



## *Laudato si'*: Concern for our global commons

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On Friday 25 September, Pope Francis will address the UN General Assembly in New York, whose members will be discussing many of the issues that the pope addressed earlier this year in *Laudato si'*. Climate scientists Ottmar Edenhofer and Christian Flachsland give a detailed analysis of the groundbreaking encyclical, its place in church tradition and its dialogue with current climate science. How is Pope Francis challenging the Church and the world?

Pope Francis' long-awaited encyclical *Laudato si'* cannot be reduced to an 'environmental' or 'climate' document.<sup>1</sup> In fact, it discusses key ethical challenges of the 21<sup>st</sup> century: climate change, poverty and inequality. Climate change hits the poor the hardest and exacerbates inequality within global society. If global commons<sup>2</sup> such as the atmosphere, the forests, the global water cycle and the oceans are not protected, there will be no just global economic order.

The encyclical was anticipated with both high expectations and great fears: expectations on the part of those seeking support from the pope for a more just globalisation; and fears among those concerned that the pope might side with an ambitious climate and environmental movement. Indeed, even the timing of the release of the encyclical – in June 2015 – was a political statement and reminded the world community of its responsibility. It was published after the G7 Summit that took place at Schloss Elmau in Bavaria in early June, where the decision was taken to decarbonise the global economy; and prior to two United Nations summits (New York in September and Paris in December), where sustainable development goals and a new international climate agreement are to be adopted. On 25 September 2015, Pope Francis will talk about the related challenges at the General Assembly of the United Nations.



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According to *Laudato si'* (*LS*), the current generation risks going down as the most irresponsible in the history of mankind. Yet, if it chooses to, it could also be remembered for having courageously lived up to its responsibilities (*LS* §165). In saying this, Pope Francis is building on the 1963 encyclical *Pacem in Terris*, in which John XXIII made an appeal for peace to 'all people of good will' at a time when the world was on the brink of nuclear war.

Today, Pope Francis sees in climate change, global poverty and deepening inequality a comparable planetary challenge. As such, he addresses his encyclical as an invitation to 'every person living on this planet' to engage in dialogue (*LS* §3).

*LS* has triggered a worldwide debate. The weeks after its release were marked by predictable reactions: approval from the environmental movement, rejection from parts of the conservative mainstream media, and a deafening silence from the so-called climate sceptics. The corresponding biases are known, and careful readings on the part of commentators appear to have been few and far between.

Far more interesting were the reactions from the scientific community. It is unprecedented in the history of Catholic Social Teaching for renowned scientific journals such as *Nature* and *Science* to

publish favourable editorials before and after the publication of an encyclical.<sup>3</sup> These journals commended in particular the pope's desire for dialogue with the scientific community, such as that which took place at a conference organised by the Pontifical Academy of Sciences in the spring of 2014.<sup>4</sup> With a view to climate science, many scientists have confirmed that *LS* accurately summarises the state of knowledge on the climate problem as assessed by the Intergovernmental Panel on Climate Change (IPCC), whose reports reflect the current state of scientific knowledge.

### *Climate change and the Catholic Church*

The clarity and decisiveness with which *LS* acknowledges the ethical challenges of climate change, poverty and inequality can only be appreciated fully when one considers the Vatican's hesitation to address the topic of climate change in the past. No previous papal encyclical has dealt with climate change in a systematic manner. It has been addressed only by national conferences of bishops, to which the pope pays tribute with no fewer than eighteen citations in his encyclical.

Three reasons may explain the Vatican's previous difficulties with the issue of climate change.<sup>5</sup> First, it may not have wanted to express an opinion about the cause of climate change as long as there was no consensus in the scientific community. Again and again, interested parties tried to sway the Vatican by highlighting the outstanding scientific uncertainties and disagreements. Without clarification, it was apparently considered impossible for the Church to take a position: to do so would have been to risk damaging its moral authority.

Secondly, the Vatican may have feared that the difficult issue of population policy could resurface in the context of climate change. If the burning of coal, oil and gas, as well as deforestation, are causing an increase in the global mean temperature, then it must be acknowledged that population growth is, alongside economic growth, a driver of climate change. Yet this means that the issue of population policy, largely unresolved in the Church's social teaching, is again open for discussion.

The third – and presumably main – reason for the Vatican's hesitant approach to climate change thus far is a concern for the power dynamics in play. However, as no pope before, Francis is questioning the current global economic system. For him, climate change, global poverty and inequality are threatening the foundation of our 'common home.'

In the past, the Vatican has not denied that there is a 'natural' climate change and that this primarily affects the poor. And its response, in the past, was to counter this natural climate change with greater emphasis on international development and support for the poor. This position was reinforced by Catholic think tanks in the United States, who repeatedly insisted on a clear prioritisation: the fight against poverty was to come first, and only afterwards, possibly decades later, might we consider climate change mitigation. They referred to, inter alia, the analysis by the former environmentalist Bjorn Lomborg, and the Copenhagen Consensus Centre that he founded.<sup>6</sup> Lomborg repeatedly tried to demonstrate, and has stated in his commentaries on the encyclical,<sup>7</sup> that the fight against poverty, such as through investments in medical care, education and access to clean water, should be given preference over the fight against climate change. Yet, this stance tends to legitimise the continued postponement of climate action, by providing purportedly good reasons for doing so and without giving an appearance of cynicism. From that angle, climate policy is framed as a secondary, if not trivial, concern.

Significantly, however, the bishops of the South have been decidedly opposed to such rhetoric. Under Benedict XVI, a remarkable rethinking took place in this regard. The German Catholic bishops' organisation, Misereor – together with the Potsdam Institute for Climate Impact Research, the Institute for Social and Development Studies at the Munich School of Philosophy, and the Munich Re Foundation – initiated in 2007 a project that examines the issues of climate change, poverty and inequality. This project resulted not only in a book but also in dialogue forums where research results were discussed in Africa, Asia and Latin America with local populations.<sup>8</sup> In addition, Misereor organised several conferences with bishops and others from Brazil, India, the

Philippines and Ethiopia, which addressed the poor's experiences of climate change.<sup>9</sup> It emerged that in many poorer countries the limits of adaptation to climate change appear to have been reached. Moreover, climate change threatens to undo the progress that has been made in overcoming poverty. The question of who should be tasked, and to what extent, with the mitigation of climate change was thus raised within the Catholic Church and required a response.

With *LS*, this response has now been given. The clear style of the encyclical is a strong indication that *LS* was not drafted by ghostwriters from academia or politics but by Pope Francis himself. In unconventionally direct terms, he attacks the denial of climate change as an expression of veiled power interests – 'veiled' because such endeavours are not a quest for scientific truth but efforts to protect private interests against those of the common good (*LS* §54, §135, §188).<sup>10</sup> Francis emphasises that the analysis of and response to the climate problem should not be determined by the interests of the powerful but rather by the demand for global justice.

In principle, the encyclical is structured according to the four steps of *see – judge – act – celebrate*.<sup>11</sup> The global environmental problems identified by science are outlined in Chapter I and are then interpreted in light of the biblical message (Chapter II) and explained in the broader context of the papal understanding of globalisation and modernisation (Chapter III). In Chapter IV, *LS* then discusses ethical orientations, while chapters V and VI discuss the motives and approaches to action.

Below, we examine key issues of the encyclical: the relationship between climate change, poverty and inequality, and the concern for the global commons; the need to tackle poverty reduction and climate protection simultaneously; practical recommendations of the encyclical; the responsibility of humankind in dealing with the power of technology at the 'end of the modern world'; and the future challenges resulting from *LS* for the churches.

### *Climate change, poverty and inequality*

The starting point of the encyclical is the scientific knowledge, as summarised in the [reports of the IPCC](#), that climate change is caused by mankind through the

burning of coal, oil and gas, through deforestation and through the emissions of other greenhouse gases. That said, the encyclical cannot, understandably, offer as systematic and comprehensive a description of the impacts of climate change as, for example, the Working Group II contribution to the IPCC's Fifth Assessment Report into the current state of climate change knowledge.<sup>12</sup> The encyclical emphasises above all the consequences of climate change for the poor. It points out that the poor are affected first and hardest by climate change because, more than other segments of the population, they depend on agriculture, fisheries and other ecosystem resources for their livelihood, and because they are not in the position to protect themselves effectively against increasing extreme weather events and water scarcity (*LS* §25). Moreover, the lack of access to clean water, loss of biodiversity and air pollution, and their adverse effects on health, are concerns for the pope. He fears that the negative effects of global environmental change and resource use could lead to migration movements or even wars in the future (*LS* §57).

The carrying capacity of the planet is already being exceeded without the problem of poverty having been solved. Yet it is important to note that the pope does not see population growth as the main culprit. It is not the number of people but the inequitable use of existing natural resources that is the problem. Rich countries consume too much, without adequately sharing with the poor.

Apparently, the pope regards the mitigation of climate change as a prerequisite for an effective fight against poverty, as it threatens to offset the medium- to long-term successes in the fight against poverty and to exacerbate global inequality. The encyclical proposes no specific targets for climate protection; the international community, however, has already set the goal of limiting global warming to 2°C above pre-industrial levels. This target has far-reaching consequences as it limits the amount of CO<sub>2</sub> that may yet be deposited in the atmosphere. The atmosphere is still, and primarily, used as a carbon sink by rich countries. At present, might makes right, at the expense of the poor.

### *The struggle over the global commons*

Therefore, the pope declares the climate to be a common good 'belonging to all and meant for all' (*LS*

§23). The oceans and other natural resources should likewise be considered as global commons and protected by an appropriate system of governance (*LS* §174). Thus, for the first time in the history of the Social Doctrine of the Church, the principle of the universal destination of the goods of creation is also applied to the global carbon sinks of the atmosphere, oceans and forests. In order to protect the poorest and to avoid dangerous climate change, these sinks must be prevented from overuse.

As shown in the last IPCC report, compliance with the 2°C target requires that the remaining cumulative CO<sub>2</sub> emissions stay below about 1,000 gigatons (Gt). As a measure of comparison, annual CO<sub>2</sub> emissions in 2013 were at 35 Gt, with an upward trend. Furthermore, an estimated 15,000 Gt of CO<sub>2</sub> are still present in the ground in the form of fossil fuels. The majority of these must therefore remain in the ground to avoid the CO<sub>2</sub> deposits and climate change that would result from their being burned and released into the atmosphere. Rather than a business-as-usual-scenario – in other words, a scenario without any global climate policy – meeting the 2°C objective requires that some 80 percent of the world’s coal, and 40 percent each of gas and oil, be left in the ground. Finally, if CO<sub>2</sub> cannot be captured during combustion and stored geologically, even less fossil resources can be used.<sup>13</sup> However, if the great part of the world’s fossil fuel reserves must remain in the ground, the assets of the owners of fossil fuel resources are devalued.

This raises the question of whether a climate policy that intervenes in the property rights of owners of coal, oil and gas can be justified.<sup>14</sup> But, if the climate is a global commons worth protecting, then private property rights to coal, oil and gas must be designed so that they meet the demands of serving the common good. With this clear positioning, *LS* is contributing to the development of the notion of property within Catholic Social Teaching.

Historically, the Catholic doctrine of property (especially as it is expressed in the 1891 encyclical *Rerum Novarum*) was influenced by the classical liberal tradition founded by John Locke, according to which private property rights to natural resources can be legitimised on the basis of their having been appropriated through land grabbing and enhancement by human labour. The discovery of America and the

colonisation of the ‘empty continent’ by the Europeans (through the decimation and displacement of the indigenous population) solidified this practice of the appropriation of natural resources. Land, and later fossil resources such as oil, then belonged to those who were the first to cultivate it or use it. Yet even so, Locke had already formulated an important condition for legitimate land acquisition: the appropriation may take place only if enough resources of equal quality are available to use for others (known as the ‘Lockean proviso’).<sup>15</sup> Thus, even the liberal concept of ownership does not allow for an unconditional right of appropriation of scarce natural resources.

Catholic Social Teaching reinforces this idea by emphasising that the principle of the ‘universal destination of the world’s goods’ has precedence over the right to private property (*LS* §93).<sup>16</sup> *LS* refines this principle by recognising the overexploitation of global CO<sub>2</sub> sinks as an instance in which the right to private property may be justifiably restricted (*LS* §23, and especially §93–95). In this way, the current use of the atmosphere according to the ‘might makes right’ principle is delegitimised.

The recognition of the atmosphere and the climate as a global common good could possibly have international legal consequences. For example, an obligation to protect could be invoked should the atmosphere be threatened. Some parties to the UN Framework Convention on Climate appear to fear exactly that, given that they were reluctant to designate climate change as a global commons problem in the Fifth Assessment Report of the IPCC. In fact, in a footnote on the topic, the report states that the term ‘global commons,’ as a characterisation of the climate problem, has no implications for an international agreement or for criteria of international effort-sharing when it comes to climate protection.<sup>17</sup> With *LS*, however, the pope had the courage to place the status of the atmosphere as a global commons at the forefront of the collective consciousness of humanity.

### *Climate protection and poverty reduction – are they mutually exclusive?*

The issue of the institutional design of how access to the atmosphere could be restricted, and thus the poorest protected against climate change, is not addressed by the encyclical. From an economic point of view, the pricing of CO<sub>2</sub> emissions, through taxes

or emissions trading systems, is the most effective means to achieve this objective. The encyclical rightly points to the economic principle that market prices should adequately reflect all social costs (*LS* §195). Yet currently, considering the shortage of storage capacity in the atmosphere, the market prices fail to do this. If CO<sub>2</sub> taxes or emissions trading systems are introduced, these shortages, as well as the cost of overusing the atmosphere, are signalled to the markets. This, in turn, will induce a shift in investment and purchasing practices at both the public and private levels. Essentially, these measures translate the scarcity of the common good atmosphere into the ‘hard’ language of the profit-oriented markets and thereby impose the required ethical framework.

Moreover, limiting the amount of carbon that is stored in the atmosphere by means of CO<sub>2</sub> pricing will not only protect the climate, and thus the poorest affected by climate change, but will also provide a new source of income in the form of tax revenues or auctioned emissions permits. When the atmosphere is a common good, these revenues in principle belong to all people, and their distribution should be done in compliance with the principles of justice.

Thus, the revenue from CO<sub>2</sub> pricing could be used to provide the poorest with access to basic goods. Such a CO<sub>2</sub> tax reform could be carried out by national governments who coordinate internationally.<sup>18</sup> For example, were the government of India to charge ten dollars for every ton of CO<sub>2</sub> emitted, it could provide electricity, clean water, sanitation and telecommunications for more than 60 million people every year. The same applies to China or Mexico. CO<sub>2</sub> pricing could therefore be used to combat poverty.<sup>19</sup> A first step in that direction would be to abolish subsidies for fossil fuels – that alone would free up at least \$550 billion for investments to help the poor.

Indeed, these measures would meet one of the key demands of the pope, namely to fight climate change and poverty together, at the same time. However, from the perspective of the encyclical, not all forms of CO<sub>2</sub> pricing are unobjectionable. In this regard, the pope is not afraid to venture into the more complex aspects of environmental economics.

### *When it comes to practical recommendations, even the pope is not infallible*

The pope is against emissions trading, or at least he expresses serious concerns about the use of this tool (*LS* §171). He fears an ensuing speculation on the carbon markets, which would then undermine the effectiveness of this method. His assessment has been met with opposition by experts. It is, in any case, astonishing that a pope is even reflecting on a specific instrument of environmental policy in such detail. Indeed, unlike almost all other Catholic Social Teaching documents, *LS* has not resisted the temptation to engage in the discussion of specific reform proposals. In this way, the encyclical is raising the suspicion that the pope is claiming authority on scientific matters. However, Pope Francis is not claiming a doctrinal authority in resolving scientific disputes or other conflicts of interest. Rather, it is understood that the pope, when considering specific recommendations for actions, is not claiming doctrinal authority for the underlying factual judgements.<sup>20</sup> The statements of the encyclical on emissions trading should therefore be understood as an invitation to the experts to engage in a dialogue and to take the pope’s concerns about the effectiveness of this method seriously, or to prove them groundless.

With his criticism of economic growth, the pope is not likely to attract approval from economists either. *LS* §193 reads: ‘That is why the time has come to accept decreased growth in some parts of the world, in order to provide resources for other places to experience healthy growth.’ However, the latest IPCC report showed that, and how, economic growth and emissions growth can be decoupled through technological progress. ‘Degrowth,’ as a strategy in climate policy, is a very costly option under which the poor would likely suffer the most. Other measures, such as increasing energy efficiency, use of renewable energies and a structural shift towards less resource-intensive lifestyles, are less costly and allow for growth that is environmentally and socially compatible.<sup>21</sup>

Politically, the encyclical sees the solution to the global crisis in the interplay of international cooperation, national politics, municipal engagement and the power of an emerging diverse civil society.

Some concerned commentators even wondered whether the pope is proposing in *LS* a ‘world political authority’ (*LS* §175). Yet, what the pope means is not a world government but the need for international cooperation and coordination among nation states in order to manage and channel the dynamics of globalisation. The encyclical draws on ideas similar to those developed by Elinor Ostrom,<sup>22</sup> who proposed that a polycentric governance of global public goods could, among other benefits, allow civil society actors to play an important role alongside government institutions. The encyclical regards civil society movements as a means by which to put pressure on national-level policy-making. For the pope, such movements are not limited to political protest but include empowered consumers and investors who could and should exert pressure on markets through boycotts and opposition (*LS* §206). Virtue ethics and social reform are not mutually exclusive but rather mutually dependent. Man’s increased empowerment in modernity, made possible through technology, requires heightened awareness of individuals and new forms of institutional responsibility.

### *Technology and the ‘end of the modern world’*

According to Pope Francis, the roots of the ecological crisis lie in the ambivalence of modernity. With repeated references, in Chapter III, to *The End of Modern World* by Romano Guardini,<sup>23</sup> the encyclical holds that modernity is creating, through technology, new possibilities to control nature. *LS* essentially sees technology and its possibilities as positive (*LS* §102). Yet, from the perspective of Guardini, the problem of modernity is that mankind is in denial of these expanded opportunities for power, and so it denies its responsibility. This often tacit refusal means that technology is not consciously created and designed but only executed, in a technocratic fashion and with a sole focus on economic growth and profitability – this then generates organised irresponsibility.<sup>24</sup>

By contrast, the encyclical emphasises that the increased opportunities for control and power allow for more freedom in decision-making; yet this requires ethical judgment. It is against this background that the reflections of the pope on technology should be understood, such as when he calls for greater energy efficiency and the development of renewable energies (*LS* § 26) or when he expresses concerns about

nuclear energy (*LS* §104, 184). *LS* is not technology-hostile but calls for a responsible approach and an ethical design of the new possibilities offered by technology. Technological progress is not a juggernaut to which people should be sacrificed; instead it can help to solve the problems of climate change, poverty and inequality.

In his analysis of modernity, the pope points to the great biblical stories of creation, fall, redemption and salvation. When applied to today’s world, these stories teach us that a disfigured earth is not just an expression of a disturbed relationship between God and mankind, but also an expression of violence among people (*LS* §70). The biblical stories should remind people that humanity awaits accomplishment by God and that it is not doomed to tragic failure. However, averting tragedy will require mankind to face reality and to change its course. In this sense, the encyclical argues not only from a philosophical or natural law perspective but offers a new theological view of the planetary crisis. *Laudato si’* is thereby challenging not only politics but, above all, the Christian churches. This creates opportunities for action by the churches in the following areas.

### *Challenge to the churches*

1. *Giving the poor a voice:* Already today, church aid agencies such as CAFOD and Misereor are making outstanding contributions to combating climate change, poverty and inequality. They should continue the dialogue with the poor and other stakeholders on climate and development policy, and one hopes that they will be able to do so even more forcefully in the future thanks to the support of the pope. The voice of the Vatican in the international climate negotiations of the United Nations could become more audible. The Holy See could become the voice within the circle of the powerful that points again and again to the requirements of the common good, without which the pursuit of national interests is at risk of degenerating to mere power politics.

2. *A global initiative in religious educational institutions:* The problems of climate change, poverty and inequality call for a well-rounded education encompassing the natural, social and economic sciences, together forming the basis for engaging in an ethical and theological reflection. The Catholic

Church has a global education system that includes, in addition to universities, nearly all types of schools. To carry out such an educational initiative would be an important task and opportunity for religious institutions (LS §209–215).

3. *Further development of the social teaching of the Catholic Church:* LS carefully dodged the issue of population policy and has not resolved it. It remains unclear which family planning methods the Catholic Church may condone in the future and which it may not. The implications of a growing, declining or stationary population require ethical reflection. In addition, how to ensure a fair globalisation is one of the key questions raised by the encyclical. Unfortunately, the argumentation in this regard is often too simplistic. For example, it proposes that we depart from an uncritical or exaggerated reliance on the market, yet does not propose the measures required to realise such reforms. It would be good to examine which social and economic reforms might help gradually to overcome the most pressing injustices. It could also make concrete proposals for action, as it has successfully done in the past e.g. for the construction of the German welfare state.<sup>25</sup>

4. *Revision of ecclesiastical economic activity:* In most national governments, the ministers of the environment are responsible for the climate problem, and they usually have less power than the ministers of finance and the economy. Yet the latter ministers in particular should concern themselves with the climate issue. After all, if not they, who is to introduce CO<sub>2</sub> pricing, abolish subsidies for fossil fuels and make public investments in infrastructure to reduce emissions and improve the plight of the poor? The Church is in a similar situation: the environmental officers in the dioceses have less power and influence than the vicars general and asset managers, who make decisions about the procurement of goods and services and the investment strategy in the capital markets (LS §206). Although the churches are already playing an important role in ethical investment, they could be more active and have a stronger media presence on these matters.

5. *Continue the incipient dialogue between the Church and science* (LS §199–201). The encyclical shows that the dialogue between religion and science is not only bringing ethical challenges to the fore, but that it can also

help identifying ways to overcome them. The pope sees history not as tragedy but as drama. And in this drama of salvation, mankind is not doomed to failure. Pope Francis reminds his readers that God wants to perfect humanity and that modern reason must engage in a holistic understanding of reality if it wishes to solve its problems. Freedom can only emerge by interweaving science with world interpretation – without this, justice cannot be attained.

### *A dialogue between unusual partners*

Until now, the Church and its social teaching appeared to be merely reacting to the challenges of modernity, and sometimes to be barely capable of meeting them. By contrast, LS is now challenging the world. This encyclical has initiated a dialogue with partners who are unusual for the Church: scientists, diplomats, activists, politicians and those affected. While the pope acknowledges the various contributions of these parties, he also propels and encourages them to take further steps. In the weeks after the release of *Laudato si'*, the two authors of this article were impressed to see that, worldwide, scientists (even those who consider themselves to be atheists or agnostics), political conservatives who are sceptical of climate policy, and activists who have long since written off the Church, were talking about Pope Francis and his encyclical. However, they are not just talking *about* him but also *with* him, because his concern for the 'common home' is also their concern.

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<sup>1</sup> [http://w2.vatican.va/content/francesco/en/encyclicals/documents/papa-francesco\\_20150524\\_ enciclica-laudato-si.html](http://w2.vatican.va/content/francesco/en/encyclicals/documents/papa-francesco_20150524_ enciclica-laudato-si.html)

<sup>2</sup> [https://en.wikipedia.org/wiki/Global\\_commons](https://en.wikipedia.org/wiki/Global_commons)

<sup>3</sup> See editorials in: *Nature* 522 (391), ‘Hope from the Pope’ (25 June 2015); *Science* 345 (6203), ‘The Pope tackles sustainability’ (19 Sep 2014); and *Science* 349 (6243), ‘The beyond-two-degree inferno’ (3 July 2015). In the latter editorial, the editor of *Science*, Marcia McNutt writes: ‘I applaud the forthright climate statement of Pope Francis [in *Laudato si’*], currently our most visible champion for mitigating climate change.’

<sup>4</sup> See the following conference report published by the Pontifical Academy of Sciences: *Sustainable Humanity, Sustainable Nature: Our Responsibility* (Vatican City, 2015). Available at: [www.casinapioiv.va/content/accademia/en/publications/extraseries/sustainable.html](http://www.casinapioiv.va/content/accademia/en/publications/extraseries/sustainable.html)

<sup>5</sup> These positions were clearly manifested in discussions which Ottmar Edenhofer had in 2008 with the then representatives of the Pontifical Council for Justice and Peace.

<sup>6</sup> See, for example, George Weigel, ‘The Sky is not Falling,’ *The Catholic Difference*, 31 Jan 2002; *ibid.*, ‘The Sixties, Again and Again,’ *First Things*, April 2008.

<sup>7</sup> See Bjorn Lomborg, ‘What Pope Francis should do to really help the poor,’ *USA Today*, 22 June 2015.

<sup>8</sup> See Ottmar Edenhofer, Johannes Wallacher, Hermann Lotze-Campen, Michael Reder, Brigitte Knopf, Johannes Müller (Eds.), *Climate Change, Justice and Sustainability. Linking Climate and Development Policy* (Springer, 2012).

<sup>9</sup> CELAM Misereor Conferences, Vatican City, 6-7 March 2008 and 2 Oct 2010 in Domus Sanctae Marthae; and the ‘Conference on Climate Change in Asia’ with Asian bishops on 18-20 Oct 2010 in Bangkok. Ottmar Edenhofer participated in all three conferences as a speaker.

<sup>10</sup> On the position of the so-called climate sceptics, see also Naomi Oreskes and Erik Conway, *Merchants of Doubt. How a Handful of Scientists Obscured the Truth on Issues from Tobacco Smoke to Global Warming* (New York, 2010).

<sup>11</sup> <https://leonardoboff.wordpress.com/2015/06/18/the-magna-carta-of-integral-ecology-cry-of-the-earth-cry-of-the-poor/>

<sup>12</sup> See <https://ipcc-wg2.gov/AR5>

<sup>13</sup> Ottmar Edenhofer, Christian Flachsland, Michael Jakob and Jérôme Hilaire, ‘Den Klimawandel stoppen. Es gibt nicht zu wenig, sondern zu viel fossile Ressourcen – sie müssen in der Erde bleiben,’ *Le Monde diplomatique. Atlas der Globalisierung: Weniger wird mehr* (2015).

<sup>14</sup> See: Ottmar Edenhofer, Christian Flachsland, Kai Lessmann and Michael Jakob, ‘The Atmosphere as a Global Commons - Challenges for International Cooperation and Governance,’ in Willi Semmler and Lucas Bernard (eds.), *The Handbook on the Macroeconomics of Climate Change* (Oxford, 2015), pp. 260–296.

<sup>15</sup> John Locke, *Two Treatises on Government* [1689], Essay 2, Chapter V, (New Haven, CT, 2003).

<sup>16</sup> The position of Catholic Social Teaching on these questions is articulated in: Pontifical Council for Justice

and Peace, *Compendium on the Social Doctrine of the Church*, Chapters 4-III and 10. Available at:

[http://www.vatican.va/roman\\_curia/pontifical\\_councils/justpeace/documents/rc\\_pc\\_justpeace\\_doc\\_20060526\\_compendio-dott-soc\\_en.html](http://www.vatican.va/roman_curia/pontifical_councils/justpeace/documents/rc_pc_justpeace_doc_20060526_compendio-dott-soc_en.html)

<sup>17</sup> The exact wording of the footnote is: ‘In the social sciences this [the climate problem] is referred to as a “global commons problem.” As this expression is used in the social sciences, it has no specific implications for legal arrangements or for particular criteria regarding effort sharing.’ See IPCC, ‘Summary for Policymakers,’ *Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Ottmar Edenhofer et al.], (Cambridge, 2014).

<sup>18</sup> On the challenges and opportunities of a global CO<sub>2</sub> pricing scheme, see Ottmar Edenhofer, Michael Jakob, Felix Creutzig, Christian Flachsland, Sabine Fuss, Martin Kowarsch, Kai Lessmann, Linus Mattauch, Jan Siegmeier and Jan Christoph Steckel, ‘Closing the emission price gap,’ *Global Environmental Change* 31 (2015) 132–143.

<sup>19</sup> Michael Jakob, Claudine Chen, Sabine Fuss, Annika Marxen, Narashima D. Rao and Ottmar Edenhofer, ‘Using carbon pricing revenues to finance infrastructure access.’ Presentation at the 21<sup>st</sup> Annual Conference of the European Association of Environmental and Resource Economists. Manuscript (2015):

[www.webmeets.com/eaere/2015/m/viewpaper.asp?pid=504](http://www.webmeets.com/eaere/2015/m/viewpaper.asp?pid=504)

<sup>20</sup> Unlike factual statements, ethical standards require a doctrinal authorisation, which is applied according to their degree of generality. However, in the scope of this paper, we cannot address the dogmatic and ecclesiological question of what degree of doctrinal authority is to be applied to ethical standards (e.g., the polluter-pays principle as opposed to the double commandment of love God and thy neighbour), the documents of the Church’s social teaching in general and in *Laudato si’* in particular. See Richard R. Gaillardetz, ‘The Ecclesiological Foundation of Modern Social Teaching,’ in Kenneth R. Himes (ed.), *Modern Social Teaching: Commentaries and Interpretations* (Georgetown, 2005), p.89 f.; see also Oswald v. Nell-Breuning, *Soziallehre der Kirche* (Vienna, 1977), pp. 28–31.

<sup>21</sup> See also Michael Jakob and Ottmar Edenhofer, ‘Green Growth, Degrowth, and the Commons,’ *Oxford Review of Economic Policy* 30 (2014) 447–468.

<sup>22</sup> Elinor Ostrom, ‘Nested externalities and polycentric institutions: must we wait for global solutions to climate change before taking actions at other scales?’, *Economic Theory* 49 (2012), 353–369.

<sup>23</sup> Romano Guardini, *The End of the Modern World* (Wilmington, 1998).

<sup>24</sup> See Franz-Xaver Kaufmann, *Der Ruf nach Verantwortung. Risiko und Ethik in einer unüberschaubaren Welt* (Freiburg, 1992).

<sup>25</sup> See Oswald v. Nell-Breuning, *Soziale Sicherheit* (Freiburg, 1979).