

THE COMMUNICATION OF ADAPTATION TO CLIMATE CHANGE IN SPANISH PRESS

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Abstract

This article is a translation, with some modifications, of the research "Adaptation to climate change in the Spanish press", from the LIFE-Shara program. This is a media analysis of the adaptation to climate change in Spain in the newspapers *El País*, *El Mundo*, *La Vanguardia*, and *Expansión*. The methodology followed is the application of a content analysis to each article that contains the terms "adaptation", and "climate change" and/or⁴⁷ "global warming", through a series of variables with categories. The My News search engine analyzes the articles between January 1, 2012 and December 31, 2016. The results show a description of how adaptation is being socially constructed in Spanish media.

Key Words

Communication, Adaptation, Climate Change, Global Warming, Mass Media

Resumen

El presente artículo es una traducción parcial, con algunas modificaciones, del trabajo "La adaptación al cambio climático en prensa española", del programa LIFE-Shara. Se trata de un análisis mediático de la adaptación al cambio climático en España en los diarios *El País*, *El Mundo*, *La Vanguardia* y *Expansión*. La metodología seguida es la aplicación de un análisis de contenido a cada pieza periodística que contiene los términos "adaptación", y "cambio climático" y/o "calentamiento global", mediante una serie de variables con categorías. A través del buscador My News se analizan los relatos entre el 1 de enero de 2012 y el 31 de diciembre de 2016. Los resultados muestran una descripción sobre cómo se está construyendo socialmente la adaptación en medios de comunicación españoles.

Palabras clave

Comunicación, Adaptación, Cambio climático, Calentamiento global, Medios de comunicación

Abstract

The origin and funding of this article comes from the LIFE SHARA project "Sharing Awareness and Governance of Adaptation to Climate Change", coordinated by the Ministerio de Agricultura y Pesca, Alimentación y Medio Ambiente -through the Fundación Biodiversidad- and that counts as beneficiaries associated: the Organismo Autónomo Parques Nacionales, the Agencia Estatal de Meteorología, the Oficina Española de Cambio Climático and the Agência Portuguesa do Ambiente.

⁴⁷"Climate change" or "global warming" is present, or both

1.- Introduction

Climate change has emerged as one of the main challenges for humanity. The scientific robustness has been growing as the different reports of the IPCC (Intergovernmental Panel on Climate Change) have been published. In the last, the V Report (IPCC, 2014), science has shown sharp conclusions: it confirms that the warming of the climate system is clear, as well as human influence, which has already generated impacts on all continents and oceans, and that it will be necessary to mitigate and adapt to avoid harmful climate impacts. Adaptation, together with mitigation, has therefore emerged as an essential response.

Communication has had a crucial role in the anthropogenic recognition of climate change, mediating between science and society, at the same time that, as a general trend, the media are aligned with the collective tendency not to attend to it properly (Heras, 2015). It is necessary to start from the basis that climate change is a marginal issue for the Spanish media, both quantitatively (León, 2014)⁴⁸ and qualitatively (Teso, 2015)⁴⁹. Despite this, it is important to know the media coverage of climate change and global warming for the proposal of active policies (Boykoff, 2008, Meira et al, 2009, 2011, 2013, Teso, 2015, Heras, 2015, Moser, 2017). The present study of the media treatment of adaptation aims to gather useful information about the social representation of this important response to climate change. From there, adaptation actions can be designed both from political institutions and from other areas, such as information professionals.

The study of the media treatment of adaptation to climate change is presented as a novel initiative in Spain, and little explored internationally (Boykoff and Yulsman, 2013, Corner and Clarke, 2014, Ford and King, 2015, Moser, 2014, 2017; Wirth et al., 2014, among others). This research addresses the need to deepen the analysis of content and frames in the communication of adaptation, pointed out by Moser (2014). On the flip side, it would be interesting to research the communication of mitigation, in a complementary manner, as the other great consensus response to climate change (Takahashi and Meisner, 2013, Fernández-Reyes, 2014, Fernández-Reyes and Aguila-Coghlan, 2015).

⁴⁸ In the periods analyzed, the number of information on climate change did not reach 0.2% of the total, being 0.19% of the sample analyzed for the case of television news (León, 2014: 16)

⁴⁹ According to research conducted by Gemma Teso on Spanish television, the treatment of climate change is characterized by superficiality and lack of contextualization, in pieces lasting between 1 and 2 minutes on average (Teso, 2015: 638)

The newspapers are the place where important elements of the debates and arguments of the political, economic and social agendas are resolved, where a greater number of profiles are usually approached around a topic, where more is deepened and a greater variety of nuances. Therefore, it is considered that the newspapers chosen represent a valid tasting, with its strengths and weaknesses, for the study of the media treatment of adaptation.

In a superficial incursion to get a first impression on how "adaptation to climate change" appears on social networks, we find numerous Facebook pages, mostly Latin American, in which non-specific adaptation content abounds. Even less presence of these terms is found on Twitter and Instagram.

Regarding the treatment on websites, the Adaptecca platform⁵⁰, of the Spanish Office of Climate Change and the Biodiversity Foundation, deserves a special mention. In fact, it intends to be a reference in the supply of information and resources on adaptation to climate change in Spain.

For the rest, when Google⁵¹ search is used, there is a continuous growth of the results obtained by searches on "Adaptation to climate change", multiplying by four the references between 2012 and 2016⁵².

2.- Methodology

The methodology followed is the application of a content analysis (Bardin 1986, Gaitán and Piñuel, 1998) to each unit of analysis through a series of variables with categories. While the quantitative analysis gives a more objective value to the analyzed variables, the qualitative analysis has a component of inescapable subjectivity in the inferred variables.

The process followed consists of the following steps:

- a) Location of the analysis units that deal with adaptation, using a specialized search engine
- b) Characterization of each unit of analysis according to a previously defined set of variables
- c) Statistical analysis of the results, detection of relevant trends and interpretation of the results

⁵⁰ <http://www.adaptecca.es/>

⁵¹ For its part, the Google Trends tool indicates that there is not enough data in Spain for the search with the terms "Adaptation to climate change" to obtain results

⁵² See original investigation

2.a. Location of the analysis units that deal with adaptation, using a specialized search engine

The search engine used is My News. In My News Hemeroteca Profesional we access article that contain "adaptation" AND "climate change", and then we search for "adaptation" AND "global warming" to add the result of both, eliminating the repeated articles⁵³. Each unit of analysis is assigned a number to identify it.

The present investigation analyzes the period from January 1, 2012 to December 31, 2016. The newspapers analyzed are *El Mundo*, *El País*, *La Vanguardia* and *Expansión* in its written edition. These newspapers are chosen because of their high influence, because they are newspapers of greater circulation or of greater diffusion. *El País* and *El Mundo* represent the daily press of a generalist nature. *La Vanguardia* represents the regional press. And *Expansión* is the main representative in the economic press⁵⁴. In total, 241 articles are analyzed⁵⁵: 66 of *El País*; 81 of *El Mundo*; 75 of *La Vanguardia*; and 19 of *Expansion*.

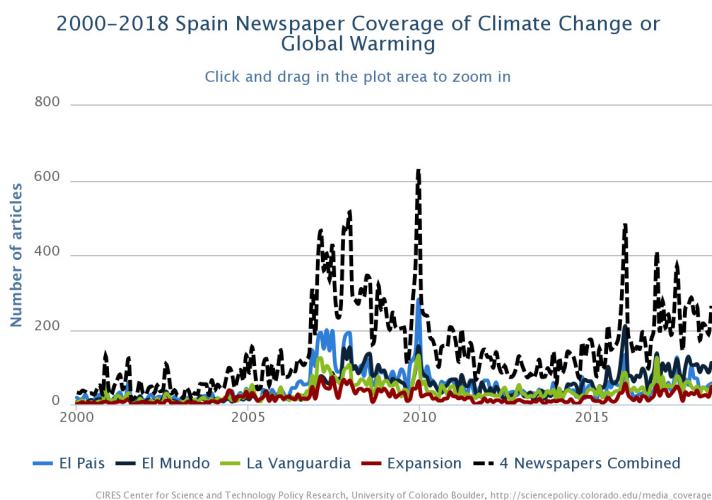
These journals are analyzed in other investigations. It allows comparisons to be made. Specifically, there is a continuous study over time of the *Center for Science and Technology Policy Research (CIRES)* of the University of Colorado, called *Media and Climate Change Observatory (MeCCO)*, which shows the monthly quantitative evolution of the presence of the terms " climate change "or" global warming "in these newspapers:

⁵³ Sometimes, the same articles appear on several occasions on the same day, since they are published in different editions. In these cases, it is only counted once

⁵⁴ According to OJD (Oficina de Justificación de la Difusión) in 2015

⁵⁵The aticles that refer to another previous climate change are eliminated, and the articles in which the term adaptation does not have the connotations linked to climate change or global warming

Graph 1. Coverage in the Spanish press of the terms climate change or global warming (Ja 2000-Jn 2018): data by header and aggregates



Graph 1.- Evolution of the presence of the terms "climate change" or "global warming" in *El País*, *El Mundo*, *La Vanguardia* and *Expansión*, through the My News search engine (Fernández-Reyes, 2018)

2.b. Characterization of each of the analysis units according to a previously defined set of variables

The variables focus on the basic descriptive information (day, year, month), as well as the framing of other options that provide information on the communication of adaptation. Numerous variables are used in other studies. Others are taken directly from researchers (Piñuel et al, 2013, Erviti, 2014), or from published documents (*Tercer Programa de Trabajo del Plan Nacional de Adaptación al Cambio Climático*, 2014). And others suppose a novel proposal in this study. Some of them, specifically referring to the types of adaptation, have been agreed upon in meetings with experts on the subject.

In the mentioned days of work with technical specialists in adaptation, which have been held in the research process, it has been perceived that there are variables in which there is a considerable weight of subjectivity and interpretation given that the categories are under construction, or they do not have a clearly defined outline. It occurs, in a special way, in the variable "types of adaptation" with the coping approach-incremental-transformational categories. The delimitation of the categories and the definition of

the inferences were investigated and deepened, but the complexity of their classification is recognized. In spite of this, his study has not been renounced.

The variables that are applied are the following: Journals, Years, Months, Relevance, Headlines, Sources of Information, Geographical Scope, Framing, Sectors and Territories, Measures, Types of adaptation, Images and Key Concepts. Each variable has a series of categories and, in some cases, subcategories for the classification of the units of analysis.

Table 1. Variables and categories used in the analysis

VARIABLE	DESCRIPTION	DEFINED CATEGORIES
Newspapers	Newspaper on paper support	- <i>El País</i> - <i>El Mundo</i> - <i>La Vanguardia</i> - <i>Expansión</i>
Years	Annual publication date of each article	- 2012 - 2013 - 2014 - 2015 - 2016
Months	Monthly publication date of each article	- <i>January</i> - <i>February</i> - <i>March</i> - <i>April</i> - <i>May</i> - <i>June</i> - <i>July</i> - <i>August</i> - <i>September</i> - <i>October</i> - <i>November</i> - <i>December</i>

Relevance	Relevance of adaptation in the diary analyzed and in the articles in which it is present	<p>1. <i>Global:</i> <i>Presence in the front page</i> <i>Presence in editorial</i></p> <p>2. <i>Particular:</i> <i>Priority subject</i> <i>Secondary subject</i> <i>Punctual subject</i></p>
Headlines	Relevance of the adaptation in the headlines and characteristic of what is exposed	<p>3. <i>Presence of terms in the headlines:</i></p> <p>4. <i>About what is exposed:</i> <i>What is said</i> <i>What is done</i> <i>What happens</i></p>
Sources	Sector of the sources used in the adaptation	<p>5. <i>Political/Public Administration</i></p> <p>6. <i>Social</i></p> <p>7. <i>Economic</i></p> <p>8. <i>Scientific/Technological/Research</i></p>
Geographic scale	Place where the article is located	<p>9. <i>Interior scale</i> <i>Local/comarcal</i> <i>Provincial</i> <i>Regional</i> <i>National</i></p> <p>- <i>Exterior scale</i> <i>International</i> <i>Europe</i> <i>África</i> <i>North America</i> <i>South and Central America</i> <i>Asia</i> <i>Oceania</i> <i>Arctic</i> <i>Antártida</i></p> <p><i>Genéric/Difficult to contextualice/Unspecipied</i></p>

Framming	Type of framed	10. <i>Scientific</i> 11. <i>Technological/Innovation</i> 12. <i>Economic</i> 13. <i>Political</i> 14. <i>Social</i> 15. <i>Others/Difficult to frame</i>
Sectors and Territories of the PNACC	Sectors and Territories of the National Adaptation Plan with which the information is related.	16. <i>Sectors</i> <i>Biodiversidad</i> <i>Bosques</i> <i>Agua</i> <i>Suelos y Desertificación</i> <i>Agricultura, Pesca y Acuicultura</i> <i>Turismo</i> <i>Salud</i> <i>Finanzas y Seguros</i> <i>Energía</i> <i>Transporte</i> <i>Urbanismo y construcción</i> <i>Industria</i> <i>Caza y Pesca continental</i> - <i>Territories</i> <i>Insular</i> <i>Medio rural</i> <i>Medio urbano</i> <i>Medio marino</i> <i>Zona costera</i> <i>Zona de montaña</i>
Measures	The sector or territories in which the adaptation measures are applied are classified.	<i>They are the same categories as in Sectors and Territories of the PNACC</i>
Types of adaptation	The adaptation is classified according to several categories	17. <i>Adaptation Natural, Human, or Both</i>

		<p>18. <i>Adaptation Proactive, Reactive, Both, Unspecified/No allusion</i></p> <p>19. <i>Adaptation Planned, Autonomous, Both, Unspecified/No allusion</i></p> <p>20. <i>Adaptación Individual, Colective, Both, Unspecified/No allusion</i></p> <p>21. <i>Adaptación Implicit, Explicit, Both, Unspecified/ No allusion</i></p> <p>22. <i>Coping approach, Incremental, Transformacional, Every Options, Coping approach/Incremental, Incremental/Transformacional, Coping approach/Transformacional, Unspecified/No allusion</i></p>
<p>Images</p>	<p>The images that appear in the articles are analyzed</p>	<p>- <i>Typology</i></p> <p><i>Photo</i></p> <p><i>Graphic</i></p> <p><i>Table</i></p> <p><i>Drawing</i></p> <p><i>Maps-Infographoics</i></p> <p><i>Without image</i></p> <p><i>Could no access</i></p> <p>- <i>Theme</i></p> <p><i>Impacts</i></p> <p><i>Causes</i></p> <p><i>Solutions</i></p> <p><i>Protests</i></p> <p><i>Other</i></p> <p><i>Without image</i></p> <p><i>Could no access</i></p> <p>- <i>Spatial Identification</i></p> <p><i>Near</i></p> <p><i>Far</i></p> <p><i>Difficult to identify or classify</i></p> <p><i>Without image</i></p>

		<p><i>Could no access</i></p> <p><i>- Temporary Identification</i></p> <p><i>Near</i></p> <p><i>Far</i></p> <p><i>Near and Far at the same time</i></p> <p><i>Difficult to identify or classify</i></p> <p><i>Without image</i></p> <p><i>Could no access</i></p>
Key words	It's studied the presence of some terms (through their roots) considered key in their relationship with adaptation	<p><i>"Vulnerabilidad"</i></p> <p><i>"Resiliencia"</i></p> <p><i>"Descarbonización"</i></p> <p><i>"Maladaptación"</i></p>

2 C. Statistical analysis of results, detection of relevant trends and interpretation of results.

Each unit of analysis is analyzed with each of the variables and their categories. This information is classified with the SPSS Statistics 20 computer program. The frequency and percentage of each of the variables is analyzed through simple tables and contingency tables by years and by newspapers. The analysis is applied separately to each newspaper and, subsequently, to all together. From all this, the present synthesis of results is extracted. The graphics are configured with Excel 2016.

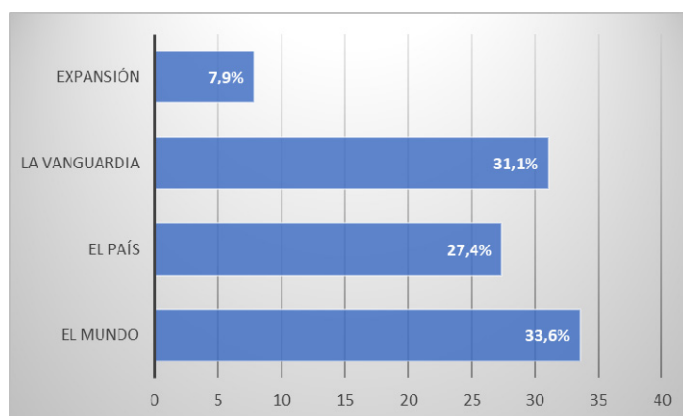
It must be borne in mind that real adaptation has a larger scope than the one analyzed here. In all certainty, our study will not have detected initiatives or adaptation responses for not referring to the terms "adaptation" and "climate change" or "global warming". It happens, for example, with the plans of prevention before the heat waves, with a considerable presence in the press, but that do not appear in our study for not including the term

"adaptation" in the article. In any case, and although not all adaptation communication is collected, the study serves to identify the degree of recognition of the term "adaptation" as a consensus universal response.

3.- Analisis

3.1.- Number of articles published by newspapers

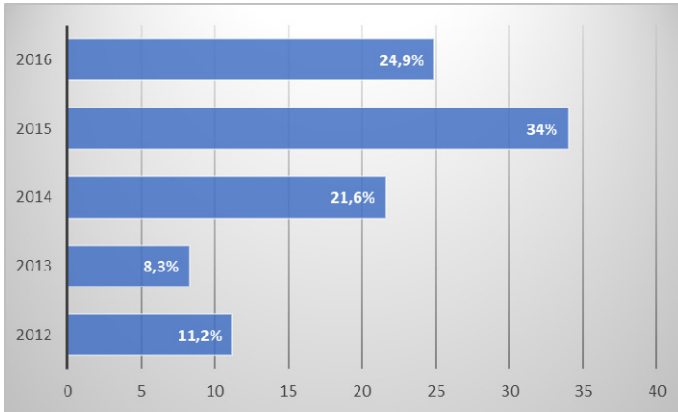
El Mundo is the newspaper with the most references (81), followed by *La Vanguardia* (75), *El País* (66) and *Expansión* (19). *La Vanguardia*, which surpasses *El País*, shows a volume close to *El Mundo*, which seems to point to a greater interest in addressing the issue.



Graph 2.- Distribution of articles on adaptation by newspapers

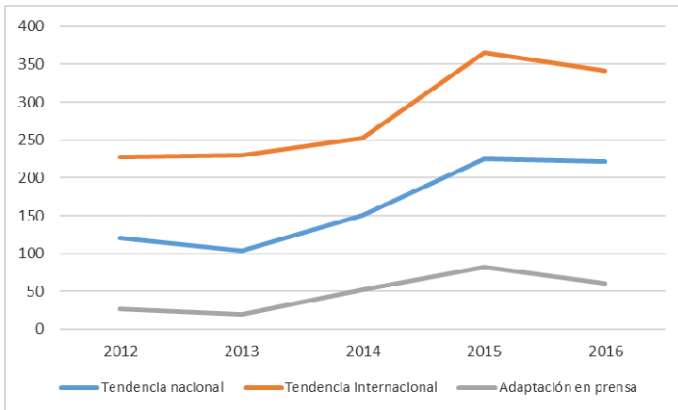
3.2.- The articles in the annual calendar

The trend of the presence of adaptation in the journals studied is growth, although there are two decreases: one in 2013 and another in 2016. These trends are similar to those offered by the recount of articles with references to "climate change" or "global warming" both nationally and internationally (Boykoff et al., 2018, Ford and King, 2015, Fernández-Reyes, Piñuel-Raigada and Aguila-Coaghan, 2017).



Graph 3.- Distribution of articles per year

Graph 4 shows trends in the presence of the terms "climate change" and / or "global warming" in the press at the national and international levels. And it is compared with the presence of adaptation in the articles analyzed in this investigation. As you can see they maintain a considerable parallelism:



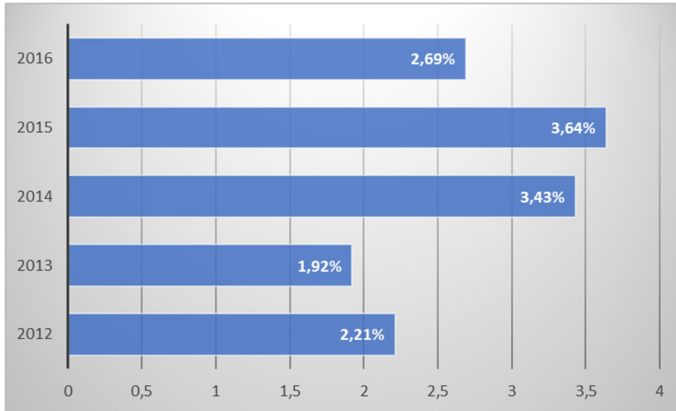
Graph 4.- Articles on climate change, global warming and adaptation.

In orange line, articles that include the terms "climate change" and / or "global warming" in the international press⁵⁶; in celestial line, the articles that include the terms "climate change" and / or "global warming" in the

⁵⁶ On this occasion there is no slight decrease from 2012 to 2013, but a slight rise

national press; in gray line, the articles that include "adaptation" and "climate change" and / or "global warming" in the Spanish press analyzed

If we analyze the percentage of the presence of adaptation within the articles on climate change and global warming, it also presents a tendency with ups and downs. This is the result:



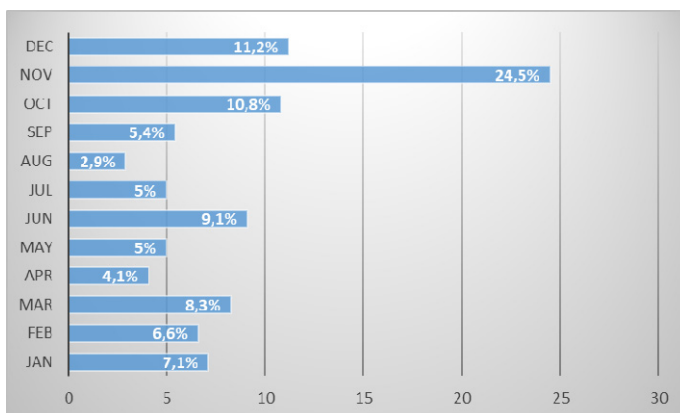
Graph 5.- Presence of the term adaptation in the articles where "climate change" and / or "global warming" appear

The data, with an average of 2.77%, are similar to the proportion of adaptation in newspapers in the international arena, around 2% (Boykoff and Yulsman, 2013).

3.3.- The articles in the annual calendar by months

Graph 6 shows the total number of articles published in each month of the year. We observe that the quarter in which more articles appear is the one corresponding to October, November and December, with very notable differences with respect to the rest of the quarters of the year. It coincides with the quarter in which the Summits of the UN Framework Convention on Climate Change are held. They are one of the main, if not the main, media attention generators on climate change.

By order, November is the month with the most articles (59, 24.5%), followed by December (27, 11.2%) and October (26, 10.8%). The month with less presence is August (7, 2.9%), when the editions are cut for holiday reasons.



Graph 6.- Distribution of articles by months (2012-2016)

3.4.- Relevance of adaptation

3.4.1.- Global

The newspapers contain spaces reserved for topics considered of special importance within the journalistic routine. In the investigation we have come across two editorials, one in *El Mundo* (11/20/2016) and the other in *La Vanguardia* (11/06/2015). There is no allusion in the front page. Therefore, it is not perceived that the adaptation has a relevance in the spaces of special interest in the press.

3.4.2.- Particular

In this section we study the relevance of adaptation within the articles in which it appears. It is considered that the relevance granted is a priority when adaptation is the protagonist, or when it shares the protagonism with mitigation. It is considered secondary when addressing mitigation, effects, etc., of climate change and global warming, and adaptation is addressed with a smaller volume. It is considered punctual when it appears as an unimportant element. The adaptation is presented in the texts in a similar proportion as a priority theme (107 articles, 44.4%) and as a secondary theme (112, 46.5%). To a lesser extent, it appears as a specific topic (22, 9.1%).

3.5.- Holders, with regard to what is exposed

3.5.1.- Presence of adaptation in the headlines

The term "adaptar" and "adaptación" appear only once in the headlines. When it's made a word cloud with the headlines, this is the result:



Figure 1.- Word cloud based on the terms appearing in the headlines of the analyzed media

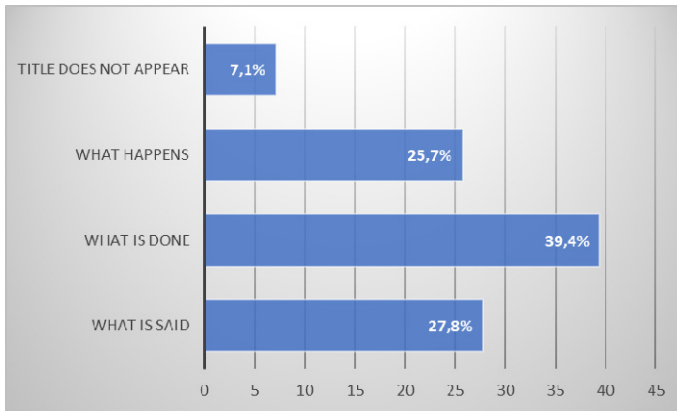
In Table 2 we observed that the most frequent terms in the news in which adaptation is addressed are “climático”, “cambio”, “clima” and “cumbre”.

Table 2.- Most repeated terms in the headlines

TERM	NUMBER OF APPEARANCES
Climático	51
Cambio	47
Clima	17
Cumbre	12
Mar	8
Global	7
Ciudades	7
Ucero	6
Futuro	5
París	5
ONU	5
Agua	5

3.5.2.- Regarding what is exposed

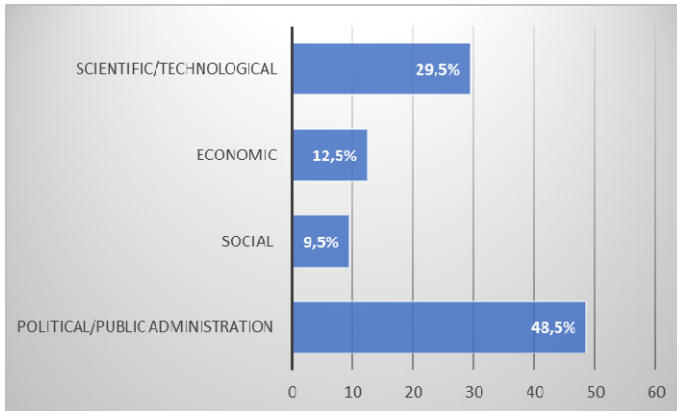
When analyzing the holders of the articles in relation to what they exhibit, we find that the option of presenting "what is done" predominates, followed by "what is said" and, finally, of "what happens". This would indicate that the content of the texts is linked, in the first place, to the action, and, secondly, to the debate. It can be considered a strength since in other studies controversy, the debate, has prevailed over what is said (Piñuel et al., 2013, Fernández-Reyes and Aguila-Coghlan, 2015).



Graph 7.- Distribution of articles in relation to what is exposed in the headline

3.6.- Sources of information

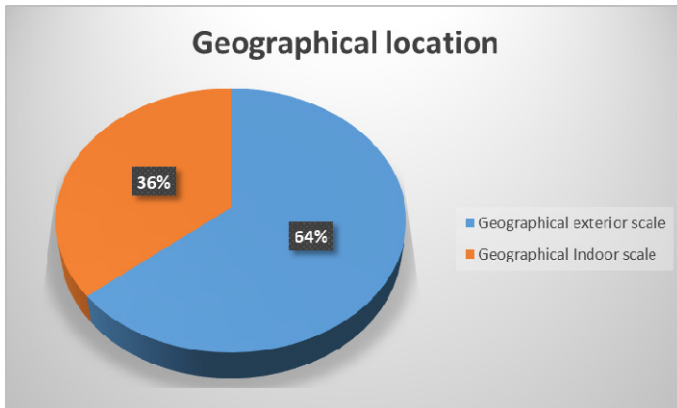
In this section we study the sources used linked to the term “adaptation”. The political sphere-public administration is the one with the greatest presence (48.5%); it is followed by the scientific-technological-research sphere (29.5%) and, to a lesser extent, the economic sphere (12.5%). Finally, there is the social area, which adds 9.5%.



Graph 8.- Distribution of articles by informative sources on adaptation

3.7.- Geographical scope

62.6% of the articles analyzed refer to the outside of Spain and 36.3% to the interior. This confirms the tendency shown in other studies that the international agenda on climate change and/or global warming has a considerable influence on the national agenda (Fernández-Reyes et al, 2017).⁵⁷



Graph 9.- Distribution of articles by geographical location

When we look at the articles in the interior, we can see that there are fairly even levels between articles of local-regional (32.9%), national (31.8%) and regional (30.6%). Lastly, the provincial scope is treated (4.7%). The international option is the one that has the most presence in the foreign sphere

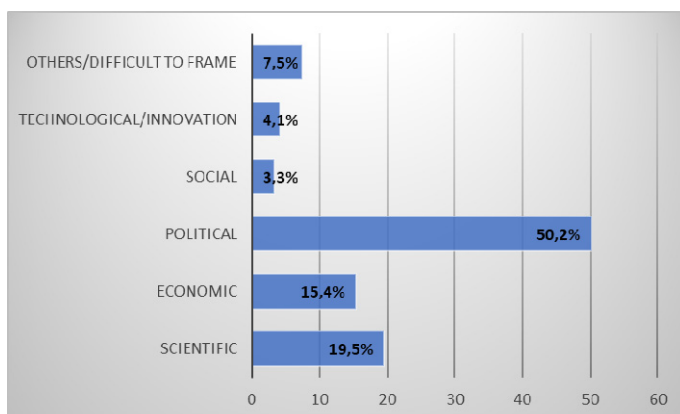
⁵⁷ This trend is not fulfilled, however, in all newspapers, given that, in *El Mundo*, with a wide range of regional and provincial editions, information of an internal scope prevails

with difference (71.8%), followed at a distance from Europe (16%). These graphs contrast markedly with the geographical location of the articles that address the adaptation in North America, in which 71% are indoor, reaching up to 94% of the articles in 2012 and 2013. The articles located in the externally, they refer, predominantly, to adaptation in developing countries (Ford and King, 2015).

3.8.- Framed

Graph 10 shows the distribution of the articles according to their framing. To classify this variable, special importance is given to the title, pre-title and subtitle. Dominates the political frame (50.2%), followed by the scientist (19.5%) and the economic (15.4%). Only 3.3% of the articles analyzed have a social frame.

When analyzing the results per year we find that the political framing articles reach their highest peak in 2015, the year of the Paris Summit, while those of scientific framing show it in 2014, the year of the presentation of the V IPCC Report. The economic framing articles, meanwhile, are mainly concentrated in 2016.



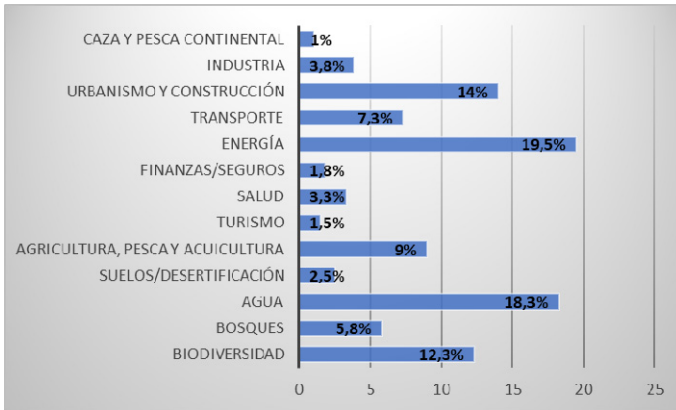
Graph 10.- Distribution of articles according to the framing

3.9.- Sectors and Territories according to the classification of the National Plan of Adaptation to Climate Change (PNACC)

In this section, the categories that appear in the III Work Program of the National Plan of Adaptation to Climate Change and the connotations that are applied there are studied. The following sectors are contemplated: Biodiversity; Forests; Water; Soils and Desertification; Agriculture, Fisheries and Aquaculture; Tourism; Health; Finance and Insurance; Energy;

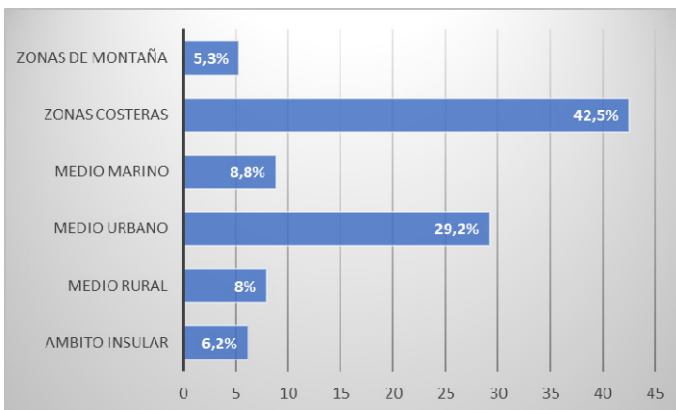
Transport; Urbanism and Construction; Industry; Hunting and Fishing Continental. And the following geographic territories: Insular area; Rural area; Urban area; Marine area; Coast area; and Mountain area.

As can be seen in Graph 11, the following stand out: Energy (19.5% of total references), Water (18.3%), Urbanism and construction (14%), Biodiversity (12.3%) and Agriculture, fishing and aquaculture (9%). The three sectors with less presence are: Hunting and inland fisheries (4, 1%), Tourism (1.5%), and Finance and insurance (1.8%).



Graph 11.- References to sectors that appear in the articles

When studying the presence of the territories included in the III Work Program of the National Plan of Adaptation to Climate Change, we observe that the Coastal area (42.5% of the references to territories) have the most presence, followed by the Urban area (29.2%). The rest present small values.



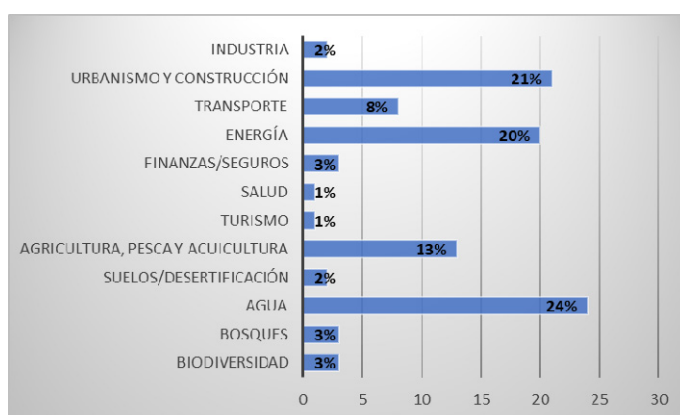
Graph 12.- References to territories that appear in the articles

The *Tercer Programa de Trabajo del Plan Nacional de Adaptación al Cambio Climático* maintains the priorities established in the previous Work Programs on sectors and territories, due to its nature as strategic resources, sensitive and vulnerable area, territorial importance and socio-economic weight. The sectors that are considered priority are: Water, Biodiversity, Forests, Health, Tourism and Agriculture; The priority territory is Coastal area. When observing its presence in the analyzed press we observed that only Water, Biodiversity and Agriculture are among the 5 most present sectors, while Forests, Health and Tourism appear less frequently. As for the territories, Coastal area have the most presence, in line with what has been established as a priority.

3.11.- Measures

In this section, the categories "sector" and "territory" where the adaptation measures are applied are considered. The sectors and territories of the *Tercer Programa de Trabajo del Plan Nacional de Adaptación* are used as references.

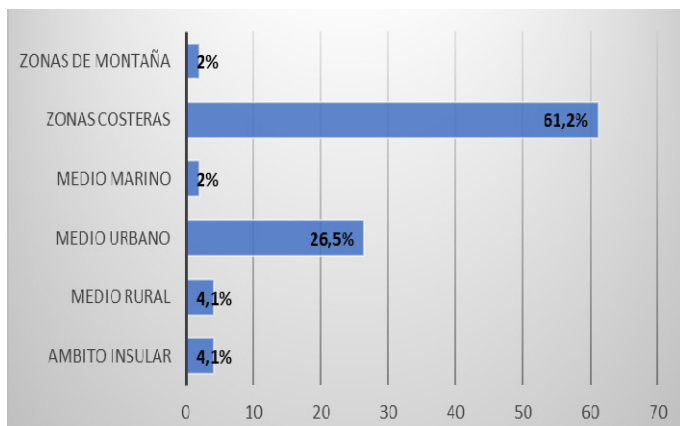
In 12% of the articles, no measures are addressed, 30% are not specified and 8.3% are addressed by other types of measures. The percentage of measures by sector is shown in Graph 15. In order of greater presence, it is observed that Water is the sector to which more measures refer (24%), followed by Urbanism and construction (21%) and the sector of Energy (20%). On the other hand, the ones that appear the least are: Hunting and inland fishing, which does not have any presence, the Tourism and Health sector, with an allusion (1%).



Graph 15.- Distribution of articles according to the sectors of adaptation measures

The Coastal area, 61.2% of the total of the references to territories, are the ones that most often appear in relation to the measures. It is followed by the Urban area (26.5%). With small values are the Insular area and the Rural area (4.1%), and the Marine area and Mountain area (2%).

The volume of references in which no measure is specified can be interpreted with the hypothesis that we are in a first stage in which the need to legitimize adaptation as a response prevails. If this is the case, subsequent studies will detect more allusions to measures carried out or to be carried out.



Graph 14.- Distribution of articles according to the territories of the adaptation measures

When analyzing the sectors in which adaptation measures are reported, it is observed that of the five that have more appointments, only Water and Agriculture are among those considered priorities by the Tercer Programa de Trabajo del PNACC. Tourism, Health, Forestry and Biodiversity have almost no allusions. As for the territories, Coastal area have the most presence, in line with what is established as preferential.

References to regulations and plans have also been analyzed, highlighting the mention of the PIMA Adapta Plan (11 analysis units) and the Coastal Law (10 units).

3.10.- Types of Adaptation

When there are several allusions to the term "adaptación" in the same article, the first occasion is studied. Subsequently, the following allusions are studied and information is added, without repeating, in the event that it complements. First, the Human, Natural or Both categories are studied. If the article deals with Human Adaptation (or Both), the subcategories are

studied: Proactive / Reactive, Planned / Autonomous, Individual / Collective, Implicit / Explicit and Coping approach / Incremental / Transformational. In each pair, two more categories are also considered: Both and Unspecified / No Allusion. And in the Coping approach / Incremental / Transformational trio there are combinations in which several can be identified at the same time: Unspecified / No Allusion, Coping approach, Incremental, Transformational, All, Coping approach / Incremental, Incremental / Transformational and Coping approach / Transformational.

Table 3.- Description of the categories used in the types of Adaptation

We collect in the present table the categories of types of adaptation, some of new use:

A) Anticipatory or proactive adaptation / reactive adaptation. It is anticipatory when it occurs before the impacts of climate change are observed; and it is reactive when it occurs after having observed such impacts.

B) Planned adaptation / autonomous adaptation. The planned one is the one initiated and executed from the political-public sphere, while the autonomous one is initiated and executed by individuals, companies or private organizations.

C) Individual adaptation / collective adaptation. The individual refers to an actor and the collective to several.

D) Implicit adaptation / explicit adaptation. The implicit refers to cases in which adaptation is included, without the text specifying it; explicit when alludes to adaptation in a clear and express way.

E) Coping approach / incremental / transformational adaptation. This category is more complex, so it was decided to deepen its meaning. It is recognized that the transformational concept is still vague and defined in different ways. With the support of existing bibliography (Kates et al., 2012, Climate change, 2013, Lonslade et al., 2015, Urban adaptation, 2016), these categories are contemplated:

Coping approach adaptation:

- 1) Faces the consequences of a meteorological event⁵⁸ in order to restore the previous form
- 2) The essence and integrity of an existing system or process at a given scale is maintained.
- 3) Tends to apply actions and behaviors already known
- 4) The consequences of an event are addressed without addressing the complex or interdependent issues of climate change
- 5) Address short-term challenges (high risk of maladaptation⁵⁹)

Incremental adaptation:

- 1) It is considered that the magnitude and speed of climate change remains at a minimum or moderate level
- 2) The essence and integrity of an existing system or process at a given scale is maintained
- 3) It can be considered as an extension of actions and behaviors that are already underway
- 4) Address challenges in the short and medium term (average risk of maladaptation)

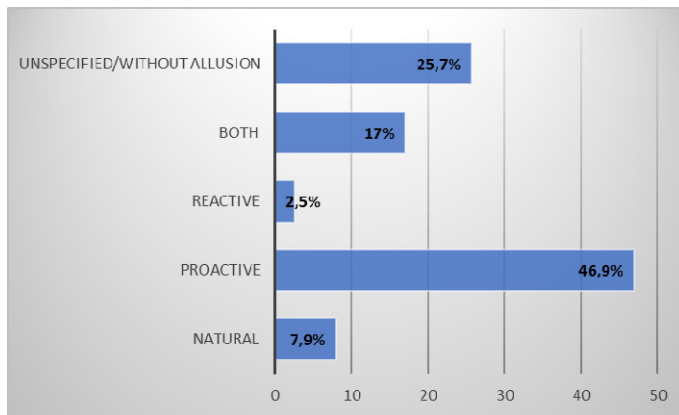
Transformational adaptation:

- 1) It is expected to occur when vulnerability is high or when the rate and magnitude of climate change is severe, threatening to overcome the resilience of existing systems
- 2) Change the fundamental attributes of a system, in response to the observed or expected effects of climate change
- 3) Can include measures or changes on a larger scale or higher intensity
- 4) These are measures or changes that transform places, or lead to a change in the location of activities
- 5) New changes in a region or system of resources
- 6) Address long-term challenges (low risk of maladaptation)

⁵⁸ In response to weather events, it has the difficulty of being or not linked to climate change. Those that are linked to it are studied

⁵⁹ Since there are no references to maladaptation, we have left this subcategory in parentheses of another subcategory. It is possible that in a later investigation it can be separated as a subcategory of its own

- A. Human or Natural
- B. Most of the articles analyzed treated human adaptation, 90.5%. Natural adaptation is treated in 7.9% of the articles; while the option "both" appears at 1.7%.
- C. Proactive or Reactive
- D. The "proactive" type adaptation has a greater presence (it has been applied in the 46.9% of cases) than the "reactive" adaptation (2.5%). The option "both" is present in 41 articles, that is, 17%. These data contrast with data provided in North America in which the proactive option prevails until 2011 and the reactive option in 2012 and 2013 (Ford and King, 2015)⁶⁰.



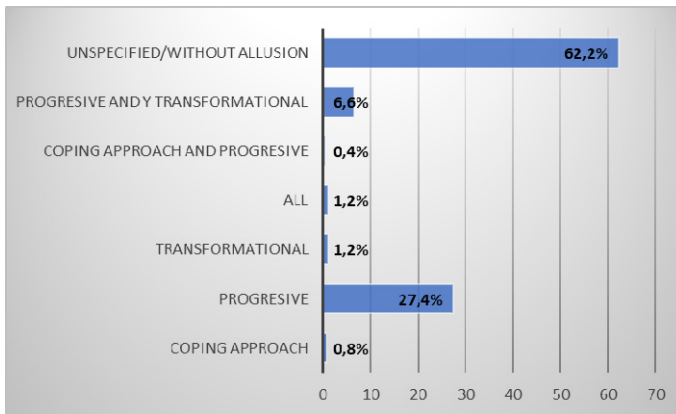
Graph 15.- Articles according to the type of proactive or reactive adaptation

- E. Planned or Autonomous
- F. The "planned" adaptation prevails (65.1%) over the "autonomous" adaptation (7.5%). The option "both" has been applied in 8.7% of the cases.
- G. Individual or Collective
- H. The adaptation of the "collective" type is the majority, 86.7%, compared to the adaptation of the "individual" type, which is present at 2.1%.
- I. Implicit or Explicit
- J. The adaptation of the "explicit" type prevails with 86.3% over the adaptation of the "implicit" type, which represents 4.6%.

⁶⁰This research analyzes adaptation articles from 1993 to 2013

K. Coping approach, Incremental or Transformational

- L. This is one of the categories in which it has been found more difficult when it comes to agreeing where the articles are classified, so they have subjective concepts. In any case, and to begin with, we find that in many of them (62.2%) there is no information that allows classification. In the remaining articles (38.8%), and assuming the questionable nature of the classification, the option of "incremental adaptation" prevails (27.4% of the total of the articles), followed by the option "progressive and transformational" to the once (6.6%).



Graph 16.- Articles according to the type of coping approach, incremental or transformational adaptation

The few allusions to the coping approach category are surprising, linked to meteorological events. In total it is present in 3 articles, while in North America it becomes the main number of adaptation articles in the years 2012 and 2013 (Ford and King, 2015), addressing Hurricane Sandy and the floods of Alberta and Toronto, in Canada.

3.12.- Images

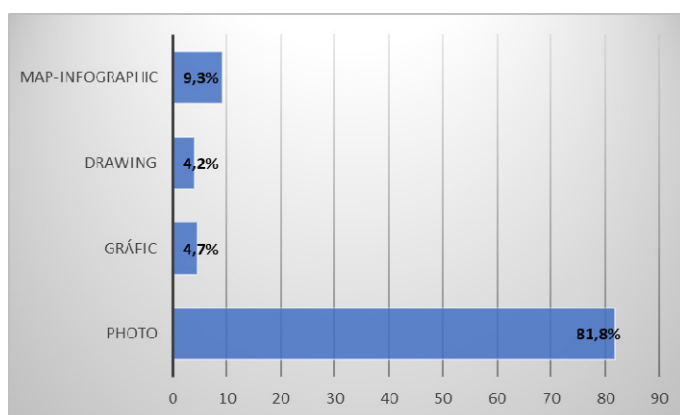
The images used to illustrate the articles where it is present in terms of adaptation are studied. Therefore, it is appropriate to take into account that the images are related to the complete articles, not exclusively with the information related to the adaptation.

The categories applied are: Typology (with the subcategories Photo, Graph, Table, Drawing, Maps-Infographics, Without image and Could not be accessed), Theme (with the subcategories Impacts, Causes, Solutions, Pro-

tests, Other, Without image and Could not be accessed), Spatial identification (with the subcategories Near, Far, Difficult to identify or classify, No image and Could not be accessed) and temporary identification (with the subcategories: Near, Far, Near and Far at the same time, Difficult to identify or classify, No image and Could not be accessed).

For the category "Theme" we base ourselves on the proposal of María del Carmen Erviti (2014)⁶¹.

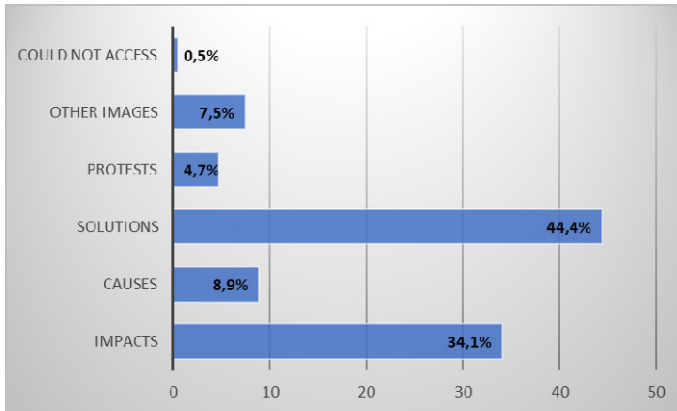
From each analysis unit a maximum of two images is taken, according to the size granted. Most of the images included in the journalistic articles are photographs (81.1%), followed by map-infographics (9.3%), graphics (4.7%) and drawings (4.2%).



Graph 17.- Distribution of articles to the type of images

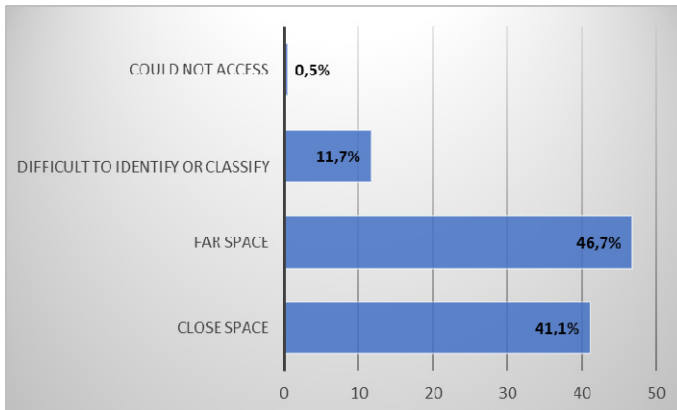
Regarding the themes represented in the images (Graph 18), the allusion to solutions prevails (44.4%), followed by impacts (34.1%), causes (8.9%) and protests (4.7%). The prevailing subject of solutions can be considered a strength.

⁶¹The "cities" subcategory, which Professor Erviti includes in Causes, has sometimes been included in Solutions, depending on the topic that is addressed



Graph 18.- Distribution of articles according to the theme of the images

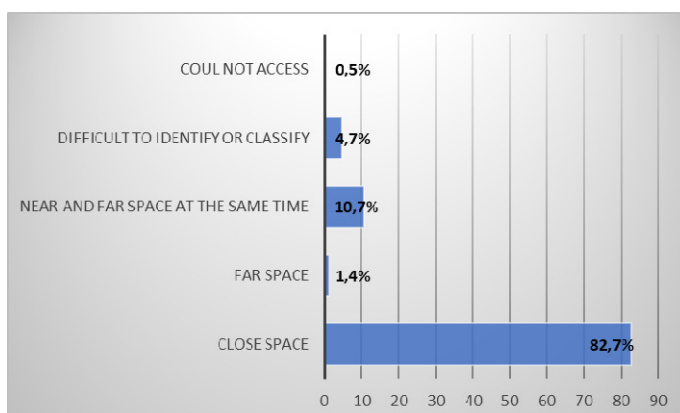
The images refer mainly to distant spaces, 46.7%. Allusions to nearby spaces⁶² add up to 41.1%. This result coincides with the predominance of the representation of outer space over the interior, which implies an important questioning of the communication that is being made not only of adaptation, but of climate change in general.



Graph 19.- Distribution of articles according to the location of the images

⁶² For the difference between proximity and spatial remoteness, it has been considered, in an arbitrary way, that the "near" category includes the references that refer to the Spanish territory and up to approximately 500 kilometers away from said territory

When the images are analyzed according to whether they refer to a distant or close time⁶³, the differences are remarkable: in 82.7% the allusions prevail at a close time compared to 1.4% that allude to a distant time. This has its pros and cons since, as is well known, there is a contribution to the forcing of the committed climate system that will face in decades or centuries.



Graph 20.- Distribution of articles according to the temporary location

3.13.- Key concepts

From the analysis of the presence of key concepts (identified from their lexical root), these conclusions are drawn: the root "vulnerab" appears in 28.2%, "resilien" in 5% and "descarboniz" in a 5,4 %. The term "maladaptación" (habitual in the Anglo-Saxon literature on the subject) does not appear in any occasion. It has also been observed the presence of the root "migr", which appears in 5.4% of the articles.

4.- Conclusions

Science has shown clear conclusions about climate change in the V IPCC Report (2014). It is, therefore, interesting to know the media coverage of climate change and global warming for the proposal of active policies (Boykoff, 2008, Meira et al, 2009, 2011, 2013, Teso, 2015, Heras, 2015, Moser, 2017).

⁶³ In proximity / temporal remoteness we propose as a reference the arbitrary criterion of 5 years as a limit between both categories since the publication of the news.

The media represent the main source of information for citizens on this subject. Of these, the press is considered as an ideal support for research because it offers a greater depth and variety of nuances (Dirikx and Gelders, 2008).

Adaptation has become, together with mitigation, as an essential response to climate change. However, the study of the media treatment of adaptation to climate change is presented as a novel initiative in Spain, and little explored in the international arena. This work addresses the need to deepen the analysis of content and frames in the communication of adaptation, pointed out by Moser (2014).

The results of the analysis⁶⁴ of the 241 journalistic articles that deal with adaptation and climate change and / or global warming in the newspapers of hegemonic influence *El País*, *El Mundo*, *La Vanguardia* and *Expansión* during the period between January 1, 2012 and on December 31, 2016, they indicate that *El Mundo* is the **newspaper** with the most references, followed by *La Vanguardia*, *El País* and *Expansión*. It is the same order as that resulting from searches for the terms climate change and global warming without the term adaptation. The tendency of the presence of adaptation in the newspapers studied is one of growth over the **years**, although there are two decreases: one in 2013 and another in 2016, similar to the results that other investigations have obtained from the presence of climate change and / or global warming. We observe that October, November and December is the quarter with the most references, with considerable differences with respect to the rest of the year. It coincides with the quarter in which numerous Summits of the UN Framework Convention on Climate Change are held. Of them, highlights the **month** of November.

The adaptation has little **relevance** in the most prominent spaces of the newspapers. It does not appear on any front page and is present in two editorials. Within the articles, it presents a similar proportion as a priority theme and as a secondary theme. To a lesser extent it appears as a punctual topic. When analyzing the **headlines** of the articles on the subject of what they say, we find that the option of presenting "what is done" predominates, followed by "what is said" and, finally, "what happens". This would indicate that the content of the texts is linked, in the first place, to the action, and, secondly, to the debate. The words that most appear in the headlines are, in order: climate, change, climate, summit, sea, global and cities. The term "adaptation" and "adapt" appear only once in the headlines.

⁶⁴In the original article other variables are also addressed, such as Sections, Journalistic Genres and Authorship

In the references made to news **sources** about adaptation, the political-public administration sphere has the greatest presence, followed by the scientific-technological-research field.

In the analyzed articles, the adaptation is located **exterior scale** of Spain in 62.6% of the articles, compared to 36.3% that deals with the interior. The result confirms the idea that information on climate change and global warming has a predominantly international spatial scope. The international category has the most presence in the external field, followed by Europe. When we stop at the articles about the **interior scale**, we observe a similar amount of articles referring to the local-regional, national and regional scale. The provincial scope is present in smaller amount.

The **framing** of the articles is mostly political, followed by scientific and economic. Social framing has little presence. When analyzing the results for years we find that the political frame has its highest peak in 2015, year of the Paris Summit, while the scientist shows it in 2014, the year of the presentation of the V IPCC Report. The economic one, for its part, shows it in 2016.

The following variable refers to the **sectors** established by the PNACC that are mentioned in the articles studied. Of the 13 sectors that are analyzed as categories, the three with the most presence are: Energy, Water and Town Planning and Construction. Those that appear less are Hunting and inland fisheries, Tourism (a striking 1.5%) and Finance and insurance. Regarding the variable corresponding to **geographical territories** that are also mentioned, the category that has the most presence is Coastal area, followed by the Urban area.

The mention of specific adaptation **measures** has also been analyzed. It is observed that Water is the sector to which more measures refer, followed by Urban Planning and Construction and Energy. The ones with fewer appointments are the Hunting and inland fisheries, the tourism sector and the health sector. As for the territories in which measures are applied, the Coastal area and the Urban area are those that are mentioned more often.

The following variable tries to analyze the **types of adaptation** to which the journalistic articles allude. The results indicate that human adaptation prevails over the natural, the proactive over the reactive, the planned over the autonomous, the collective over the individual and the explicit over the implicit. The incremental adaptation is the one that has the most references between the coping approach, incremental and transformational.

Next, we analyze how the articles are illustrated. Most of the **images** are photographs, followed by maps-infographics, graphics and drawings. Regarding the content of the illustrations, the subject of solutions prevails, in order of volume, followed by the impacts, the causes and the protests. The images refer, mostly, to distant spaces and to a nearby time.

When the presence of key concepts is studied, it is observed that "vulnerability" appears in a considerable way. The concepts "resilience", "decarbonization", as well as "migration" have less presence. The concept of "maladaptation" is not mentioned at any time.

5.- Discussion

As noted by Ford and King, the main barriers to the implementation of significant processes of adaptation to climate change are identified with "a lack of interest among politicians and society, and confusion about what adaptation implies" (2015). According to these authors, "the limited coverage of the media contributes even more to the absence of an awareness of adaptation in the public sphere." It is considered that, within the joint responsibility involved in the task of raising awareness, the media can exercise a relevant social function. As discussed by Boykoff and Yulsman (2013), Ford and King (2015), and we subscribe, good media coverage is a necessary condition, but not sufficient to raise the status of adaptation in the public sphere. It is important that other areas also help to report on the subject. It is essential that adaptation reaches relevance in the political agenda. We propose the discussion in the political and communicative field as recommendations:

a) For policy makers

In the light of the results, it is confirmed that the trend of media attention to issues related to "adaptation" is matched with that which lends itself to the topic of "climate change" and "global warming" depending on the calendar of certain events. For this reason, it can be interesting to provide information to the media about adaptation responses coinciding with the periods in which they have climate change on their agenda, such as during the Climate Summits. The relevance given to adaptation does not only depend on the media agenda, but also on the political, economic and social agenda.⁶⁵

Although the adaptation appears in the journalistic texts in a similar proportion as a priority and secondary issue, it has had a marginal presence in the editorials and has not appeared on the front page at any time. Likewise, its presence in the headlines is marginal. This gives an idea that the media have not yet come to consider the importance of the topic, which is not among their information priorities. It is the responsibility of managers and

⁶⁵ As concluded the XII Congreso Nacional de Periodismo Ambiental, organized by APIA (Asociación de Periodistas de Información Ambiental) in Valencia in November 2017, it is necessary to introduce climate change into the political agenda. The Congress was titled "Climate change, the most urgent news"

decision makers to transfer the true dimension and urgency of the challenge.

A strength that the results show is that, in the headlines of the articles, the information of "what is done" prevails over "what is said" and "what happens". It is interesting to consolidate this tendency, which indicates that the gaze is focused on action beyond controversy, inaction or the mere collection of facts.

Today the media are fed, to a large extent, press releases provided by third parties. Caring for presence in the media involves the commitment of technical personnel and / or a communicative strategy that actively generates and disseminates information. Institutions should also take care of the contribution of images that complement the information provided, since it is often difficult to obtain adequate illustrations that visually reinforce the messages.

It is important to know who are the professionals who, in each newspaper, have specialized in addressing information related to climate change to send them directly the news of interest and establish a professional link that favors a greater and better informative attention to these topics.

Adaptecca is a very timely platform as a source to gather information about adaptation. It is a project, an initiative of the Spanish Office of Climate Change and the Biodiversity Foundation, which offers information exchange and communication among all the experts, organizations, institutions and agents active in this field, at all levels.

In the same way, it is necessary to take into account that politicians and researchers are essential agents for the dissemination of topics related to climate change, the adaptation between them. Media coverage depends a lot on whether these sources generate information about it.

As the results show, when adaptation is addressed in the Spanish media, information on the external scale to Spain predominates, in line with what also happens with information on climate change and global warming. These data indicate a generalized dysfunction and point out the need to informatively center adaptation to climate change on the interior scale. It is appropriate to situate the look at the near thing for a greater implication of the citizenship. The framing of the articles, mainly political, and then scientific and economic, with very little presence of the social framing, seems to indicate that adaptation is a mostly top-down strategy, which has been less assumed by social organizations and the general public. From there it can be interesting to dynamize bottom-up strategies (Moser and Pike, 2015).

Regarding the sectors and territories that appear related to information on adaptation in general, or where concrete adaptation measures are described, it is observed that Water, Biodiversity, Agriculture and Coastal Area have a considerable presence. However, the rest of the sectors considered priorities in the PNACC, such as Forests, Health and Tourism appear much less. The order of priority of the sectors and territories according to the consideration of the technicians does not correspond to the one that appears in the press. It is worth asking: are they present in the media according to the importance given to them from the political, scientific, economic or social spheres? Or maybe there is still no reflection about it?

Regarding the mention of plans and laws related to adaptation, it is worth reflecting if the few references that appear are not reflecting an important lack in the policies.

From the high degree of vulnerability considered in the Spanish territory, the imperative need of the promotion of proactive adaptation and adaptation of transformational type is perceived. We suggest the need for a special training in the types of transformational adaptation, and its relation to incremental adaptation (Kates et al., 2012, Lonsdale et al., 2015), in which a systemic view must prevail. Needless to remember the importance of adaptation going hand in hand with mitigation, and therefore, be recognized as a joint response, which implies a change in the *status quo* and a copernican turn at a technological, institutional and human level.⁶⁶

Another challenge arises around the presence of key concepts in the field of adaptation. It may be interesting to promote in the informative articles the appearance of concepts such as "vulnerability", "resilience", "decarbonization", and even "maladaptation", in order to generate and normalize a specific language to describe the new challenges to the that we face.

Finally, refer to the existence of proposals on good practices regarding the communication of adaptation (Corner and Clarke, 2014, Wirth et al., 2014).

b) For communication professionals

We will try to avoid what Professor Diaz Nosty calls the fashion of the evaluation of the deficit (2013), in which we discover in the content gaps with respect to an ideal theoretical model of framing and agenda, traced by the researcher. It would be interesting to have some kind of feedback in which

⁶⁶As stated in the IPCC press release after the presentation of the contribution of Working Group III: "to avoid dangerous interferences in the climate system, we can't continue with the status quo, and that the containment of climate change goes through a Copernican turn at the technological, institutional and human levels of immediate start, global involvement and substantial investments "(04/13/2014).

the professionals will approach how they perceive the results and they themselves will be the ones who will contribute suggestions.

A proposal, within the possibilities allowed by the journalistic routine and the limitations of specialization that are presented today in newspapers, is that of greater quantitative attention towards adaptation. If climate change has positioned itself as a priority issue on the international agenda, it is justified that the proportion of media presence of adaptation to climate change, as an essential response together with mitigation, is parallel to the scientific robustness and the perception of risk. And it is justified that it be treated in main pages, such as in the front pages or in the editorial section, and the term "adaptation" be present in the headlines, not only in the months of special events, but throughout the year. In this sense, it would require more specific training in the middle management of journalistic structures.

In light of the results of the study, and as recognition of the journalistic work, it is valued that in the headlines of the articles where the term "adaptation" and "climate change" or "global warming" is present, the information of "what it is done" on "what is said". Also the fact that among the journalistic genres that most deal with adaptation are the reportage and the opinion article, in addition to the information.

On the other hand, it is essential that it be a subject treated in a transversal manner and not limited to the specific sections of the environmental field. At the same time, we perceive the need for specialized training of professionals in climate change, in order to offer quality information.

Adaptecca is also a very timely platform for journalism professionals as a source to gather information on adaptation.

One challenge is to invest the proportion of articles as based on the focus of spatial attention, privileging those that treat close adaptation, which are now a minority. That is, to tend to prevail the information referred to interior scale. The same thing happens with images, which refer, in general, to distant spaces.

If the communication of adaptation to climate change is perceived as predominantly *top down*, the media can make visible and favor the diffusion of *bottom up* adaptation initiatives, undertaken or led by civil society.

As stated in the section on policy makers, the high degree of vulnerability in Spanish territory entails the imperative need to promote proactive adaptation and adaptation of a transformational nature. However, it is, in the case of adaptation of a transformational type, a novel field, under construction, which requires special training, in relation to incremental adaptation (Kates et al., 2012, Lonsdale et al., 2015), where a systemic view must prevail.

As for the types of adaptation, a call for attention can be made about the need to be vigilant before those measures, projects and initiatives that may be considered "maladaptation". In this case, as is well known, it is not an exclusive task of communication professionals, but it can be indicated given the critical social function that they sometimes exercise.

Probably this stage analyzed is characterized by being a period in which the term adaptation is being legitimized. A second phase would require detailing how this response to climate change develops or should develop.

In the field of image analysis, we consider it a strength that the issue of solutions is the one with the greatest presence. The weakness - and with it the challenge - comes from the fact that they refer, in their majority, to distant spaces.

As in the recommendations to policy makers, it refers to the existence of proposals on good practices regarding the communication of adaptation (Corner and Clarke, 2014, Wirth et al., 2014).

Finally, reflect on the proposal of journalism in transition (Fernández-Reyes and Aguila-Coghlan 2017) in response to climate change. Information professionals, especially environmental journalists, are especially aware of the seriousness of climate change because accessing information more frequently. This allows them to have more clarity and perspective on the challenge. Alan Rusbridger, former director of the newspaper *The Guardian*, world reference in information on climate change, said "climate change is so important that perhaps in this issue journalism can ignore its rules and take sides," that is, position⁶⁷. This without losing the rigor, the quality information and the veracity.

Thanks

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⁶⁷ Reference provided by Clara Navío, president of APIA (Asociación de Periodistas de Información Ambiental) at the inauguration of the XII Congreso de Periodismo Ambiental https://www.youtube.com/watch?v=I90p2j37kVI&list=PLS90N-94A2nDjYyKXddyfy_klq0ue-RBh

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Annex 1. Main results

The trend of the presence of adaptation in the **newspapers** studied is one of growth, with ups and downs throughout the **years** studied. The **month** in which the adaptation has the most presence is November, a month in which, mainly, the Summits of the UN Framework Convention on Climate Change are held.

In the **headlines** of the articles where the adaptation is present, "what is done" predominates, followed by "what is said" and, finally, "what happens". The words with more presence in the headlines are: "Climate", "Change", "Climate" and "Summit".

The presence of adaptation in privileged places of newspapers, such as in the front page and the editorial, is marginal, as well as in the headlines. It has, therefore, little **relevance**.

The **source** of the political-public administration sphere is the one that has the greatest presence in the adaptation information, followed by the scientific-technological-research field.

The articles in which the adaptation is present are mostly located on the external **scale**. The **framing** is mainly political.

The three **sectors** of adaptation that have more presence are: Energy, Water and Urban Planning and Construction. As for the **territories**, they are: the Coastal area, followed by the Urban area.

By order of greater presence it is observed that Water is the sector to which more **measures** refer, followed by Urbanism and construction and the Energy sector. As for the territories, they are the Coastal area and the Urban area.

As for the **types of adaptation**, human adaptation prevails, proactive, planned, collective, explicit and incremental.

Most of the **images**, by far, are photographs. The issue of solutions prevails and refers, mostly, to distant spaces and to a nearby time.