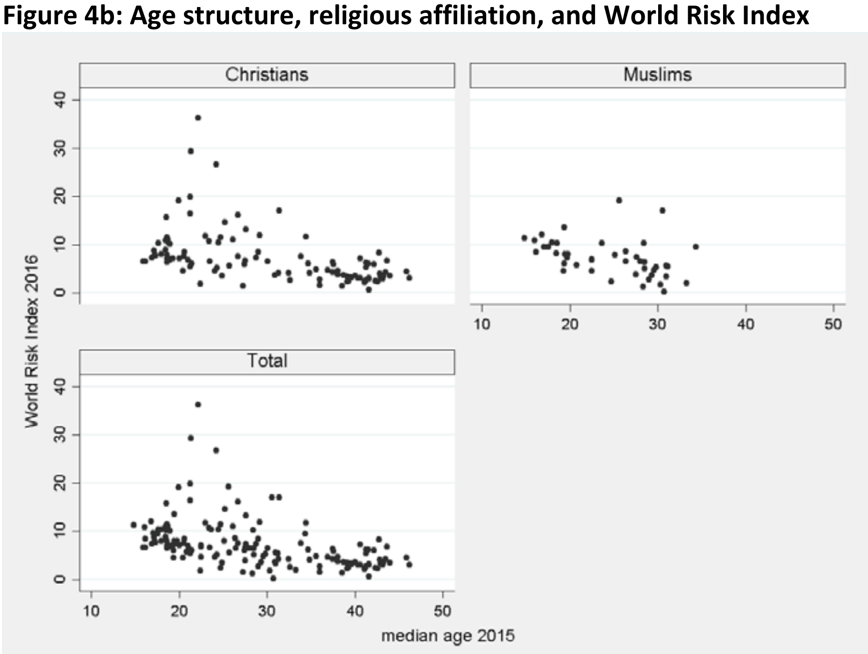


Figure 4a: Age structure, religious affiliation, and energy consumption



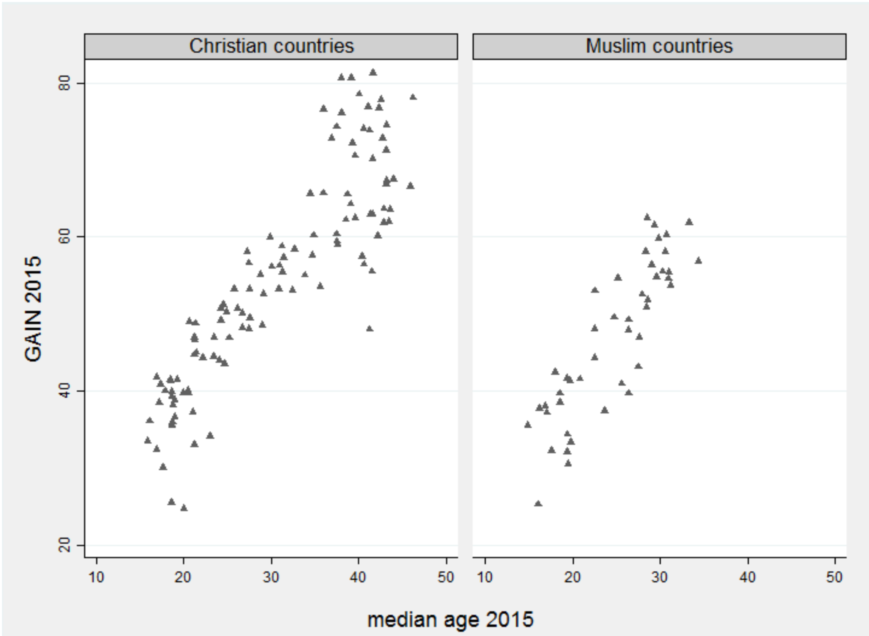
Note: correlation coefficients are 0.38 for all countries, 0.45 for Christians and 0.48 for Muslims.

Figure 4b: Age structure, religious affiliation, and World Risk Index



Note: correlation coefficients are -0.4 for all countries, -0.49 for Christians a -0.41 for Muslims.

Figure 4c: Median age, religious affiliation, and ND-GAIN score (environmental preparedness – a higher score equals greater preparedness), overall and for Christian and Muslims countries



Note: correlation coefficients are 0.86 for Muslim countries and 0.89 for Christian countries

GDP and emissions by religious group

Certain religious groups represent a relatively greater share of the global contribution to GDP relative to their population numbers. On the basis of the assumption that within-national variation in GDP by religion is equal (clearly within-country GDP-group variation differs, yet since many countries are dominated by one religion, these challenges are often relatively modest), the following global distribution of belief-specific GDPs is given (figure 5). Christians, although accounting for only 31.4% of the world population account for 49.3% of global GDP. The unaffiliated were only 16.4% of the population but represented 22.2% of GDP. Muslims accounted for 23.2% of the world population in 2010, but represented only 12.3% of global GDP. Hindus were 15% of the population, but their GDP was only 4.9%. Figure 6 depicts projections of religion and GDP from 2010 to 2050 by global region. The global estimation of Gross National Income using an augmented Solow model (Barro 2006, Pinkovskiy and Sala-i-Martin 2009), combining World Bank Development Indicators Database with forecasts for population growth and religious affiliation.[4] We then combine these with UN-World Income Inequality Database data to produce a distribution of income for the different religious groups globally to 2050. Consistent with the methodology in this study, we use a macro level approach ignoring within-country variation in economic levels. In some countries this clearly plays an important role, as economic variation

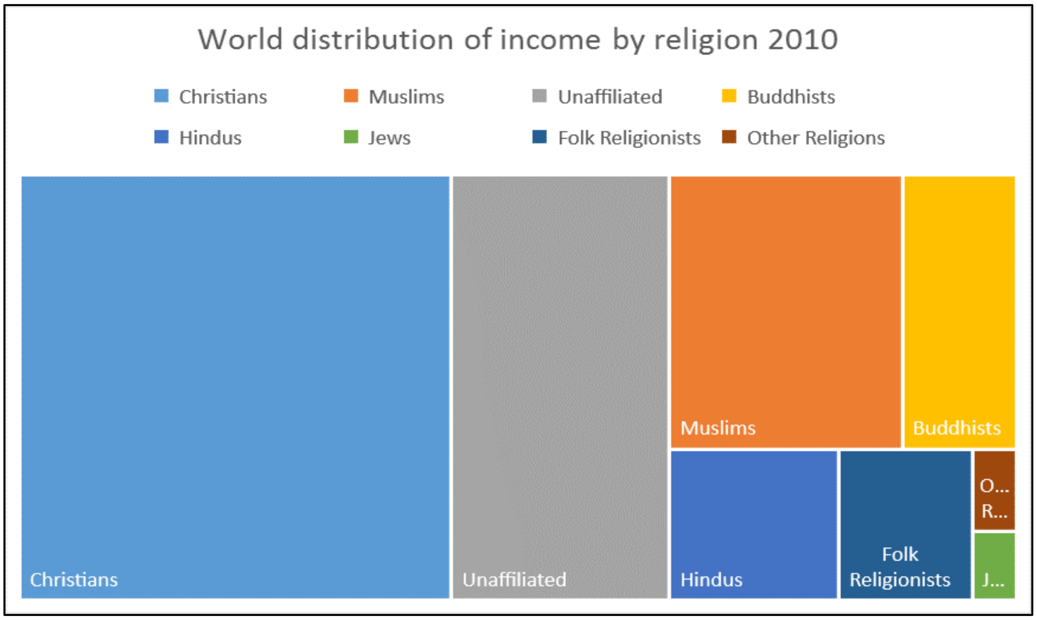
[4] GDP growth projections used are from March 2017. They are expressed in real per capita terms PPP, and are drawn following the methodology used in the Organization for Economic Cooperation and Development (OECD) "Looking to 2060" website (www.oecd.org/eco/ outlook/lookingto2060.htm). Where OECD projections are not available, we use our own growth projections are based on an augmented Solow model of economic production, using a Cobb-Douglas function:

$$Y = AK^{\alpha}L^{\alpha-1} + residual$$

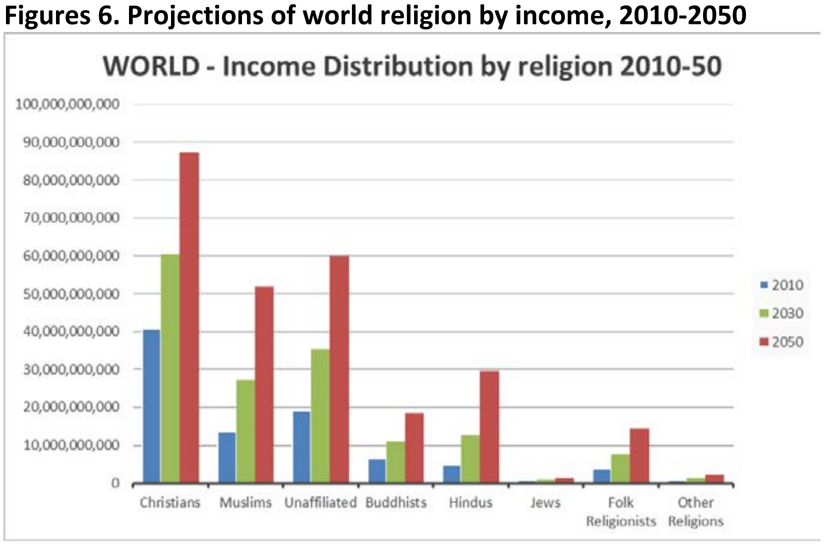
where A represents productivity, K is capital, and L is labour. We assume that technology will evolve across countries as a process of catchup with the most developed economies, as has been the case in the period 1950-2010. Convergence depends on Gross National Income per capita, and the basic assumption is that as developing economies get closer to income per capita levels of more developed economies, their productivity growth rate will slow. By 2050, the end of our forecasting horizon, we assume the output gap has closed and there is no difference between PPP and real exchange rates. The rate at which they catch up depends on technology transfer and on the initial productivity gap with more developed economies.

between economic groups can differ greatly. However, many countries are completely dominated by one religion and within country variation in income by religious groups is often smaller than variation between countries. We also correct for countries without a majority religion to keep this effect contained.

Figure 5. Religion by share of global GDP, 2010. Source own estimates (figures in 2011 USD)



Figures 6. Projections of world religion by income, 2010-2050



Over the next two decades the structure of world population and income are likely to undergo profound changes. Rapid population growth is taking place in Africa, where strong economic growth is also projected. Such changes will transform the global distribution of incomes and with it the patterns of consumption, in terms of goods and services demanded and the location of consumers. The biggest developing markets (BRICNIS, Brazil, Russia, India, China, Nigeria, Indonesia and South Africa) are projected to represent more than 60% of growth in GNI globally, and contribute significantly to

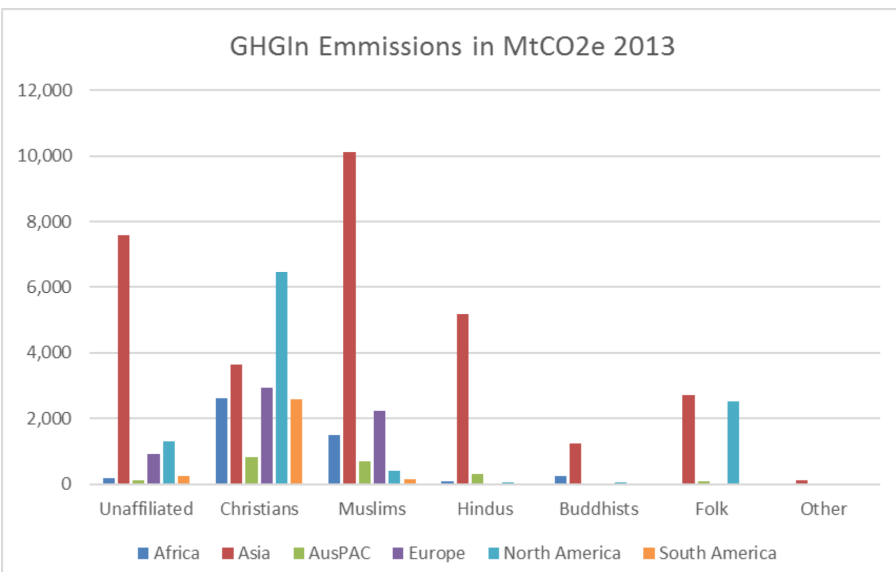
Greenhouse Gas (GHG) Emissions. Figure 7 gives estimates on religious groups GHG emissions by continent.

In terms of absolute numbers, we expect Christians to remain steady at about a third of population, with Muslims rising progressively to match their numbers by 2060. Variations in fertility scenarios produce varying dates by not more than 3 years in this happening.

The aging of Western Societies is compensated by the ascent of believers in Latin America and Africa, whereas for Muslim societies, the youth bulge in much of the Middle East and South East Asia noticeable today tapers off around 2030, but is again propelled by Africa until 2050, when growth should begin reaching diminishing returns.

Religiously unaffiliated, which in 1970 made up close to 20% of the global population, have been in steady and gentle decline ever since. China´s aging, which hosts half of the world´s unaffiliated, will join the West in draining that group. The age profile though will make it a very important economic entity that allows it to box above its weight and remain the world´s second largest after Christians.
Hindus reach a plateau around 2025, and will gently decline thereafter, with aging. Their economic rise will be quite significant, especially in the context of the BRIC-NIS. Buddhists and folk-religionists will continue their gentle decline as a proportion of world affiliated, in tandem with the aging of their societies.

Figure 7. GHG emissions by religion and continent where the emissions originate.



Figures 8 and 9 present maps highlighting the relationship between religion and potential drivers of environmental degradation (GDP levels and GHG emissions). The relationships vary across but also within religious groups, as can also be observed in table A.2 (means and standard deviation), especially for GDP per capita. In terms of direction and strength of the relationship, for the world as whole, the share of the population in the largest religious group are negatively and significantly related with GDP per capita and emissions. For Muslim countries, this holds only for the share in the largest religion, GDP and emissions per capita, while for Christian countries, only GDP appears significantly related to religious affiliation and the share of the population in the largest religious group (table A.3).

Figure 8. GDP and majority religion

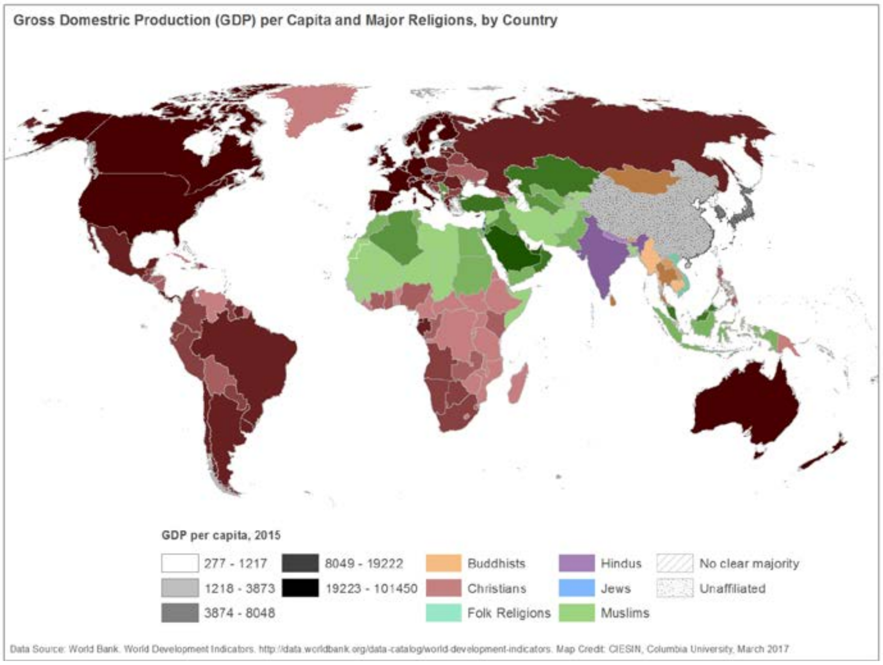
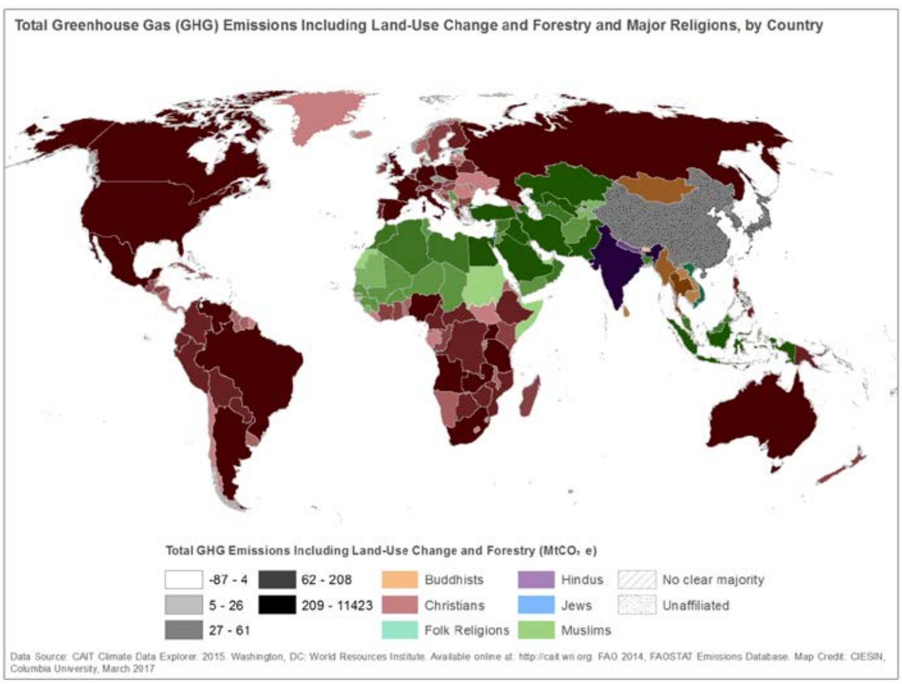


Figure 9. Greenhouse Gas emissions and religion



Figures 10 through 12 display the relation between religion and environmental impact indicators (adaptive capacity, risk index, and water stress), which shows substantial inter- and intragroup heterogeneity. Table A.4 summarizes these links, displaying correlation coefficients (with significance level and number of observations) for religion and environmental impact indicators. For all countries, the larger the share of the largest religious group, the higher the water stress index score and the lower the ND-GAIN index; for religious affiliation, larger proportions are associated with higher scores in the world risk index and lower values in the ND-GAIN index. These associations are also observed for Christian countries, however there are not significant associations between these variables for Muslims countries.

Figure 10. Adaptive capacity to environmental change (ND-Gain) and religion

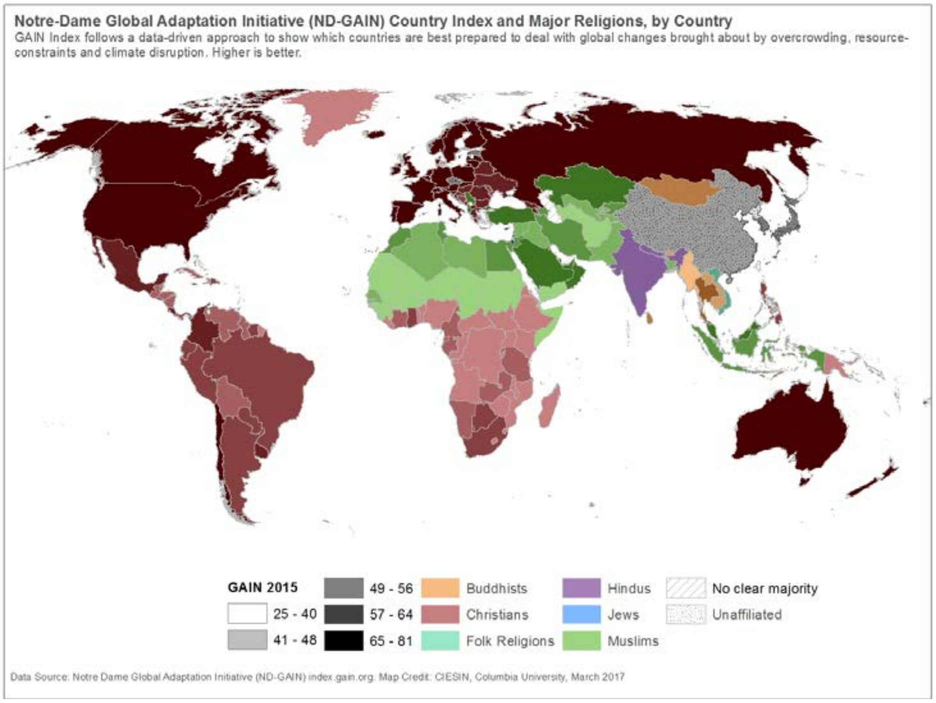


Figure 11. Water stress and religion

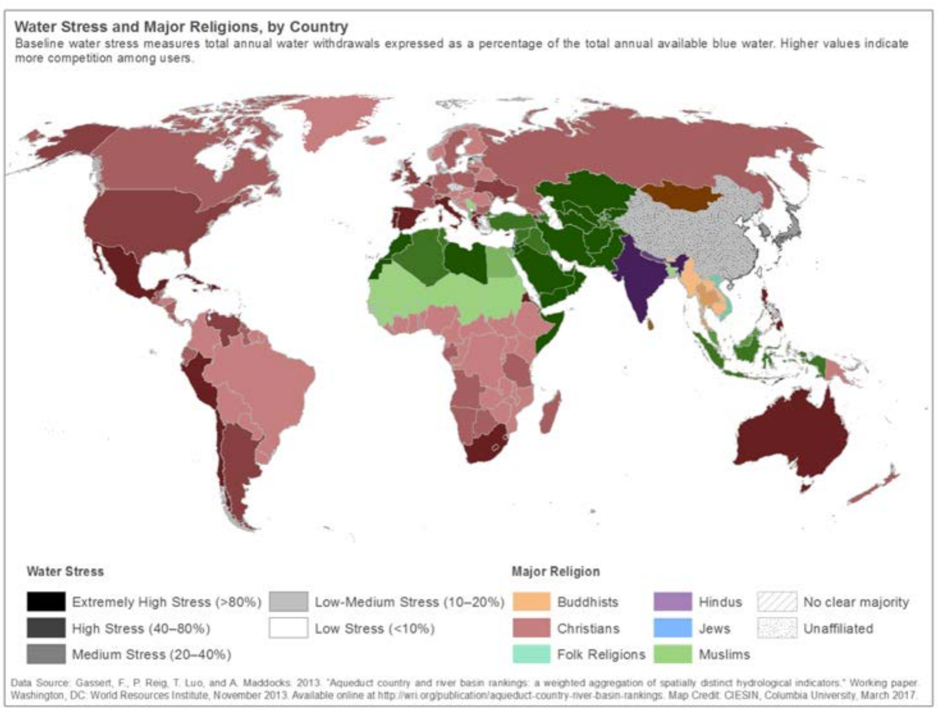
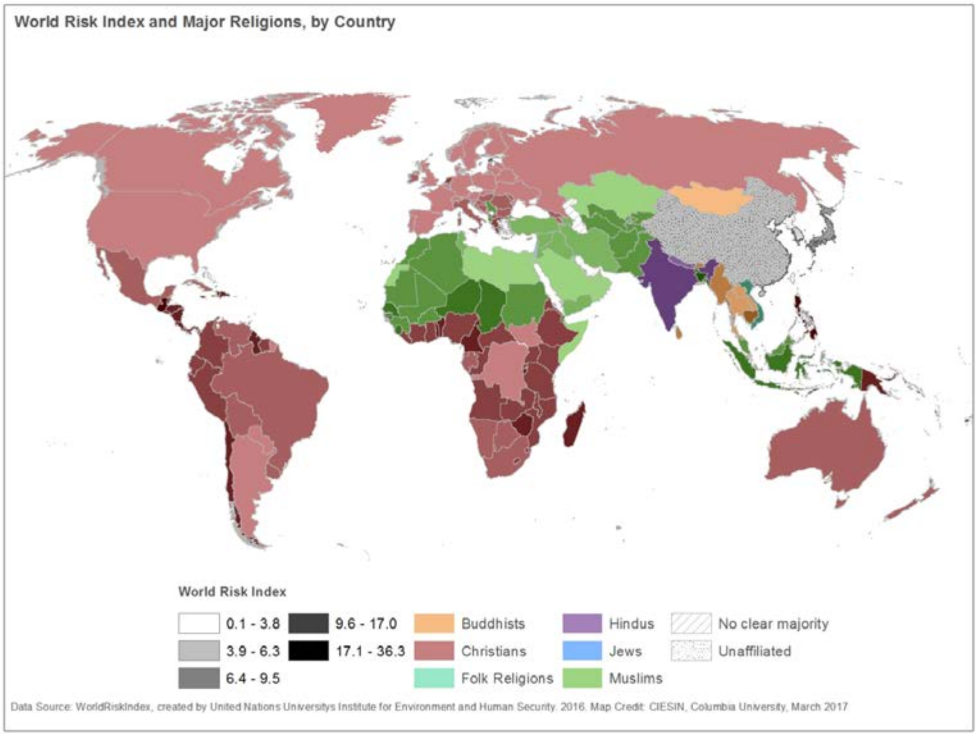
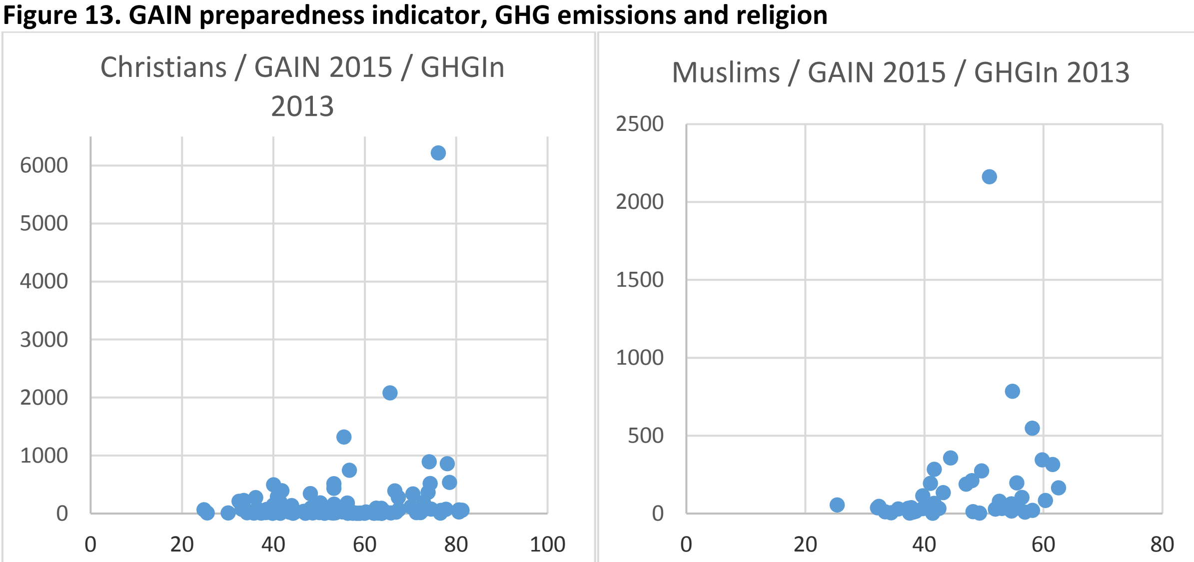


Figure 12. World risk index and religion



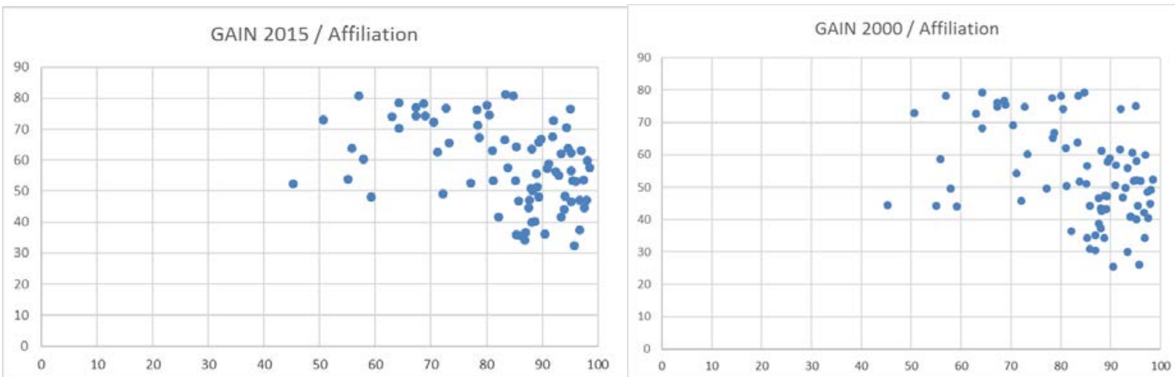
Looking at preparedness for climate change through the ND-GAIN index, we do find a relationship between contribution to climate change and religions, with Christians and Muslims showing a higher level of the GAIN index at higher levels of GHG emissions. This is shown in Figure 13.

Figure 13. GAIN preparedness indicator, GHG emissions and religion



However, the effect is most pronounced among the unaffiliated, see Figure 14, showing higher levels of the GAIN index at comparable levels of GHG and GDPpc. Overall, among the Religious (affiliated), we observe a positive development in the timespan since the year 2000. This may be due to the progress made by least developed countries in this 15 year time-span, in developing along less energy intensive and GHG-efficient paths than industrialised countries to date.

Figure 14. GAIN preparedness indicator and percent belonging to a religion



Conclusions

The paper identified and described relationships between environmental challenge and cultural factors, particularly religious belief structures, on a global scale.

Religion is a powerful identity marker relating to individual community belonging, potentially affecting different types of behaviours ranging from fertility to social cohesion and willingness-to-pay for climate change. Our findings indicate that religious affiliation relates to with greenhouse gas emissions, energy use and gross domestic product on a global scale.

We also show that the dominant religion in a country relates to effective adaptation and one's preparedness for climate change. Our results suggests that countries where the religiously unaffiliated are the largest group have the highest GDP per capita - and also contribute most to climate change in form of higher levels of Greenhouse gas emissions. Energy use per capita is also highest among those without a religious affiliation, while the lowest levels observed among the Hindu dominated countries.

The lowest climate change preparedness (proxied by ND-Gain levels) are found among countries with Muslim and Hindu majorities, while where the religiously unaffiliated are in majority, levels of climate change preparedness are the highest. Also the World Risk Index is lowest for the religiously unaffiliated. In terms of risk of future water shortages, countries dominated by Muslims and Hindus have the highest levels of water stress, while Christian and Buddhist countries have the lowest levels. Disaster data suggests that disasters have been particularly important for Hindu majority nations.

The importance of cultural markers, such as religion, in an era where global environmental risks are high, increases the need to raise the level of understanding and awareness of these interrelations on a global scale.

This is a highly preliminary analysis, and more extensive research and studies are needed. Further studies are needed to better understand the likely impact of cultural factors on causes and consequences of environmental change.

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Annex A: Additional Material

Table A.1: Socioeconomic and demographic variables description and sources

Variable	Description	Data Source	Units
Largest religious group		Stonawski et al. 2015a	Nominal
Largest religious group percent		Stonawski et al. 2015a	Percent
Second largest religious group		Stonawski et al. 2015a	Nominal
Second largest religious group percent		Stonawski et al. 2015a	Percent
Religion percent unafilliated		Stonawski et al. 2015a	Percent
Religion percent affiliated		Stonawski et al. 2015a	Percent
Total population 2015	De facto population in a country, area or region as of 1 July of the year indicated.	United Nations, Department of Economic and Social Affairs, Population Division (2015). World Population Prospects: The 2015 Revision, DVD Edition.	
Total area	A country's total area, excluding area under inland water bodies, national claims to continental shelf, and exclusive economic zones. In most cases the definition of inland water bodies includes major rivers and lakes.	World Bank. World development indicators. Based on data from The Food and Agriculture organization (FAO)	Square kilometers
Total fertility rate - TFR - 2010-15	The average number of children a hypothetical cohort of women would have at the end of their reproductive period if they were subject during their whole lives to the fertility rates of a given period and if they were not subject to mortality.	United Nations, Department of Economic and Social Affairs, Population Division (2015). World Population Prospects: The 2015 Revision, DVD Edition.	Children per woman.
Median age 2015	Age that divides the population in two parts of equal size, that is, there are as many persons with ages above the	United Nations, Department of Economic and Social Affairs, Population Division (2015). World	Age in years

Variable	Description	Data Source	Units
	median as there are with ages below the median.	Population Prospects: The 2015 Revision, DVD Edition.	
Population growth rate 2010-15	Average exponential rate of growth of the population over a given period. It is calculated as ln(Pt/P0)/t where t is the length of the period.	United Nations, Department of Economic and Social Affairs, Population Division (2015). World Population Prospects: The 2015 Revision, DVD Edition.	percentage
Life expectancy 2010-15	The average number of years of life expected by a hypothetical cohort of individuals who would be subject during all their lives to the mortality rates of a given period. It is expressed as years.	United Nations, Department of Economic and Social Affairs, Population Division (2015). World Population Prospects: The 2015 Revision, DVD Edition.	years
IMR 2010-15	Probability of dying between birth and exact age 1. It is expressed as deaths per 1,000 births.	United Nations, Department of Economic and Social Affairs, Population Division (2015). World Population Prospects: The 2015 Revision, DVD Edition.	per thousand
Urban population	Annual Percentage of Population at Mid-Year Residing in Urban Areas	United Nations, Department of Economic and Social Affairs, Population Division (2014). World Urbanization Prospects: The 2014 Revision, custom data acquired via website.	percentage
GDPpc 2015	Gross Domestic Product per capita 2015	World Development Indicators. Downloaded 1 Feb 2017. http://data.worldbank.org/data-catalog/world-development-indicators	Current US$
GHG 2013 (in)	Greenhouse Gas Emissions <u>Including</u> Land-Use Change and Forestry, in 2013	CAIT - Country Greenhouse Gas Emissions Data. http://www.wri.org/resources/data-sets/cait-country-greenhouse-gas-emissions-data. CAIT Climate Data Explorer. 2015. Washington, DC: World Resources Institute. Available online at: http://cait.wri.org. FAO 2014, FAOSTAT Emissions Database.	Metric Tonne Carbon Dioxide Equivalent (MtCO2e)
GHG 2013 (in) per capita	GHG 2013 (in) divided by the total population in 2015		
GHG 2013 (ex)	Greenhouse Gas Emissions <u>Excluding</u> Land-Use Change and Forestry, in 2013	CAIT - Country Greenhouse Gas Emissions Data. http://www.wri.org/resources/data-sets/cait-country-greenhouse-gas-emissions-data. CAIT Climate Data Explorer. 2015. Washington, DC: World Resources Institute. Available online at:	Metric Tonne Carbon Dioxide Equivalent (MtCO2e)

Variable	Description	Data Source	Units
		http://cait.wri.org. FAO 2014, FAOSTAT Emissions Database.	
Energy use 2013	Energy use refers to use of primary energy before transformation to other end-use fuels, which is equal to indigenous production plus imports and stock changes, minus exports and fuels supplied to ships and aircraft engaged in international transport. Data as of 23 March 2017	World Development Indicators http://data.worldbank.org/indicator/EG.USE.PCAP.KG.OE. DATA SOURCE IEA World Energy Statistics and Balances.	kg of oil equivalent per capita
Energy use clean 2013	Alternative and nuclear energy (% of total energy use) 2013 Clean energy is noncarbohydrate energy that does not produce carbon dioxide when generated. It includes hydropower and nuclear, geothermal, and solar power, among others. Data as of 23 March 2017	World Development Indicators http://data.worldbank.org/indicator/EG.USE.COMM.CL.ZS. DATA SOURCE IEA World Energy Statistics and Balances.	Percent of total energy use
Energy use fossil fuels 2013	Fossil fuel energy consumption 2013. Fossil fuel comprises coal, oil, petroleum, and natural gas products. Data as of 23 March 2017	World Development Indicators http://data.worldbank.org/indicator/EG.USE.COMM.FO.ZS. DATA SOURCE IEA World Energy Statistics and Balances.	Percent of total energy use.
Water Stress 2013	Aqueduct Country and River Basin Rankings. Baseline water stress measures total annual water withdrawals expressed as a percentage of the total annual available blue water. Higher values indicate more competition among users.	Gassert, F., P. Reig, T. Luo, and A. Maddocks. 2013. “Aqueduct country and river basin rankings: a weighted aggregation of spatially distinct hydrological indicators.” Working paper. Washington, DC: World Resources Institute, November 2013. http://wri.org/publication/aqueduct-country-river-basin-rankings.	[4–5]: Extremely high stress (>80%) [3–4): High stress (40–80%) [2–3): Medium-high stress (20–40%) [1–2): Low-medium stress (10–20%) [0–1): Low stress (<10%)
World Risk Index Risk 2016	World Risk Index calculates the disaster risk for 171 countries by multiplying vulnerability with exposure to natural hazards (cyclones, droughts, earthquakes, floods, and sea-level rise).	United Nations University. Institute for Environment and Human Security http://weltrisikobericht.de/english/	10.40-36.72 - Very High 7.31-10.39 - High 5.47-7.30 - Middle 3.47-5.46 - Low 0.08-3.46 - Very Low
GAIN 2015	The ND-GAIN Country Index, a project of the University of Notre Dame Global	Notre Dame Global Adaptation Index (ND-GAIN) http://index.gain.org/about/download	

Variable	Description	Data Source	Units
	Adaptation Initiative (ND-GAIN), summarizes a country's vulnerability to climate change and other global challenges in combination with its readiness to improve resilience. A higher score is better.		
Disasters occurrence 1970-2016	Number of natural and complex disasters between 1970 and 2016.	EM-DAT database. D. Guha-Sapir, R. Below, Ph. Hoyois - EM-DAT: The CRED/OFDA International Disaster Database – www.emdat.be – Université Catholique de Louvain – Brussels – Belgium.	
Disaster Deaths	Number of people who lost their life because the event happened.	EM-DAT database. D. Guha-Sapir, R. Below, Ph. Hoyois - EM-DAT: The CRED/OFDA International Disaster Database – www.emdat.be – Université Catholique de Louvain – Brussels – Belgium.	
Disaster Total affected (000)	Sum of injured, homeless, and affected.	EM-DAT database. D. Guha-Sapir, R. Below, Ph. Hoyois - EM-DAT: The CRED/OFDA International Disaster Database – www.emdat.be – Université Catholique de Louvain – Brussels – Belgium.	per thousand
Disaster Total damages (000)	The amount of damage to property, crops, and livestock. The value of estimated damage is given in US$ ('000). For each disaster, the registered figure corresponds to the damage value at the moment of the event, i.e. the figures are shown true to the year of the event.	EM-DAT database. D. Guha-Sapir, R. Below, Ph. Hoyois - EM-DAT: The CRED/OFDA International Disaster Database – www.emdat.be – Université Catholique de Louvain – Brussels – Belgium.	per thousand

Table A.2: Summary statistics of countries according to their largest religious group

Variable (number of countries for which data exist in parenthesis)	**Buddhist**		**Christian**		**Hindu**		**Muslim**		**Unaffiliated**	
	mean	**SD**	**mean**	**SD**	**mean**	**SD**	**mean**	**SD**	**mean**	**SD**
% affiliated with any religion in 2010 (195)	93.25	*13.06*	91.18	*9.57*	99.65	*0.33*	99.3	*0.98*	40.14	*10.55*
Share affiliated with largest religious group in 2010 (229)	71.14	*20.4*	84.06	*13.54*	69.57	*18.24*	88.05	*14.0*	59.86	*10.55*
GHG 2013 (in) (184)	103.05	*128.52*	177.04	*616.72*	1026.43	*1736.4*	166.21	*350.14*	2271.98	*4511.86*
GHG 2013 (in) per capita (184)	0.000006	*0.000007*	0.000333	*0.003396*	0.000003	*0.000002*	0.000009	*0.000012*	0.000011	*0.000006*
Median age 2015 (197)	29.76	*6.48*	30.33	*9.35*	28.30	*6.20*	24.12	*5.49*	40.61	*4.13*
Population growth rate 2010-2015 (233)	1.27	*0.61*	1.01	*1.17*	0.95	*0.47*	2.32	*1.58*	0.29	*0.41*
TFR 2010-15 (201)	2.21	*0.62*	2.76	*1.37*	2.1	*.0.53*	3.55	*1.53*	1.49	*0.26*
Life expectancy 2010-15 (201)	70.99	*5.83*	71.34	*8.95*	70.21	*3.49*	68.40	*7.80*	78.38	*4.93*
IMR 2010-15 (201)	25.09	*16.9*	24.18	*23.54*	28.56	*15.06*	36.36	*27.14*	6.60	*7.60*
% urban population 2015 (233)	46.6	*27.42*	60.56	*25.76*	30.33	*10.75*	56.23	*21.55*	76.14	*16.58*
GDP 2015 (per capita) (183)	9,174.02	*17,735.93*	13,938.92	*18,764.45*	3,864.54	*4,685.29*	8,028.42	*13,728.94*	24,461.26	*12,647.95*
Energy use 2013 (per capita) (139)	1,640.65	*1,731.50*	2,409.94	*2,849.22*	690.15	*369.77*	3,093.43	*4,292.49*	3,932.68	*1,147.58*
Water stress 2013 (175)	1.87	*1.92*	1.75	*1.56*	2.99	*0.84*	3.0	*1.88*	2.69	*0.91*
GAIN 2015 (171)	52.15	*12.70*	54.32	*13.74*	50.80	*8.66*	46.77	*9.86*	65.01	*11.54*
World Risk Index 2016 (171)	7.18	*4.41*	7.23	*5.63*	9.10	*5.62*	7.21	*3.93*	5.94	*4.22*
Disasters- occurrence 1970-2016 (215)	47.5	*42.17*	49.81	*87.42*	233	*294.44*	56.13	*80.32*	182	*274.35*
Disasters-Deaths (207)	24,541	*48,477*	9,952	*42,556*	72,295	*106,589*	28,987	*88,241*	156,082	*258,631*
Disasters-Total affected (000) (210)	20,900	*29,800*	6,555	*20,900*	64,700	*1,110,000*	17,300	*61,400*	454,000	*1,180,000*
Disasters-Total damages (000) (190)	8,452	*17,400*	11,400	*60,800*	30,600	*47,200*	4,137	*8,589*	135,000	*215,000*

Please refer to the variables description for units of measurement.

Table A.3: Environmental outcomes and religion (correlation coefficients, significance level and number of observations)

All countries	**GHG in 2013**	**GDP pc 2015**	**GHG pc in 2013**	**Share largest religious group**	**Religious affiliation (%)**
GHG in 2013	1 *184*				
GDP pc 2015	0.0736 *0.339* *171*	1 *183*			
GHG pc in 2013	0.0081 *0.914* *184*	-0.0402 *0.601* *171*	1 *184*		
Share largest religious group	-0.1481 *0.045* *184*	-0.2824 *0.000* *183*	0.0735 *0.321* *184*	1 *229*	
Religious affiliation of any group (%)	-0.2535 *0.001* *172*	-0.4000 *0.000* *174*	-0.1197 *0.118* *172*	0.4863 *0.000* *195*	1 *195*
			Muslims countries		
GHG in 2013	1 *43*				
GDP pc 2015	0.0029 *0.9862* *39*	1 *43*			
GHG pc in 2013	0.0668 *0.671* *43*	0.8041 *0.000* *39*	1 *43*		
Share largest religious group	0.0776 *0.621* *43*	-0.3383 *0.027* *43*	-0.2898 *0.060* *43*	1 *48*	
Religious affiliation of any group (%)	0.0901 *0.565* *43*	-0.0581 *0.711* *43*	-0.0069 *0.965* *43*	0.5649 *0.000* *48*	1 *48*
			Christian countries		
GHG in 2013	1 *121*				
GDP pc 2015	0.2238 *0.017* *113*	1 *120*			
GHG pc in 2013	0.0281 *0.759* *121*	-0.0556 *0.558* *113*	1 *121*		
Share largest religious group	-0.0784 *0.393* *121*	-0.2011 *0.028* *120*	0.0965 *0.292* *121*	1 *159*	
Religious affiliation of any group (%)	-0.1392 *0.149* *109*	-0.5276 *0.000* *111*	-0.1467 *0.128* *109*	0.5002 *0.000* *125*	1 *0* *121*

Table A.4: environmental impacts and religion (correlation coefficients, significance level and number of observations)

All countries	water stress 2013	world risk index 2016	GAIN 2015	Share largest religious group	Religious affiliation (%)
Water stress 2013	1 *175*				
World risk index 2016	-0.2366 *0.003* *161*	1 *171*			
GAIN 2015	0.2116 *0.006* *167*	-0.4335 *0.000* *170*	1 *181*		
Share largest religious group	0.1704 *0.024* *175*	0.0915 *0.234* *171*	-0.2183 *0.003* *181*	1 *229*	
Religious affiliation of any group (%)	0.0488 *0.529* *169*	0.2163 *0.005* *169*	-0.4624 *0.000* *177*	0.4863 *0.000* *195*	1 *195*
Muslim countries					
Water stress 2013	1 *46*				
World risk index 2016	-0.6967 *0.000* *44*	1 *44*			
GAIN 2015	0.4903 *0.001* *44*	-0.487 *0.001* *44*	1 *45*		
Share largest religious group	0.2317 *0.121* *46*	-0.0746 *0.630* *44*	-0.1052 *0.491* *45*	1 *48*	
Religious affiliation of any group (%)	0.1527 *0.311* *46*	-0.0042 *0.978* *44*	-0.0012 *0.994* *45*	0.5649 *0.000* *48*	1 *48*
Christian countries					
Water stress 2013	1 *111*				
World risk index 2016	-0.0065 *0.9486* *100*	1 *109*			
GAIN 2015	0.2191 *0.024* *106*	-0.4594 *0.000* *108*	1 *117*		
Share largest religious group	0.1854 *0.051* *111*	0.1438 *0.136* *109*	-0.1143 *0.220* *117*	1 *159*	
Religious affiliation of any group (%)	-0.0262 *0.791* *105*	0.3217 *0.0007* *107*	-0.5446 *0.000* *113*	0.5002 *0.000* *125*	1 *125*