

# Constructive News Across Languages and Cultures

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## Multimodal, Multilingual, and Constructive Communication in *Vatican News*

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## Introduction

The Roman Catholic Church has a long history of news publication in multiple formats: the Vatican's newspaper *L'Osservatore Romano* has been published since 1860; the Vatican radio station has been broadcasting continuously since 1931, and the news website [www.vaticannews.va](http://www.vaticannews.va) has been live since 2017. Each of these news outlets has a multilingual and global presence.<sup>1</sup> The ethos of news delivery in these outlets is encapsulated in the words delivered by Pope Francis for the 51st World Communications Day in 2017:

I would like to encourage everyone to engage in constructive forms of communication that reject prejudice towards others and foster a culture of encounter, helping all of us to view the world around us with realism and trust. I am convinced that we have to break the vicious circle of anxiety and stem the spiral of fear resulting from a constant focus on “bad news” (wars, terrorism, scandals and all sorts of human failure). This has nothing to do with spreading misinformation that would ignore the tragedy of human suffering, nor is it about a naive optimism blind to the scandal of evil. Rather, I propose that all of us work at overcoming that feeling of growing discontent and resignation that can at times generate apathy, fear or the idea that evil has no limits. Moreover, in a communications industry which thinks that good news does not sell, and where the tragedy of human suffering and the mystery of evil easily turn into entertainment, there is always the temptation that our consciences can be dulled or slip into pessimism. I would like, then, to contribute to the search for an open and creative style of communication that never seeks to glamourise evil but instead to concentrate on solutions and to inspire a positive and responsible approach on the part of its recipients. I ask everyone to offer the people of our time storylines that are at heart “good news”.

Francis 2017 (originally delivered in Italian)

This approach to news communication is encouraged from the top of the Catholic hierarchy and is adopted by those working in the Vatican's media sections. Federico Lombardi, director for many years of the Vatican Radio, has said that he always

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invited his colleagues to adopt the motto: “*comunicare per unire, comunicazione per costruire comunione*” [communicate to unite, communication to build communion] (Lombardi 2021, 141).<sup>2</sup> Andrea Monda, current director of *L’Osservatore Romano*, has spoken of how the newspaper highlights areas that are ignored by other news sources and how the Catholic Church works in this capacity ‘for the good of humankind, to promote its value and defend its dignity (Monda 2021, 61).’

The journalistic ethos and institutional attitude of the Catholic Church align closely with the approach to constructive news that has been theorised and promoted over the last twenty years. Indeed, the principles and practices related to constructive news reporting (McIntyre and Gyldensted 2018; Mast, Coesemans, and Temmerman 2019; Bro 2019) find expression in the outputs of the Catholic Church on a daily basis, including (but not limited to) a solutions focus, future orientation, and depolarising ethos.<sup>3</sup> The annual World Communications Day messages by successive popes have called for “stories that build up, not tear down; stories that help us rediscover our roots and the strength needed to move forward together” (Francis 2020). Pope Francis insisted on the need for a communication of “*incontro*” [encounter] rather than “*scontro*” [conflict] which means the building of positive and constructive relationships through communicative structures. Catholic Church communication focuses not just on social problems but also on possible responses, and its approach is underpinned by a desire to build a better world, not just to report on world issues.

As a global institution, the Catholic Church is committed to communicating its news output in multiple languages. It has also long embraced multimodal forms of communication. The constructive news produced by the Catholic Church is therefore both multilingual and multimodal, and as such, offers an excellent opportunity to comparatively study constructive news content across languages and cultures.

### **Corpus Overview**

To examine multilingual and multimodal constructive news communication by the Catholic Church, we have chosen to study a recent corpus of news reporting relating to climate change on their official news website [www.vaticannews.va](http://www.vaticannews.va). This news website contains content in over 35 languages and is updated daily by teams of journalists, editors, and translators working for the Vatican. We have chosen the topic of climate change because it represented a key concern of Pope Francis, regularly featuring on all Vatican news outlets (Francis 2015; Pasquale 2019; McKim 2019; Chu 2022; Cavanaugh 2018). The Catholic Church’s interest in reporting on issues relating to the environment meant that we were confident we would be able to collect a significant number of articles on this theme from the news website during the defined collection timeframe. Climate change as a news topic was of further relevance as it has already been analysed from a constructive news perspective (Atanasova 2022) and because, as a topic, it can be reported on in different ways: it is possible, for example, to report on climate issues in a sensationalist manner, with a focus on the devastating and negative impacts of climate change, but it is also possible to take a future-oriented and solutions-based approach which

engages positively with audiences to encourage active, participatory change. A corpus of climate-related news content from the Vatican's main news website therefore offered the possibility of studying whether a constructive news approach was being adopted by the different language groups working for *Vatican News* and in the different modalities present on the website. We collected the corpus over a two-month period (early October to early December 2023) dating from the publication of the Pope's apostolic exhortation *Laudate Deum: To All People of Good Will on the Climate Crisis* to COP28 (The 28th Conference of the Parties to the United Nations Framework Convention on Climate Change). Forty-one pieces of news relating to climate issues and their iterations in five languages (Italian, English, French, Spanish and Portuguese) were retrieved from *vaticannews.va* in this time frame. This content is usually (but not always) created in Italian for the news website before being translated for different linguistic groups. The keywords used for selecting the corpus articles were (in English) "climate," "cop," "Laudato," "environment," "fossil," and "sustainability."<sup>4</sup> Each keyword was searched individually in each monolingual corpus, without the use of "and" or "or" operators, to prevent potential database errors.

The curated corpus provided a sample of 172 articles across the five languages, which we categorised by language and aligned by matching them based on the similarity of the articles. Text (including headlines, leads and subheadings), images/infographics (visual representations supporting the text), and various other interactive elements (such as metadata) were gathered from the news website. It should be noted that not every item of news was reported in each language and therefore each language corpus is a different size (It: 41; En: 37; Pt: 32; Fr: 25; Es: 37). We used the corpus to question how the constructive approach to news reporting fared in multilingual and multimedia communication.

## Methodology

An analysis of the news content of the *Vatican News* website involves examining how various modes of communication – such as text, images, videos, and other such elements – convey information, and how they do so in different languages. In the field of news translation, only a few recent studies have attempted to assess multimediality and multimodality (for example Altahmazi, 2020; Riggs, 2021; 2024a; Hernández Guerrero 2022) and the analysis of a multilingual news corpus encompassing multiple semiotic forms remains a challenge, especially when investigating large datasets. The study of different modes requires a considered approach (Kress and Van Leeuwen 2020) and the task is even more complicated when multimodality intersects with multilingualism (Boria *et al.* 2020; Valdeón 2024). The nature of the corpus that we constructed therefore required a mixed-method approach based on Corpus-Assisted Multimodal Discourse Analysis (CAMDA) (Bednarek 2015), to which we added our own Natural Language Processing (NLP) methods carried out with various customised Python pipelines. The mixed-method approach to the corpus consisted of *metadata analysis*, *keyword analysis*, *topic modelling*, *sentiment analysis*, and *visual analysis*. The first three methods served

to establish the recurring themes and topics in the corpus and enabled a comparative overview of the news presented in multiple languages. *Metadata analysis* provided insights into structural patterns (Miller 2022), such as publication timelines and author's identity, helping us contextualise the broader ecosystem of Catholic news production. *Keyword analysis* allowed us to identify recurring themes and focal points across languages, offering a granular view of the extent to which climate change narratives are prioritised by each cultural context.

*Topic modelling* is an NLP technique used to discover abstract topics within a collection of documents by identifying patterns of words that frequently occur together (Bednarek 2024). It helps summarise large datasets, revealing underlying themes without requiring prior labelling of the data. Topic modelling thus helped us detect underlying topics and thematic trends that might not be immediately apparent in a large, multilingual dataset.

*Sentiment analysis*, another NLP technique, was used to determine the emotional tone behind a piece of text. It involves analysing textual data to identify and categorise opinions, emotions, and attitudes expressed in the news with the goal of understanding the sentiment conveyed in each text as positive, negative, or neutral (Taboada 2016). To this end, we used the Multilingual Bidirectional Encoder Representations from Transformers (mBERT)—a large language model developed by Google that is capable of contextual understanding and of handling complex sentences and language nuances. Importantly, we employed these linguistic tools across all five languages under consideration. While metadata, keyword analysis, and topic, and topic modelling are not language-dependent, mBERT enabled us to analyse sentiment across all five corpora, ensuring a consistent and equitable approach to cross-language analysis without concerns over unequal language resources.

For *visual media analysis*, we employed the Contrastive Language–Image Pre-training (CLIP) approach. CLIP is a neural network trained on a large-scale dataset of images and their associated captions. Unlike traditional image classification models that rely only on visual features, CLIP is trained to associate images with their corresponding textual descriptions, which was particularly relevant to our news corpus. This is achieved through a contrastive learning objective, which encourages the model to pull matching image-text pairs closer together in the embedding space while pushing non-matching pairs apart. Consequently, CLIP can understand a wide range of visual concepts and their textual descriptions, making it highly versatile for various vision-and-language tasks and able to detect image sentiment. Visual media analysis (Rogers 2021) complemented the above textual approaches by addressing the role of imagery and image choice and prioritisation in framing climate-related stories. It also offered a reliable methodology for assessing patterns of image use in our large multilingual dataset.

These methods allowed us to analyse the framing (the way in which information is presented and structured to shape the audience's perception and interpretation of events or issues) and tone (the overall emotional attitude or sentiment conveyed by the language, style, and presentation of the content) which are critical aspects of how news content is constructed and interpreted. The combination of metadata analysis, keyword analysis, topic modelling, sentiment analysis, and visual analysis

provided a multi-faceted methodological framework that captures the complexity and multidimensional nature of news construction. While framing analysis offers depth and precision, it can be labour-intensive and limited in scope when applied to large datasets. In contrast, our methodological approach allows for broader, more scalable investigations of *framing patterns* across diverse languages. These quantitative approaches complement traditional framing analysis by providing a macro-level understanding of how frames operate in complex, multilingual news ecosystems while retaining the ability to explore tone, thematic emphasis, and visual representation.

## Findings and Discussion

### *Metadata Keywords*

The first analysis was of the metadata keywords for the five languages, which are the words used by the news website to tag their articles. A comparative analysis of these reveals the self-identified priorities of *Vatican News* in its reporting on climate issues. In Italian, the terms “*cambiamenti climatici*” [climate changes] (30) and “*ambiente*” [environment] (28) are highly prioritised, reflecting a strong focus on environmental issues and on the impact of climate change and environmental conservation. The Italian articles also prominently feature Pope Francis (26) and emphasise social and humanitarian topics: “*povertà*” (10), “*solidarietà*” (5), “*acqua e alimentazione*” (5), “*economia*” (4), “*guerra*” (4), and “*cultura*” (4) [poverty, solidarity, water and food, economy, war, and culture]. In English, there is a similar environmental concern – “*climate change*” (23), “*environment*” (21) – combined with a focus on the Pope (18) and international relations: “*United Arab Emirates*” (18), “*UN*” (9), “*Holy See*” (4), “*Catholic Church*” (4). The French coverage highlights environmental issues and the Pope’s teachings – “*Pape François*” [Pope Francis] (14), “*Laudate Deum*” (14), “*Laudato Si*” (12), with additional attention to international development and politics (“*ONU*” 14, “*Afrique*” [Africa] 4), while the Spanish news places a strong emphasis on Pope Francis (24), environmental matters (“*cambio climático*” [climate change] 21, “*ambiente*” [environment] 15), and social problems, indicating a comprehensive approach to religious issues (“*Laudato Si*” 13, “*mensaje*” [message] 7, “*Vaticano*” [Vatican] 5, “*iglesia*” [church] 4) and societal topics (“*ciencia y tecnología*” [science and technology] and “*agua y nutrición*” [water and food], each with five occurrences). Finally, the Portuguese pieces prioritise environmental concerns and the Pope’s influence, with attention to “*solidarity*” (4) and “*peace*” (5). The metadata keyword analysis shows that the common threads are the significant focus on environmental issues and the influence of Pope Francis across all five languages. The most frequent term is “*climate change*” but the agency of Pope Francis as an actor in these topics is also prominent. An emphasis on social issues and international relations also emerges quite clearly in the keyword tagging. Overall, we can see that across the languages, there is consistency of keywords and prioritisation of focus on the Church’s presence and teachings on climate crisis. There is also a clear emphasis

on constructive journalism and solution-based reporting, through the focus on practical responses to climate challenges and the promotion of positive action and engagement with social and environmental issues through the lens of the Church's teachings.

### *Term Frequency Analysis*

The analysis of the entire corpus reveals that the top 10 terms are similar across all five languages, with the most commonly used terms for all relating to Pope Francis, climate change and COP28 (Table 7.1). Examining these through a constructive news lens, it is apparent that only one negative term occurs among the 10 most frequent terms across the five languages, namely "*crisi*" [crisis], which occurs 68 times in the Italian corpus. Considering the ethos of Catholic news reporting and its solutions-oriented focus, it is striking that the word "change" is particularly prominent, and this term can be seen to drive the discourse in English (178), Italian (175) and Spanish (144). It is less prominent in Portuguese and French, but is nonetheless in the top ten in the former. Other important terms which indicate a constructive news orientation include (En.) "action" (86); (Fr.) "paix" [peace] (34); and (Es.) "todos" [all] (86).

The importance of human driven intervention is seen in the high frequency of mentions of Pope Francis and the focus on people, leaders and communities.

### *Topic Modelling*

In addition to analysing each language in the corpus based on individual keywords or bi-grams (sequences of two consecutive words that appear together in a text), topic modelling was conducted using Latent Dirichlet Allocation (LDA) to automatically group words into topics based on their co-occurrence patterns within the articles. Topics are groups of words that frequently occur together in a set of documents, representing a coherent theme or subject. Each topic is defined by a distribution of terms that co-occur in a way that suggests they are related to a common idea. For example, in a climate-related corpus, one topic might include terms like "emissions", "carbon", and "energy", indicating a theme related to environmental policy. After running the model, we manually reviewed the resulting topics to ensure their relevance and coherence, and identified the most representative keywords for each topic. These topics were then analysed to understand the overarching themes in the reporting, focusing particularly on climate change and constructive solutions. The topics for the English language corpus are shown in Table 7.2. These further illustrate the tendencies towards constructive news in the reporting and all underscore the need for collaborative efforts across different sectors and communities to tackle the pressing issue of climate change.

Topic 1 is heavily centred on Pope Francis and his engagement with environmental issues. Key terms like "Pope Francis," "*laudato*," "creation," and "Earth" indicate a focus on religious leadership and environmental stewardship. Topic 2 covers international climate policies and the role of indigenous peoples in the climate change discourse. Keywords like "climate," "change," "emissions,"

*Table 7.1* The Most Frequent 10 Terms in Each Corpus

<i>IT</i>		<i>EN</i>		<i>FR</i>		<i>ES</i>		<i>PT</i>	
Papa	235	climate	295	Pape	109	Papa	190	Papa	217
Francesco	175	Pope	201	Cop28	105	cambio	144	Francisco	154
cambiamento	175	change	178	François	87	Francisco	132	mundo	98
clima/-tici	173	Cop28	139	pays	68	climático	119	climática	89
Cop28	152	Francis	132	climatique	68	cop28	105	Cop28	74
mondo	128	faith	100	monde	59	mundo	99	laudato	65
Dubai	113	world	94	Dubaï	58	todos	86	Dubai	63
leader	70	global	90	environnement	48	vida	72	peessoas	60
Emirati	70	leaders	88	climat	42	lideres	62	mundanças	54
crisi	68	action	86	paix	34	personas	56	vida	53

Source: Compiled by the Authors.

Table 7.2 Topics in the English Language News

<b>Topic 1. Pope Francis and the Environment (10 files)</b>	<i>Pope Francis, Laudato Si', Italy/Italian, people, common, bishop, environment, change, home, small, Mansa, diocese, care, creation, Earth, Roberta, village</i>
<b>Topic 2. Global Climate Agreements and Indigenous Issues (7 files)</b>	<i>countries, climate, indigenous, change, emissions, quantum, agreement, United Nations, women, conference, global, protocol, Cop28, states, peoples, Kyoto, Paris, action, world</i>
<b>Topic 3. Religious Leadership in Climate Action (20 files)</b>	<i>climate, Pope, change, Cop28, Francis, faith, world, leaders, global, action, summit, people, holy, religious, United Arab Emirates, crisis, need, together, role</i>

Source: Compiled by the Authors.

Table 7.3 Topics in the French Language News

<b>Topic 1. Indigenous Peoples and Global Climate Resources (7 files)</b>	<i>peuples, autochtones, Pape François, changement, eau, nations, pays, monde, personnes, ressources, durable, climatiques, caritas, autres</i>
<b>Topic 2. COP28 and Religious Perspectives on Climate Action (7 files)</b>	<i>Cop28, Pape, François, climatique, Dubaï, pays, monde, tous, Émirats arabes unis, paix, énergies, décembre, Laudate deum, fossiles, environnement</i>
<b>Topic 3. Climate Change Impact on Vulnerable Communities (11 files)</b>	<i>pays, COP28, Pape, climatique, communautés, climat, Dubaï, tous, personnes, climatiques, fonds, vulnérables, face, gouvernements, Terre, être, développement, migrants, François</i>

Source: Compiled by the Authors.

and “global” highlight the ongoing discussions about reducing greenhouse gas emissions and mitigating climate change. Other terms refer to major climate agreements and conferences, such as the Paris Agreement (2015) and the Kyoto Protocol (1992). Finally, Topic 3 (the most prominent one) combines the influence of religious leadership with global climate action, while the term “climate” appears frequently and indicates a strong focus on climate change and related actions; references to “leaders,” “summit,” and “global” suggest high-level meetings and the involvement of world leaders in climate discussions; and words like “faith,” “holy,” “religious,” and “role” emphasise the involvement of religious communities and leaders in climate advocacy. It is worth highlighting at this point that, with the notable exception of “crisis,” most of the prominent keywords the topics are made of are positive, referencing either a call for collective efforts and urgent action to address the climate crisis or the influential role of global religion in advocating for climate action.

If we then examine the topic modelling of the French news corpus, we can see similar trends, even if there is not an exact reproduction of the English-language topic scheme (Table 7.3).

The three topics reveal the following make-up: Topic 1 centres around the intersection of indigenous peoples' issues and global climate resources, just like Topic 2 in English; however, keywords like “*durable*” [sustainable] and “*climatiques*” [climate-related] emphasise a concern with long-term environmental challenges and the need for sustainable solutions, which is unique among the three corpora. There is no other mention of sustainability among the topic keywords in the other two corpora, while in French it is quite prominent. Both the English and the French topics address indigenous issues within the broader context of global climate change. The English topic explicitly mentions “agreements” and specific protocols like Kyoto and Paris, indicating a focus on international climate agreements. The first French topic, while also global in scope (“*nations*” [nations], “*monde*” [world]), places a stronger emphasis on the involvement of Pope Francis and of the Catholic religious perspective. The English topic highlights the formal mechanisms of climate action, whereas the French topic integrates moral and ethical considerations more prominently through the involvement of religious leaders. Even more strikingly and unlike in the other languages, the third French topic, the most prominent one (present in 20 pieces of news) addresses the impact of climate change on vulnerable communities, highlighting the groups most affected by climate change. The presence of “*fonds*” [funds] and “*gouvernements*” [governments] suggests solution-based discussions around financial and policy responses, while the terms “*migrants*” [migrants] and “*Terre*” [Earth] indicate broader humanitarian and environmental concerns, respectively.

The slight differences that emerge between the French and English topics speak to the fact that, although many of the articles in the corpus are versions of each other, they are not exact replicas, and each language group tailors content and themes for its own audience. Similarly to what has been observed in other news translation contexts, articles on the *Vatican News* can vary greatly in terms of length and content, even when ostensibly being a translation of another article. Journalists and translators in each language group in the Vatican's Dicastery for Communication have the editorial freedom to create articles which they feel will suit their public. Despite this freedom of operation, we can see from both topic modelling and keyword analysis that similar concerns and attitudes drive the news coverage across the languages considered in the corpus.

### *Sentiment Analysis*

The automated sentiment analysis carried out for each language demonstrated that the overall sentiment of all our corpora is neutral to positive. The average sentiment scores show that the only slightly negative corpus is the English one, with all the others slightly positive and in keeping with the almost neutral tone of the Italian. Of the 172 files, only the English and Italian corpora contain some pieces of news with negative scores, but despite this, the overall figure scores slightly positively or neutral overall, aligning the sample with the depolarising ethos of the Catholic Church's communication. Table 7.4 shows the number of positive, neutral and negative headlines (Column A) and leads (Column B) in each language corpus,

Table 7.4 Sentiment of Headlines, Leads, and Main Bodies of Text in Each Language Corpus

Lg.	A. <i>Headline</i>			B. <i>Lead</i>			C. <i>Main Text</i>	
	+	0	-	+	0	-	+	-
IT	39	6	4	39	7	3	21.582	19.417
EN	39	0	4	41	0	2	16.138	16.861
FR	21	4	7	27	1	4	10.464	9.535
ES	39	2	5	39	0	5	18.338	16.661
PT	26	6	10	21	4	5	16.968	15.031

Source: Compiled by the Authors.

as well as the average sentiment score for each dataset (Column C) – numerical representations that reflect the overall sentiment of the collection of texts in the respective language. Then, we retrieved the positive and negative sentiment counts for each date of publication and calculated the average sentiment.

Looking in more detail at the English-language news, there are twenty words with the highest positive and negative scores (Table 7.5), which drive the sentiment across the corpus. On the one hand, the presence and frequency of positive words such as “faith,” “care,” “agreement,” and “hope” convey a narrative characterised by optimism, collaboration, and commitment to addressing environmental challenges. These words reflect a collective belief in finding solutions and highlight a sense of unity and cooperation among stakeholders. Terms like “important,” “progress,” and “support” underscore the significance and urgency of tackling climate change issues and emphasise the societal relevance and the need for concerted efforts. Additionally, words such as “peace,” “help,” and “protect” evoke aspirations for positive outcomes and environmental stewardship. The presence of ethical considerations, as suggested by words like “justice,” and “solidarity” emphasises moral dimensions inherent in discussions about climate change. Overall, the consistent use of these positive terms in the news corpus underscores an optimistic and determined discourse, suggesting a shared commitment to advancing climate action and environmental sustainability.

On the other hand, the presence of terms such as “crisis,” “damage,” “loss,” “urgent,” and “vulnerable” alongside others like “conflict,” “problems,” “lack,” and “risk” within this specific corpus of news on climate change suggests a narrative that acknowledges the severity and urgency of environmental challenges. These words convey a sense of crisis and vulnerability, highlighting the potential for significant damage and loss associated with climate-related issues. Terms like “poor” and “suffering” underscore the disproportionate impact of climate change on vulnerable populations and regions. Additionally, words such as “war,” “violence,” and “threat” suggest potential conflict and security implications arising from environmental disruptions. The presence of terms like “difficult” and “affected” further points to the adverse consequences and challenges posed by climate change. Overall, these negatively loaded words contribute to a narrative that emphasises the critical need

Table 7.5 Highly Ranked Positive vs. Negative Sentiment Words in the English Corpus

<i>Positive sentiment</i>		<i>Negative sentiment</i>	
faith	<b>100</b>	crisis	<b>41</b>
care	<b>40</b>	no	<b>25</b>
agreement	<b>38</b>	poor(er)	<b>29</b>
hope	<b>31</b>	damage	<b>24</b>
commitment	<b>28</b>	problem(s)	<b>23</b>
important	<b>27</b>	loss	<b>23</b>
good	<b>26</b>	conflict	<b>16</b>
peace	<b>24</b>	urgent	<b>15</b>
help	<b>24</b>	vulnerable	<b>14</b>
progress	<b>23</b>	lack	<b>13</b>
God	<b>22</b>	leave	<b>10</b>
great	<b>21</b>	war	<b>9</b>
importance	<b>19</b>	violence	<b>8</b>
reach	<b>18</b>	threat	<b>8</b>
like	<b>18</b>	affected	<b>8</b>
protect	<b>17</b>	difficult	<b>8</b>
ensure	<b>17</b>	suffering	<b>7</b>
support	<b>17</b>	risk	<b>7</b>
justice	<b>16</b>	combat	<b>7</b>
solidarity	<b>15</b>	disaster	<b>7</b>

for action and intervention to address the multifaceted impact of climate change on societies and ecosystems.

However, we can easily see that the scores of the positive words are more than double the values of the negative ones, with a constant difference from the highest (“faith,” 100 vs. “crisis,” 41) to the lowest ranked (“justice,” 16 vs. “risk,” 7). While it is important for news coverage to highlight the gravity of climate change and its impact, the predominance and weight of positive terms both contribute to a narrative that does not focus on the negative aspects and risks but rather emphasises constructive solutions. The *Vatican News* approach balances the portrayal of challenges with the coverage of efforts, innovations, policies, and community initiatives aimed at addressing climate change, fostering resilience, and achieving sustainable outcomes. It thus displays a comprehensive and constructive news approach that involves not only highlighting the problems (e.g., “emissions”) but also showcasing actionable strategies and positive developments in the context of climate change adaptation and mitigation.

To delve slightly more deeply into how these terms function in the corpus, we examined in more detail the term “care” in the English language corpus as it is a highly-ranked positive term with frequent occurrences. The term can be seen to establish a wide range of co-occurrences with other words related to the climate crisis as well as with other virtue-denoting nouns, such as “love,” “respect,” “fraternity” and “cooperation” (Table 7.6).

Table 7.6 Co-occurrences with Top-ranked Term “Care”

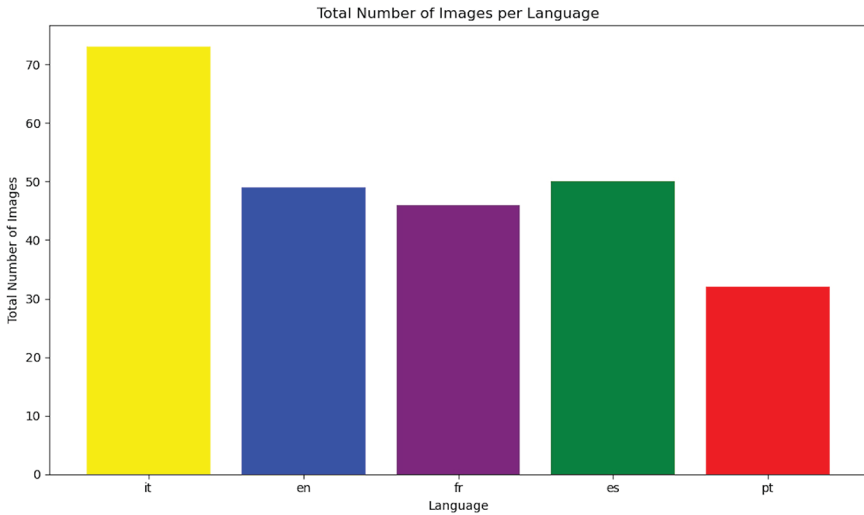
<i>Co-occurrence</i>	<i>Freq.</i>
<b>care</b> of the/or common home	<b>10</b>
<b>care</b> for creation / (Mother) Earth	<b>10</b>
spirituality that contemplates love, <b>care</b> , and respect for the environment	<b>2</b>
to educate children to <b>care</b> for and respect the planet	<b>2</b>
taking <b>care</b> to respect and preserve biodiversity / culture	<b>2</b>
taking <b>care</b> of a green space (people take <b>care</b> of themselves)	<b>2</b>
sustainability based on <b>care</b> , fraternity, cooperation between human beings	<b>1</b>
alliances that promote <b>care</b> for creation and peace	<b>1</b>
take <b>care</b> of the house that the lord [gave us]	<b>1</b>
take <b>care</b> of the land and agricultural work	<b>1</b>
to <b>care</b> for current and future generations	<b>1</b>
simple way to take <b>care</b> of another person	<b>1</b>
everyone cooperates in the <b>care</b> of the village and the territory	<b>1</b>
organization helps poor people care for themselves through work in reclaiming the environment will take <b>care</b> of you	<b>1</b>

Source: Compiled by the Authors.

By contrast, the most highly ranked negative word, “crisis”, appears exclusively in the context of the phrase “(change) crisis”. The next two, “loss” and “damage”, appear almost exclusively (19 out of 24 occurrences) in the context of the Loss and Damage (L&D) Fund, one of the main pillars of solution-based reporting in environmental policy news in the period under consideration in the corpus. The constructive tone in the English news corpus derives from a prevailing positive sentiment, which can be seen clearly in collocations: there is a marked preference for the less-charged phrase “climate crisis” (169 occurrences) at the expense of the more alarmist “climate crisis” (34), with the highly constructive collocation “climate action” (53) ranked third. Although there is not space in this chapter to discuss this in more detail, the highly ranked positive and negative words in the other language groups showed trends similar to the English-language corpus, where the scores resulted in the corpus being infused with a positive sentiment. Collocations of these words (both positive and negative) further indicate a solutions-oriented approach.

### *Visual Analysis*

The corpus of textual articles is accompanied by 250 images. There is a degree of variation in the number of images used by each linguistic group, with Italian using the most and Portuguese using the least (Figure 7.1). While some articles might only have one image accompanying the story, news in Italian may use as many as nine. Greater deployment of visual images can be linked to a greater degree of persuasiveness, with the images contributing to the messaging in the article.



*Figure 7.1* The Number of Images Used Per Language.

Source: Compiled by the Authors.

Meaning is not just made through the images, and it is clear from multimodal studies that image and text are co-creative in the communicative apparatus (Kress 2009; O'Halloran 2011; Jewitt, Bezemer, and O'Halloran 2016). This was apparent in our corpus when we analysed images that can be considered quite neutral or generic (e.g., images of the COP28 location or images of Church officials attending). The images can mostly be divided into two main categories: images featuring a person or groups of people speaking or listening, and images depicting landscapes or buildings. The articles that accompany these images, however, are replete with solutions to the issue at hand and construct a much more positive and solutions-oriented tone. Articles which feature these neutral images, for example, call for the protection of indigenous rights and cultural heritage and call for respectful consultation with indigenous communities on environmental policies. In other instances, they call for gender-sensitive climate policies, inclusive climate negotiations, and the promotion of traditional sustainable agriculture to combat climate change and food insecurity, thereby stressing the need for supportive solutions.

Using the automated CLIP analysis of image sentiment in this visual corpus yielded a positive average sentiment score of 0.5. Additionally, image classification grouped all images under Label 1 (a specific content-related category from the model's training), indicating uniformity in their content. The overall sentiment of the pictures as positive underscores the fact that the corpus does not feature

images of suffering due to climate change, horrors due to impact, or destruction of ecosystems, images which often accompany discussions of climate change. Instead, the *Vatican News* coverage of climate change issues mainly features images of the people working on creating the solutions, and images of the places where these solutions are being debated. For example, reporting from COP28 in November 2023 does not include any visuals of the destructive implications of climate change, but instead shows leaders and concerned groups, buildings from the site of the discussions and logos of the event. Furthermore, even when an image can be tagged as negative (such as an image of drought), the accompanying text mitigates this negativity with a solutions-oriented textual presence (as will be seen in the case study below).

Although each language group on *Vatican News* can choose different images to accompany its articles, the use of images is coherent across languages and, similarly to the textual components of the articles, displays a focus on human-based solutions and is an indicator of impetus for positive change. Images used can also differ in terms of complexity across the languages – that is, in the number of elements contained (e.g., simple COP28 logos vs. images depicting groups of people). To explore this aspect, we analysed the image corpus with the CLIP image vision component, which extracts a numerical representation of the image’s content and calculates the norm (magnitude) of the extracted feature vector. Figure 7.2 (top) shows a comparative automated analysis of all the images in each language corpus: a higher magnitude might indicate a more complex or visually interesting group of images (typically including more elements). As we can see, the average visual complexity in each language is almost uniform. The only thing that differs is the number of images used, which, aggregated with the CLIP score above, is a sign of the level of visual persuasiveness of any piece (Figure 7.2, bottom). Although different from what we typically understand by discursive persuasiveness, the scaling of the complexity scores by the number of images used is a good indication of the impact the visual element has on a piece of news. For example, when reporting on COP28 between 4 and 6 November 2023, the Italian pieces contain images presenting clearly identifiable people facing the cameras,<sup>5</sup> while the English articles depict either the COP28 logo or people photographed from the side or with their backs turned.<sup>6</sup> The difference between the Italian images (yellow bar) and the English ones (blue bar) is visible at the centre of the bottom plot. The selection and quantity of images can significantly influence the construction of meaning conveyed through visuals. However, when combined with the text, we can see that the constructive approach remains constant in both. Therefore, while there can be variations in the images used, the institutional tendency towards constructive news reporting nonetheless emerges strongly in each language group (Figure 7.2, top). There is generally consistency between image and text, and a convergence of meaning which emerges from both modes, especially when they are considered in combination. It is a multimodal meaning that invariably relates to a solutions-based approach to climate change.

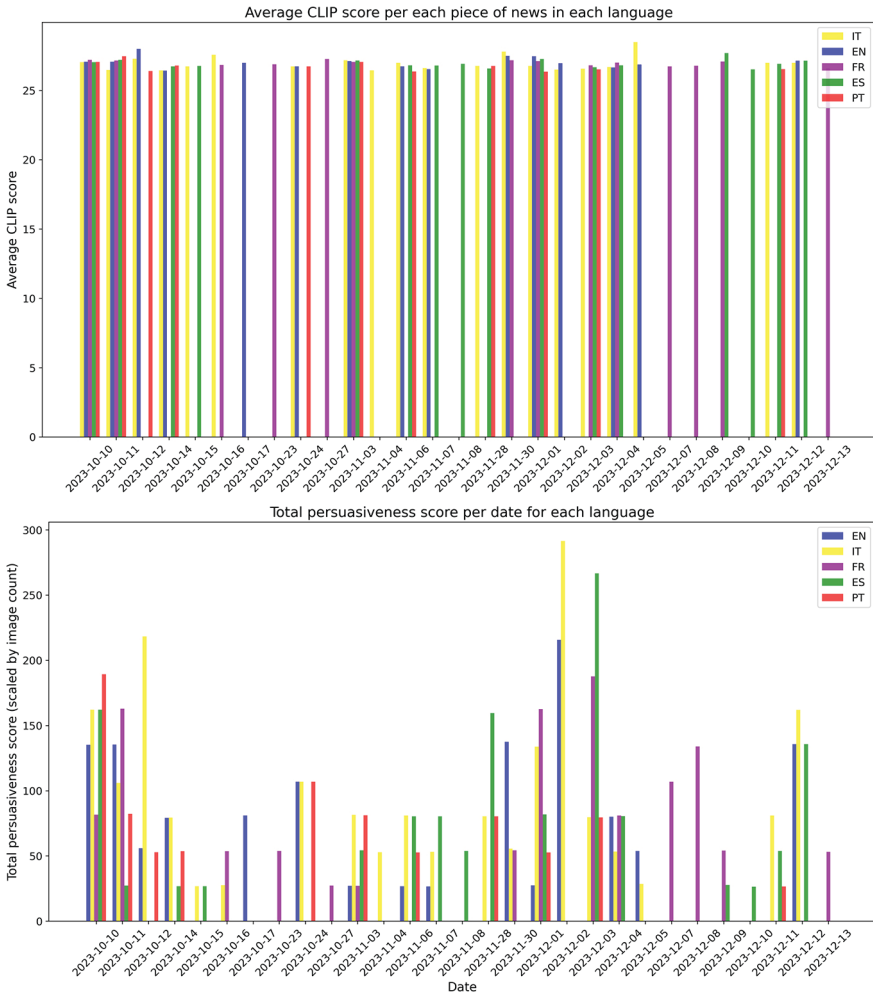


Figure 7.2 CLIP image analysis (top = CLIP score; bottom = persuasiveness score (CLIP score + image count)).

Source: Compiled by the Authors.

### Case Studies

To further analyse the corpus and better understand the link between constructive news, sentiment, and language, we considered articles which the sentiment analysis identified as negative. When we drilled down into articles that seem from the sentiment analysis to present slightly negative scores, we found that in fact

these present a solutions-oriented, constructive focus. For example, an article in the English language corpus on 12 October 2023, titled “COP28: Catholic NGOs call for action for climate justice” had a slightly negative score in the sentiment analysis (score  $-0.3$ ).<sup>7</sup> A close examination of the article, which endorses the newly established Loss and Damage (L&D) Fund, shows that it embraces a constructive approach in its reporting. Its focus on climate justice, and the deep injustice inherent in the current climate crisis (negative sentiment), is counterbalanced by the leaders advocating for a fund that is accessible, inclusive, and restorative, providing rapid response and long-term support to affected communities (positive sentiment), and by the call for urgent action to reduce emissions and invest in adaptation efforts to prevent future harms (solution-based journalism). The article is solution-based in that it focuses on the proactive steps taken by faith leaders to address the impact of climate change. It underscores the importance of international cooperation and equitable distribution of resources in supporting the communities most affected by climate-related disasters. Additionally, it highlights the upcoming COP28 meeting as a crucial opportunity to finalise the funding and define the scope of the L&D Fund. This balancing of the negative and the positive can be further seen in an article in English which has *both* the highest positive and negative scores in the sentiment analysis. The piece of news published on 28 November 2023 and titled “An overview of UN climate change summits” underscores both positive and negative dimensions of global efforts to tackle climate change.

An interesting case with a negative sentiment score in the French corpus is an article published on 16 October 2023 titled “Le Pape rappelle que l'accès à l'eau potable est un droit fondamental [The Pope reminds us that access to drinking water is a fundamental right].”<sup>8</sup> The negative score is immediately justified by a series of negatively charged nouns and adjectives in a quote from Pope Francis contained in the lead: « *Les cris d'angoisse et de désespoir des pauvres devraient nous réveiller de la léthargie qui nous saisit et interpeller nos consciences* » [The cries of anguish and despair of the poor should wake us up from our lethargy and challenge our consciences], as well as across the rest of the piece (e.g., “injustice”). However, the negative remarks on the urgency of climate change are balanced by solution-based discourse, such as « *Le Saint-Père appelle à « promouvoir des programmes efficaces pour prévenir les pertes dans les conduites d'irrigation agricole* » [The Holy Father calls for “effective programmes to prevent losses in agricultural irrigation pipes”]. It is remarkable that the positive words mitigate the highly negative ones so much that the negative score is only  $-0.2$  (Figure 7.3). The piece highlights the urgent need for sustainable water management and for inclusive access to essential resources for human development. It advocates investing in infrastructure and water treatment systems, especially in underserved areas, and promoting educational initiatives to raise awareness about water conservation. Efficient agricultural irrigation, non-polluting practices, and the leveraging of technological innovation are recommended to balance consumption and resources. The article calls for international cooperation to manage water resources equitably and sustainably, and stresses combating the culture of disability through collective and responsible actions.

Since the piece is the only markedly negative one in the French corpus, we analysed it in the context of its corresponding news in the other languages. While

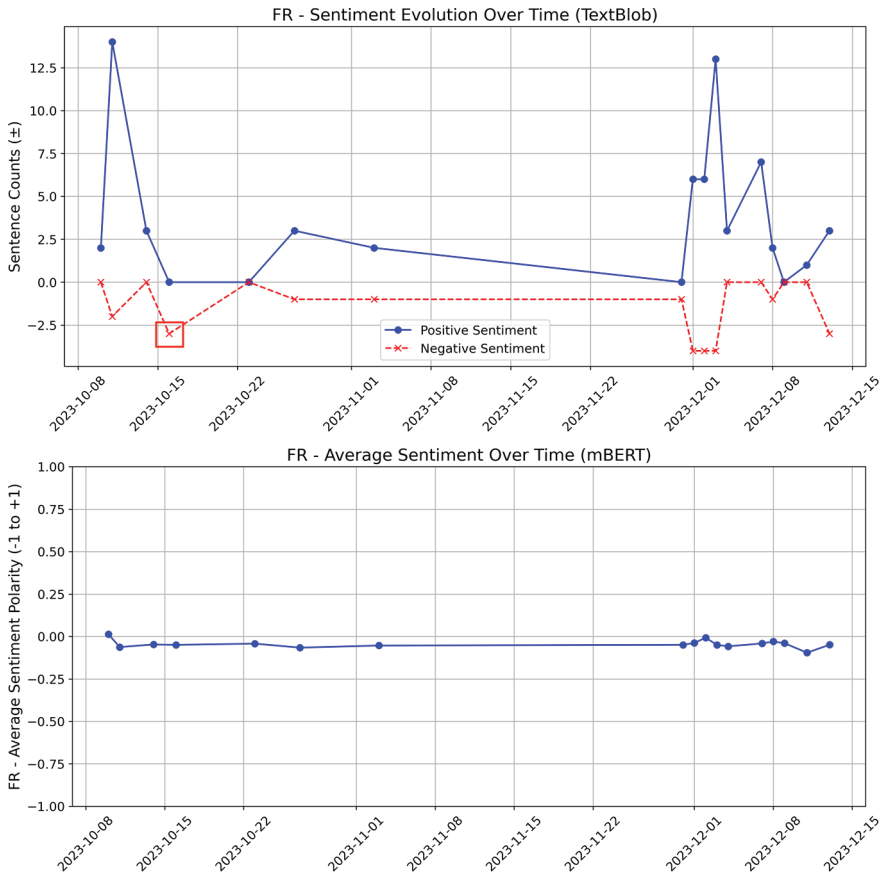


Figure 7.3 Sentiment Scores in the French News Corpus.  
 Source: Compiled by the Authors.

there is no matching piece in the English corpus dealing with clean water access, the topic is addressed in the other three corpora: Italian, Spanish and Portuguese. One notable difference is that while the lead in French (as discussed above) is negative, the leads in all the other languages are either very close to neutral, or positive. Additionally, while the Italian and Spanish titles are identical, [it] *Francesco: mai speculare sull'acqua, urge pianificare una gestione sostenibile*<sup>9</sup>; [es] *Francisco: Nunca especular con el agua, urge planificar una gestión sostenible* [Never speculate with water, plan for sustainable management urgently needed];<sup>10</sup> the French and Portuguese titles are even more constructive, omitting the speculation remark and instead emphasising that clean water is a right for all: [Fr.] *Le Pape rappelle que l'accès à l'eau potable est un droit fondamental* [The Pope reminds us that access to clean water is a fundamental right]; [Pt.] *Francisco à FAO: que a água seja patrimônio de todos* [Francisco to the FAO: water needs to be everyone's patrimony].<sup>11</sup>

Contrasts are also present at the visual level. The first accompanying image in the French piece is tagged «*Une petite fille pakistanaise boit de l'eau à Lahore, au Pakistan, le 22 mars 2019*» [A little Pakistani girl drinks water in Lahore, Pakistan, on March 22, 2019] and shows a child cupping her hands together and drinking water from a somewhat improvised pump (tied with a rag). The second image on the page (in the recommended further reading) is not a depiction of real life, but a piece of digital art showing a tree growing on planet Earth and an attached faucet from which very clean water is running. Its tag is «*Saint-Siège: l'accès à l'eau potable, un droit essentiel à la survie de l'homme*» [Holy See: access to drinking water, an essential right for human survival], which hints directly at institutional communication. The negative sentiment of the first picture is thus clearly balanced out by the positive sentiment of the second image and of its tagline. The sequencing of the images in the presentation of the news is naturally important, with the first image attracting attention and the subsequent images illustrating the discussion in the article. For this reason, in our corpus we noted the sequencing order of the images so that we could analyse different functions based on the position of the image within the article. In the case of the example above, we can see that the first image draws attention to the problem with a striking human visual while the second image relates to the solutions proposed in the accompanying text. The Italian original uses only one striking image of drought, tagged “*Un’immagine della grave siccità in Amazzonia* [An image of the severe drought in the Amazon],” which is also used in the Portuguese piece, tagged “*Seca na região amazônica* [Drought in the Amazon region]”.<sup>12</sup> The Spanish piece, on the other hand, uses one visual of drought and three related news items, all with negative tagging (e.g., “*El Papa pide que el agua no sea objeto de desperdicio, abusos y guerra* [Pope asks that water not be the object of waste, abuse and war]). The negative image tagging is counterbalanced by positive, solution-based reporting, which overall renders the sentiment of the Spanish piece positive-neutral (0.15). The text is divided into four sections, each bearing a solution-based title: *Hacer accesibles los recursos básicos* [Make basic resources accessible]; *Invertir más en infraestructuras hídricas* [Invest more in water infrastructure]; *La ciencia y la tecnología deben participar* [Science and technology must participate]; *Actuar en términos de solidaridad* [Act in terms of solidarity]. The solution keywords in these subtitles are among the most frequently used in the metadata.

As has been noted in many discussions (for example, Riggs 2024b), the interplay between the verbal and visual forms a crucial part of meaning making in news reporting, and variations in visual deployment need consideration alongside the analysis of textual variation. Our analysis of the use of images in the different languages in our corpus shows that there is significant reinforcement of messaging through the use of complementary images in most cases. Furthermore, even when negative images are present, the accompanying textual elements create a solutions-based frame and the interplay between the verbal and visual contributes to an approach that is constructive overall. Therefore, despite variations across languages in their multimodal approach to reporting on this topic, the end effect

is nonetheless similar in all languages: where negative elements are present, either linguistically or visually, these are surrounded by other positive elements such as actions and solutions, which change the frame and general tone to positive/neutral.

## Conclusion

Although religious discourse is permeated by positive terms, given the urgency of the climate crisis and the concern of Pope Francis for climate issues, it could be hypothesised that reporting on climate issues by the Catholic Church would be alarmist and highlight negative impact and repercussions. However, from the analysis conducted on the corpus described above, it is clear that the Church's commitment to constructive news comes to the fore in its reporting on climate issues. Moreover, this commitment can be seen to permeate multiple languages used in *Vatican News* reporting and multiple modes of communication. In the corpus collected for this study, we found that this approach leads to nuanced reporting where negative sentiments are not excluded but, instead, are combined with positive sentiments and a solutions-oriented focus, thus resulting in a balanced, calm tone in all of the language groups under examination. The articles selected for this analysis may not fully represent the entire spectrum of Catholic news reporting, as our data sample covers only a limited period, though a highly relevant one for climate crisis coverage. Additionally, the interpretation of image analysis results can be subjective and may not entirely reflect the intended message of the reporting. However, we mitigated potential subjectivity by applying state-of-the-art quantitative methods and complemented the computational approaches with qualitative analysis to account for the lack of contextual depth in the automated methods. What emerges throughout the corpus is a rigorous and critical approach to climate change by the Catholic Church's news team, with a focus on solutions through the persuasive and constructive use of language and images. It is an approach which can accommodate variation in terms, images and article length across languages because of the deep-rooted acceptance of the institutional ethos towards constructive news by those working within the news apparatus.

## Notes

- 1 *L'Osservatore Romano* is published weekly in French, English, Portuguese, Spanish, German, and Italian; Radio Vaticana transmits in 40 languages while vaticannews.va has content published in over 35 languages.
- 2 Federico Lombardi has also said, "I have always thought that my service was an exceptionally beautiful and privileged service, because I was at the service of positive communication, mostly consisting of messages of love, hope, solidarity, dignity of persons, human growth, forgiveness, peace ... and even when it came to the communication of warnings, risk warnings, harsh condemnations of crimes and injustices, it was invariably for the good of all." [translated from Italian] (Lombardi 2021, 124)
- 3 The principles of news reporting put forward on, for example, [www.solutionsjournalism.org](http://www.solutionsjournalism.org) or on [www.constructiveinstitute.org](http://www.constructiveinstitute.org).

- 4 [IT] *clima, cop, laudato, ambiente, fossile, sostenibilità*; [FR] *climat, cop, laudato, environnement, fossile, durabilité*; [SP] *climático, cop, laudato, ambiente, fósil, sostenibilidad*; [PT]: *clima, cop, laudato, ambiente, fósil, sustentabilidade*.
- 5 “Ad Abu Dhabi il Summit delle fedi sull’azione per il clima, in vista della Cop28,” [www.vaticannews.va/it/vaticano/news/2023-11/cop-28-religioni-summit-azione-clima-santa-sede-islam-emirati.html](http://www.vaticannews.va/it/vaticano/news/2023-11/cop-28-religioni-summit-azione-clima-santa-sede-islam-emirati.html), accessed January 15, 2024; and Christopher Wells, “Abu Dhabi, Summit delle fedi sul ruolo dei credenti di fronte alla crisi climatica,” [www.vaticannews.va/it/mondo/news/2023-11/summit-religioni-azione-clima-santa-sede-islam-abu-dhabi-cop28.html](http://www.vaticannews.va/it/mondo/news/2023-11/summit-religioni-azione-clima-santa-sede-islam-abu-dhabi-cop28.html), accessed January 15, 2024.
- 6 Christopher Wells, “Global faith leaders call for urgent action on climate change,” [www.vaticannews.va/en/world/news/2023-11/global-faith-leaders-call-for-urgent-action-on-climate-change.html](http://www.vaticannews.va/en/world/news/2023-11/global-faith-leaders-call-for-urgent-action-on-climate-change.html), accessed January 17, 2024; and [*Vatican News*], “UAE set to host global faith summit on climate action ahead of COP28,” [www.vaticannews.va/en/world/news/2023-11/united-arab-emirates-abu-dhabi-global-faith-summit-cop28.html](http://www.vaticannews.va/en/world/news/2023-11/united-arab-emirates-abu-dhabi-global-faith-summit-cop28.html), accessed January 17, 2024.
- 7 Lisa Zengarini, “COP28: Catholic NGOs call for action for climate justice,” [www.vaticannews.va/en/church/news/2023-10/cop28-catholic-ngos-call-for-action-for-climate-justice.html](http://www.vaticannews.va/en/church/news/2023-10/cop28-catholic-ngos-call-for-action-for-climate-justice.html), accessed January 20, 2024.
- 8 Jacques Ngol, “Le Pape rappelle que l’accès à l’eau potable est un droit fondamental,” [www.vaticannews.va/fr/pape/news/2023-10/francois-l-acces-a-l-eau-potable-et-sure-un-droit-elementaire.html](http://www.vaticannews.va/fr/pape/news/2023-10/francois-l-acces-a-l-eau-potable-et-sure-un-droit-elementaire.html), accessed January 20, 2024.
- 9 Tiziana Campisi, “Francesco: mai speculare sull’acqua, urge pianificare una gestione sostenibile,” [www.vaticannews.va/it/papa/news/2023-10/papa-giornata-alimentazione-acqua-fao-inquinamento-scienza.html](http://www.vaticannews.va/it/papa/news/2023-10/papa-giornata-alimentazione-acqua-fao-inquinamento-scienza.html), accessed January 25, 2024.
- 10 Tiziana Campisi, “Nunca especular con el agua, urge planificar una gestión sostenible,” [www.vaticannews.va/es/papa/news/2023-10/papa-mensaje-jornada-mundial-alimentacion-no-especular-agua.html](http://www.vaticannews.va/es/papa/news/2023-10/papa-mensaje-jornada-mundial-alimentacion-no-especular-agua.html), accessed January 25, 2024.
- 11 Thulio Fonseca, “Francisco à FAO: que a água seja patrimônio de todos,” [www.vaticannews.va/pt/papa/news/2023-10/papa-mensagem-dia-mundial-da-alimentacao-2023.html](http://www.vaticannews.va/pt/papa/news/2023-10/papa-mensagem-dia-mundial-da-alimentacao-2023.html), accessed January 25, 2024.
- 12 Thulio Fonseca, “Francisco à FAO: que a água seja patrimônio de todos,” [www.vaticannews.va/pt/papa/news/2023-10/papa-mensagem-dia-mundial-da-alimentacao-2023.html](http://www.vaticannews.va/pt/papa/news/2023-10/papa-mensagem-dia-mundial-da-alimentacao-2023.html), accessed January 25, 2024.

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