

Pursuit of the common good

Religious institutions may mobilize public opinion and action

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Humanity is at a crossroads. Do we continue trends of preceding decades that lift people out of poverty and extend life spans, but in the process run down the planet's natural capital? Solutions to this profound problem will require greater cooperation among people. The rise of market fundamentalism and the drive for growth in profits and gross domestic product (GDP) have encouraged behavior that is at odds with pursuit of the common good. Finding ways to develop

POLICY a sustainable relationship with nature requires not only engagement of scientists and political leaders, but also moral leadership that religious institutions are in a position to offer.

So it was significant that the Vatican convened a workshop earlier this year at which scholars (including the authors) from the humanities and the social and natural sciences reflected on issues at the nexus of poverty, population, consumption, and environment (1). Given the secular nature of the issues and the requisite solutions, scholars' religious beliefs were not a criterion for participation (2). Hosted jointly by the Pontifical Academies of Sciences and of Social Sciences, the workshop held one of the broadest and most interdisciplinary discussions to date on those issues. Such discussions are critical, as the United Nations General Assembly convenes later this month with a focus on a "transformative post-2015 development agenda."

OPPOSED PERSPECTIVES. The 20th century saw enormous increases in global income and improvements in human health. But this involved a massive increase in exploitation of Earth's resources (3). The Millennium Ecosystem Assessment reported in 2005 that 15 of 24 ecosystem services investigated were degraded or being exploited at unsustainable rates. The matter is now worse (4). Environmental problems are manifest at scales from the global, such as climate change, to the local, such as declines in availability of fresh water and forest prod-

ucts in villages in the poor world. High fertility rates in the poorest regions exacerbate pressure on local systems and contribute to the persistence of poverty.

Unsustainable consumption, population pressure, poverty, and environmental degradation are intricately linked (5), but this is appreciated neither by development economists (6, 7) nor by national governments who permit GDP growth to trump environmental protection in their policies.

Because the socioecological processes giving rise to this state of affairs aren't self-correcting (5), there is urgent need for collective action from the community level to the international level. Studies on resource allocation in nonlinear systems have shown that Adam Smith's famous "invisible hand" cannot, even in theory, be expected to come to the rescue (8, 9). Natural and social scientists have done their part in documenting the irreversible environmental damages

(albeit with large uncertainties) that we have inflicted and in spelling out specific mitigation actions (1). The transformational step may well be a massive mobilization of public opinion by the Vatican and other religions for collective action to safeguard the well-being of both humanity and the environment.

Among topics discussed at the Vatican, we develop three that we believe are central to disrupting destructive feedbacks between unsustainable consumption, population, poverty, and environment: well-being, wealth, and natural capital; stabilizing climate change; and universal access to energy.

WELL-BEING, WEALTH, AND NATURAL CAPITAL. Discourses on economic growth, equity, and poverty alleviation should include the role natural capital plays in our lives. The first step would be for governments to take inventory of their nations' stocks of assets and keep the accounting current on a regular basis. Most countries don't have inventories of natural capital stocks, nor are effective institutions in place for governing their use. Wide varieties of natural capital, such as ecosystems, are thereby freely available. Methodologies



A woman using a mud oven for cooking in Mukteshwar in the Kumaon Hills of Uttarakhand, India.

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are available to show how national accounts should incorporate a nation's portfolio of assets and provide estimates of its true wealth (10). The social worth (or "shadow price") of ecosystem services that are needed for the accounts can be estimated by designing institutions that make beneficiaries pay for services they enjoy or by uncovering the role ecosystems play in production. The estimates depend on, among other things, the model describing the operations of the economy, the choice of rates at which future costs and benefits are discounted, and social attitudes toward uncertainty. Pilot studies show that such accounts can indeed be prepared (10). They show also that wealth estimates should be presented as bands, not as precise figures. The move away from feigned precision that characterizes national accounts to reasoned bands should prove salutary when governments deliberate economic policies.

STABILIZING CLIMATE CHANGE. Anthropogenic climate change raises questions about the responsibilities we have to one another and to nature. Some 1 billion people are responsible for 50% of greenhouse gas emissions; a further 3 billion people for 45%; while the bottom 3 billion, who do not have access to affordable fossil fuels, are responsible for a mere 5% (11, 12). Although we all will soon be affected by climate change, it is the latter 3 billion who will, tragically, experience the worst consequences. Not only is their direct reliance on natural capital disproportionately large, they are also far less able to afford protection from extreme weather events.

A number of actions need to be taken now, particularly by the 1 billion responsible for the bulk of the emissions. Emissions of carbon dioxide (CO₂), the dominant contributor to global warming, have to be halved by mid-century and eliminated before the end of the century. Decarbonization involves moving to sources of "clean" energy, but the process would be eased if the efficiency with which energy is used were raised. Reducing waste would help. For example, some 3 billion tons of CO₂ (8 to 9% of total annual emission) are released in producing food that is wasted (13).

Humanity needs also to reduce emissions of four short-lived climate pollutants (methane, ozone, black carbon, and hydrofluorocarbons), that are currently responsible for a third of the heat energy added to the planet (11). The underlying cause of some of that pollution is acute poverty. The majority of the 3 billion at the bottom of what we may call the "energy pyramid," use firewood, dung, and crop residues for cooking and kerosene for lighting (14). This increases the

atmospheric concentration of black carbon ("soot") and ozone. Scalable technologies that reduce these emissions are available off the shelf [(11) and references therein], e.g., cleaner-burning cook stoves to replace rudimentary mud stoves and solar lamps to replace kerosene lamps for the three billion without access to fossil fuels (Fig. 1). Be-

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cause the lifetimes of these pollutants range from weeks to a decade, the mitigation effect would be almost immediate. The Vatican and other religions have vast networks of voluntary organizations that can have a major impact on distribution of clean technologies in rural areas of Asia, Africa, and South America.

UNIVERSAL ACCESS TO ENERGY. Some 1.5 billion people among the bottom 3 billion do not have access to electricity for lighting (14). In those households, women and children typically collect fuel for cooking and fetch water for drinking, meaning they can ill afford time for education or work outside the home. Four million premature deaths yearly are attributable to indoor smoke from cooking and kerosene lighting [(15) and references therein]. Lack of access to facilities that promote reproductive health contributes to keeping fertility rates high, maintaining pressure on local ecosystems and aiding perpetuation of poverty. These features of poverty should be set against the aspirations that underlie Sustainable Development Goals being discussed within the UN system. If the bottom billion were to rely on fossil fuels for their well-being, CO₂ emissions would rise by about 10 billion tons a year from the current 35 to 40 billion tons (11). But there are alternative technologies such as high-efficiency biomass, biogas or electric stoves, and solar lamps that could drastically reduce emissions of toxic pollutants (11). Minigrids for electricity powered by solar photovoltaic cells, agriculture waste, and biogas can provide energy for pumping water for irrigation and small-scale industries (14). Unfortunately the poor cannot afford them. But the strong link between poverty, air pollution, public health, and climate change makes energy access a strong contender for collective action. The Vatican and other religions can take a decisive role by mobilizing public opinion and

public funds to meet energy needs of the bottom 3 billion who struggle with preindustrial-era technologies.

PURSuing THE COMMON GOOD. Mitigation measures, including capture of atmospheric carbon, will require large investment and huge commitment from communities, charities, national governments, and international bodies. But the risks that a runaway change in Earth's climate system or significant further losses in biodiversity will produce devastating damage are not negligible. Involvement of religious institutions with issues discussed at the Vatican workshop could go a long way toward lessening risks to humanity originating at the poverty-population-consumption-environment nexus. The statement issued by contributors to the workshop (16) urged that, over and above institutional reforms and policy changes that are required, there is a need to reorient our attitude toward nature and, thereby, toward ourselves. In convening the workshop and in statements that followed (17), Pope Francis displayed deep concern over our relationship with nature and raised the profile of the issues that stem from it. It can only be hoped that such moral leadership will mobilize people to act upon them. ■

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