THE IRRIGATED AGRICULTURE BUBBLE IN SPAIN

Executive summary

* This is a summary of the report The Irrigated Agriculture Bubble in Spain (only in Spanish). All bibliographic sources are detailed in the extended version.

GREENPEACE

EXECUTIVE SUMMARY
The Irrigated Agriculture Bubble in Spain

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Madrid, Spain, June 2023

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1 WATER DATA IN SPAIN

In the current climate change scenario, rainfall in the Mediterranean region will become more erratic and intense (there will probably be less rainfall and, perhaps, more occasional heavy rainfall). In May 2023, water reserves in reservoirs were 47%, 21 points below the average of the last ten years. In this scenario, every drop counts. Yet, Spain **has less and less water, and the water Spain has is poorly managed and polluted.** According to the latest forecasts, Spain, and Greece, are the **European countries with the highest water stress**, ranking number 32nd in the world, ahead of countries such as Mauritania, Niger, Tunisia, and Egypt. **75% of Spain is threatened by desertificatio**n.

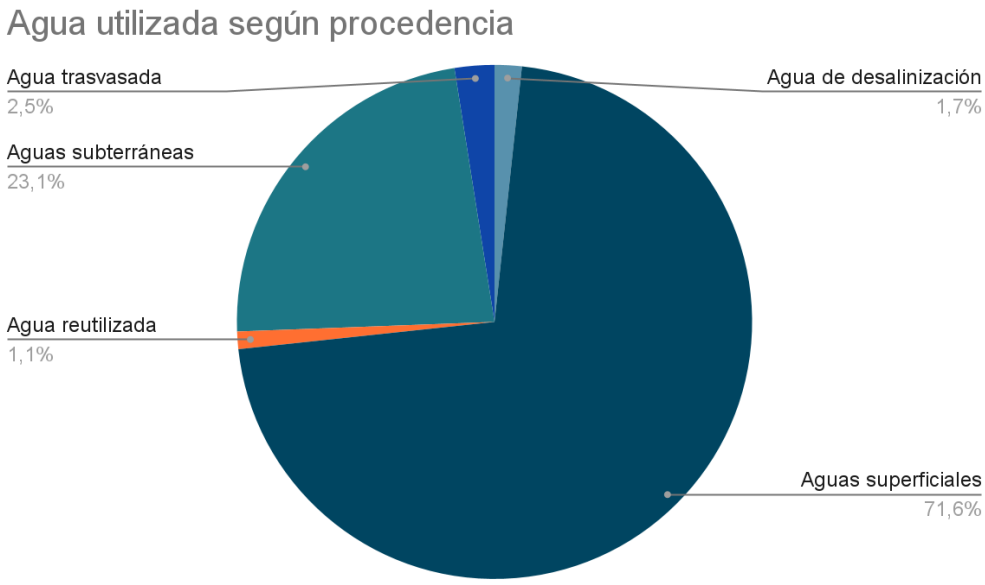
According to the 2019 data, **eleven of Spain's fifteen river basin districts were experiencing water stress** due to human demand for water from various sources. Only four basins (Western Cantabrian, Eastern Cantabrian, Coastal Galicia, and Miño-Sil) had little or no water stress at the time of the analysis. The Duero, Tajo and Catalonia's inland basins had extremely high water stress.

Projections for Southern Europe indicate that, as global warming reaches 2°C, more than one-third of the population will experience water shortages and will risk more frequent or severe agricultural and ecological droughts, or both. Authorities continue to prioritize meeting water demands, no matter how unsustainable. But if **there is one area where unsustainability is paramount, it is the national agricultural and livestock policy**, where the priorities are intensive irrigation, fodder crops (66% of Spain's agricultural land is for fodder), the conversion of rainfed crops to irrigated crops, and the slaughter of more than 900 million animals a year.

Spain's current water reservoir capacity is more than 56,000 hm3. In just over a decade, surface water reserves have **declined by an average of ten percentage points**. This trend is expected to continue because of climate change. Therefore, the **availability of stored water for the future is clearly decreasing**. Future policies must take this into account. But not all the water used in Spain comes from its river network. **Groundwater is becoming increasingly important.** The Geological and Mining Institute of Spain (IGME) estimates groundwater volume at **around 400,000 hm3,** although not all of it can be exploited. **This is about seven times the capacity of the reservoirs.** However, only about 35,000 hm3 can be exploited in a sustainable manner to avoid over-overexploitation (44% of groundwater bodies are already in poor condition). Therefore, is unreasonable to increase the use of groundwater before knowing how much water is available, how much actually is used, and how much is stolen, since there is **no real data on the number of illegal wells** in Spain, as already reported.

The water Spain uses comes from the following sources (see Graph 1):

- **71.59% surface waters**
- **23.1% groundwater**
- **2.8% unconventional (1.1% recycling and 1.7% desalination, approximately)**
- **2.49% from external transfers (water transfer)**

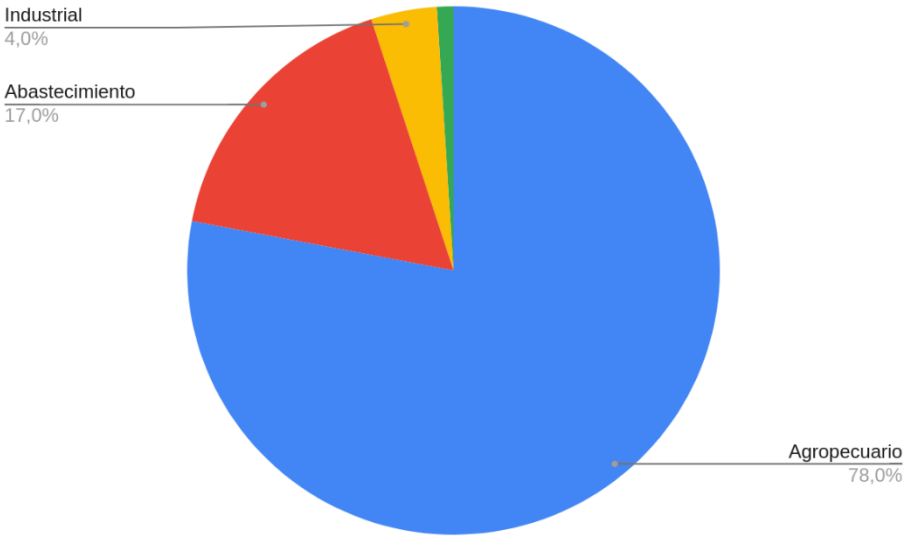


Agua utilizada según procedencia = Water used according to source:
Agua trasvasada = Water transfers
Agua de desalinización: Water from desalination
Aguas superficiales = Surface waters
Agua reutilizada = Recycled water
Aguas subterráneas = Groundwater
*Cambiar las comas de los números por puntos.

Graph 1. Source of water used in Spain.

Water distribution per use (Graph 2):

- **Agriculture and livestock 22,012.49 hm3 (78%),** used for irrigated crops, agriculture, and livestock.
- **Water supply 4,796.11 hm3 (17%),** urban and residential water (including industrial uses connected to the network, such as tourism, swimming pools...)
- **Industrial 1,248.33 hm3 (4%),** use for industrial production processes (not connected to the network).
- **Other 300.40 hm3 (1%),** for less quantitatively relevant uses such as golf irrigation.



Industrial = Industrial
Abastecimiento = Water supply
Agropecuario = Agriculture and livestock
*Cambiar las comas de los números por puntos.

Graph 2. Volume of water used to meet different needs (2020-21). Source: MITECO.

As we can see, **for 2020-21, the agricultural sector used 77.63% of the total water consumed in Spain**, primarily for intensive and industrial irrigation.

NOTE.- Greenpeace recognizes that the problems we are addressing are highly complex, and we know that our plan has limitations. On the one hand, although the report includes a brief socio-economic description of the farms, we need to analyze the impact of irrigated agriculture on social agriculture in Spain and how to support it given the increasing speculation and industrialization. On the other hand, the proposed methodology does not consider the effects of water transfers and canalization in certain irrigated areas. In addition, it may have excluded irrigated crops with high impacts, but with little presence of these impacts in the subsurface, given the "recent" introduction of some irrigated crops. However, this report is a first step in addressing a problem many experts have denounced. In addition, we go a step further by identifying areas where reducing irrigated crops is a priority. Therefore, the report establishes very conservative criteria. In the absence of an analysis of the availability of water under climate change scenarios or a dialogue with the sectors concerned, we embark on a journey we do not wish to walk alone. We hope this journey leads to a just water transition, where water distribution is based on social justice and equal access to water supply, guaranteeing our ecosystems' survival and good health.

2 THE INTENSIVE IRRIGATED AGRICULTURE BUBBLE IN SPAIN

2.1 THE CURRENT STATE OF IRRIGATED AGRICULTURE

According to the Survey of Crop Areas and Yields (ESYRCE), **irrigated land in Spain occupies at least 4 million hectares (Table 1).** This represents about 23% of Spain's agricultural land and **8% of the country** (40,000 km2, almost the size of Switzerland or the Netherlands).

Distribución de la superficie regada por tipos de cultivo y técnica de riego

GRUPOS DE CULTIVOS	Hectáreas cultivadas en 2021			Variación de la superficie de regadío entre 2004 y 2021	Superficie de regadío		Técnicas de riego (% de la superficie de regadío de cada cultivo)		
	Secano	Regadío	Total hectáreas cultivadas	(Miles de hectáreas)	En % de la superficie de riego total	En % de la superficie del cultivo	Gravedad	Aspersión y automotriz	Localizado
Cereales grano	5.237.921	932.963	6.170.885	6	24,1	15,1	45,0	52,1	3,0
Olivar	1.894.893	875.531	2.770.424	396	22,6	31,6	4,8	0,3	94,9
Frutales no cítricos	851.381	409.381	1.260.762	147	10,6	32,5	2,0	1,4	96,6
Viñedo	560.205	397.652	957.857	129	10,3	41,5	14,3	1,2	84,5
Frutales cítricos	20.247	287.096	307.343	-15	7,4	93,4	15,6	0,1	84,3
Forrajeras	720.427	252.737	973.164	-16	6,5	26,0	53,4	46,3	0,3
Hortalizas y flores	29.437	224.965	254.402	-6	5,8	88,4	23,9	53,3	22,8
Industriales	706.101	212.644	918.745	-7	5,5	23,1	12,1	35,7	52,2
Tubérculos	10.716	37.344	48.060	-19	1,0	77,7	9,5	77,9	12,6
Leguminosas grano	299.876	14.083	313.959	-18	0,4	4,5	15,6	83,0	1,5
Resto (barbechos, viveros, huertos familiares, etc.)	2.877.134	244.577	3.121.711	3	6,3	7,8	49,9	17,3	34,3
Superficie cultivada	13.024.520	3.877.901	16.902.421	600	100,0	22,9	23,6	23,1	53,7
Superficie geográfica	**46.661.641**	**3.935.926**	**50.597.566**	**536**		**7,8**			

Notas: La superficie de invernadero se incluye en regadío y en la técnica de riego localizado.
Datos de superficie de 2021 y de técnicas de riego de 2020.
Fuente: CaixaBank Research, a partir de datos del MAPA (ESYRCE, 2020 y 2021).

Distribution of irrigated land by crop type and irrigation system
Grupos de cultivo = Crop
Cereales grano = Grain cereals
Olivar = Olive grove
Frutales no cítricos = Non-citrus fruits
Viñedo = Vineyard
Frutales cítricos = Citrus fruits
Forrajeras = Fodders
Hortalizas y flores = Vegetables and flowers
Industriales = Industrial
Tubérculos = Tubers
Leguminosas grano = Grain legumes
Resto (barbechos, viveros, huertos familiares, etc.) = Other (land left to fallow, nurseries, family-owned vegetable garden, etc.)
Superficie cultivada = Area planted
Superficie geográfica = Geographical area
Hectáreas cultivadas en 2021 = Planted hectares in 2021
Secano = Rainfed crops
Regadio = Irrigated crops
Total hectáreas cultivadas = Total acres planted
Variación de la superficie de regadío entre 2004 y 2021 = Change in extension of irrigated land between 2004 and 2021
Miles de hectáreas = Thousands of hectares
Superficie de regadío = Irrigated land
En % de la superficie de riego total = Percentage of total irrigation area
En % de la superficie de cultivo = % of crop area
Técnicas de riego (% de la superficie de regadío de cada cultivo) = Irrigation methods (% of irrigated area for each crop)
Gravedad = Gravity irrigation
Aspersión y automotriz = Spray and automotive irrigation
Localizado = Localized irrigation
* En los cifras cambiar los puntos por comas y las comas por puntos.

Notas = Notes: The area for greenhouses is included both in irrigated crops and localized irrigation techniques.

2021 area data and 2020 irrigation methods
Fuente = Source: CaixaBank Research. Based on data from Ministry of Agriculture, Fisheries and Food (ESYRCE, 2020 and 2021).

Table 1. Distribution of irrigated land by crop type and irrigation system

Irrigation system improvements, a solution or an accounting scam?

Improvements in irrigation efficiency have led to a sharp increase in water demand and have created collateral problems. On the one hand**, the perception that Spain has plenty of water because "efficiency" has improved, has led to an increase in irrigated area** and plant density per unit area, as well as a shift to more water-intensive crops, and has encouraged double or triple annual harvests. Another problem is that these improvements **reduce the return of water** to rivers, wetlands, and aquifers, stimulate greater plant evapotranspiration, and increase concentrations of fertilizers and pesticides. Finally, these so-called improvements are paid for with large sums of public money, diverting **funds that could serve agriculture better if they were used in climate change adaptation models.**

By Autonomous Communities

Andalusia, Castile-La Mancha, Castilla y Leon, Aragon, the Region of Valencia, Extremadura, Catalonia, and the Region of Murcia are the Autonomous Communities with the largest irrigated area. **The Autonomous Communities of Andalusia, Castile-La Mancha, and Castilla y Leon together account for 56% of the total irrigated land in Spain.** The Canary Islands has the largest irrigated area in relation to its cultivated area. It is followed by the Region of Murcia, Catalonia, and Andalusia (Table 2).

	Irrigated area hectares	Total crop area	Geographical area	Irrigated area/crop area	Crops with the largest irrigated area
ANDALUSIA	1,123,547	3,528,451	8,759.,57	32%	Olives, cotton, oranges
Castile- La MANCHA	582,767	3,686,340	7,945,932	16%	Grapes, olives, barley
CASTILLA y LEON	472,113	3,550,749	9,422,206	13%	Corn, wheat, barley
ARAGON	420,527	1,789,153	4,772,208	24%	Barley, alfalfa,

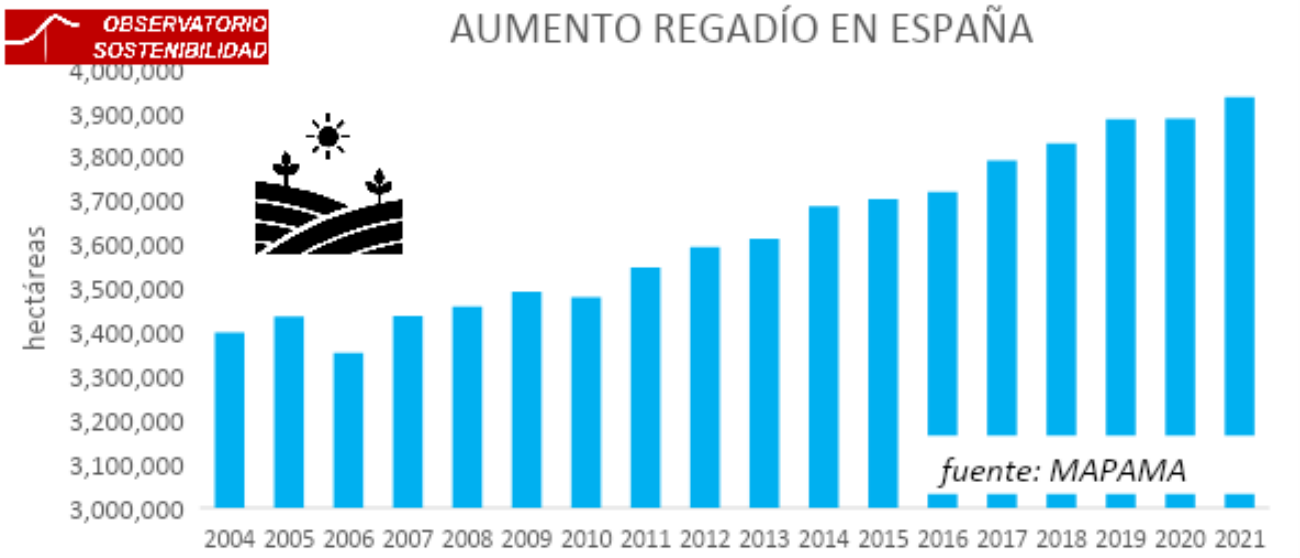
					corn
REGION OF VALENCIA	290,711	635,126	2,326,341	46%	Oranges, tangerines, grapes
EXTREMADURA	290,586	1,052,867	4,163,543	28%	Olives, corn, grapes
CATALONIA	271,361	819,352	3,211,133	33%	Corn, barley, olives
MURCIA	183,477	468,151	1,131,615	39%	Lemons, peaches, melons
NAVARRA	101,565	324,815	1,039,077	31%	Corn, wheat, vineyards
RIOJA	47,465	158,759	504,559	30%	Grapes, wheat, barley
CANARY ISLANDS	25,417	43,807	744,510	58%	Banana, grapes, avocado
MADRID	22,079	208,750	802,749	11%	Corn, barley, alfalfa
BALEARIC ISLANDS	21,522	160,659	499,170	13%	Grape, Fodder, olives
GALICIA	16,985	358,247	2,957,751	5%	Potatoes, grapes, corn
BASQUE COUNTRY	6,692	85,400	723,329	8%	Vineyards, wheat, barley
ASTURIAS	657	25,177	1,060,568	3%	Dried beans apples, tomatoes
CANTABRIA	430	6,617	533,018	6%	Potatoes, corn, alfalfa

Total	3,877,901	16,902,421	50,597,566	23%	Olives, grapes, corn

Table 2. Irrigated area in hectares, total cultivated area, geographical area, irrigated area/cultivated area, and crops with the largest irrigated area by Autonomous Community.

2.2 THE EVOLUTION OF IRRIGATED AGRICULTURE IN SPAIN

According to the data from the Survey of Crop Areas and Yields in Spain (ESYRCE**), from 2004 to 2021, the "legal" irrigated area increased by at least 536,295 hectares (Graph 3)**, of which 14,884 hectares were used for greenhouses and 521,411 hectares for all other uses. **Currently, irrigated crops occupy 3,975,000 hectares. This means the expansion of irrigated land in Spain increased by 16% between 2004 and 2021.** Although, given the lack of information or control over illegal crops, the numbers could be much higher (WWF warns that in the regions of Daimiel, Doñana, Mar Menor and Arenales alone, more than 88,000 hectares are illegally irrigated).



Aumento regadío en España = Increase of irrigation in Spain

hectáreas = hectares

fuente: MAPAMA = Source: MAPAMA

*en las cifras cambiar las comas por puntos.

Graph 3. Irrigated area evolution in Spain in hectares since 2004.

New irrigated areas

On February 10, 2023, Royal Decree 35/2023 approved the hydrological plans for all districts until 2027. **Some plans are undoubtedly optimistic, with an increase in irrigated area. Some even increase the water allocated for exploitation:**

- EBRO: An estimated **63,176 ha of new irrigated land** for the entire Ebro basin. 38,433 ha in Aragón, to be completed before 2027; there is no data for the rest of the basin.
- DUERO: Authorities plan a total of **42,892 ha of new irrigated land** for this basin (23,930 ha for the 2027 scenario and 18,962 ha for the 2033 scenario).
- GUADIANA: No increase in irrigation demand is expected after 2027 (again, the fallacy of improving irrigation techniques to increase hectares but not demand). In other words, it foresees the creation of new irrigated areas. These must be established before 2027, **we haven't found data on the number of hectares, since they are represented as volume of water demand** in Hm3/year.
- SEGURA: The plan foresees irrigated land will **increase 824 ha** by 2039 and a 4.88% increase in water demand.
- TINTO, ODIEL and PIEDRAS: The Hydrological Plan estimates a total of 87,359.70 ha of irrigated land for the basin in 2033. 8.72% more than currently (in 2021 there were 81,026 irrigated hectares). This means 14.15 Hm3 more water consumption than in 2021 and **6,333.7 ha of new irrigated land.**

The current plans indicate legal irrigated agriculture will continue to increase until 2033 (2039 in the Segura district). This goes against the scientific recommendations for climate change and water availability.

ESTIMATE OF GROSS DEMAND IN 2027 AND SUBSEQUENT YEARS BY RIVER BASIN BASED ON THE THIRD CYCLE HYDROLOGICAL PLANS

	Gross demand	Gross demand	Gross demand	Gross demand	Absolute change in gross demand	Absolute change in gross demand	Absolute chang in gross demand
	present	2027	2033	2039	present-2027	present-2027	present-2033
	Hm3/yr.	Hm3/yr.	Hm3/yr.	Hm3/yr.	Hm3/yr.	%	%
JUCAR	2,422.66	2,301.00	2,301.00	2,301.00	-121.66	-5.02	-5.02
GUADIANA	1,720.55	1,889.68	1,889.68	1,889.68	169.13	9.83	9.83
DUERO	3,281.23	3,229.50	3,251.51		-51.73	-1.58	-0.91
SEGURA	1,487.10	1,559.70	1,559.70	1,559.70	72.60	4.88	4.88
TAGUS	1,992.55	1,923.48		1,931.54	-69.07	-3.47	
EBRO	8,141.33	8,120.11		8,050.59	-21.22	-0.26	

GUADALQUIVIR	3,207.37	3,068.88	3,068.88	3,068.88	-138.49	-4.32	-4.32
ANDALUSIAN MED BASINS	904.28	846.71		834.07	-57.57	-6.37	
GUADALETE-BARBATE	304.77	295.28	285.78		-9.50	-3.12	-6.23
TINTO-ODIEL-PIEDRAS	358.32	372.47	386.61		14.15	3.95	7.90
TOTAL Districts	23,820.16	23,606.80			-213.36	-0.90	-100.00

TABLE 3. Estimated gross demand at present and for 2027, 2033, and 2039 scenarios according to the revisions of the Basin Hydrologic Plans. Source: Prepared by the authors based on data from the Third Cycle Hydrological Plans (2022-2027).

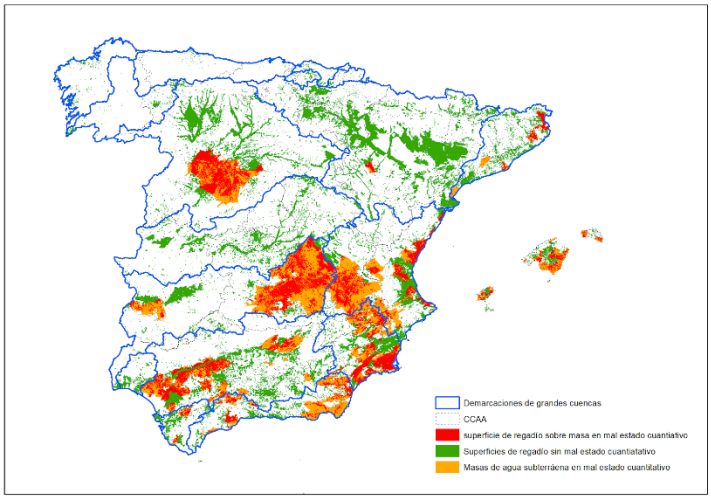
The data is hard to believe. **Three of the four major river basins districts of the Peninsula have plans to increase irrigated agriculture**, either by modernizing their techniques or by directly expanding their irrigated areas. These rivers are the Ebro, the Duero, and the Guadiana (Table 3).

3 WHERE SHOULD SPAIN START TO DECREASE/RATIONALIZE IRRIGATED AGRICULTURE

There are many areas in Spain where the pressure of agriculture and/or livestock farming is such that is impossible to justify maintaining irrigated agriculture. These are:

- Areas on aquifers with low water levels,
- Areas on aquifers with "poor chemical conditions",
- Areas with high nitrate levels,
- Areas where climate has already changed (Köppen classification).

3.1 IRRIGATED CROPS LOCATED ON AQUIFERS WITH LOW WATER LEVELS

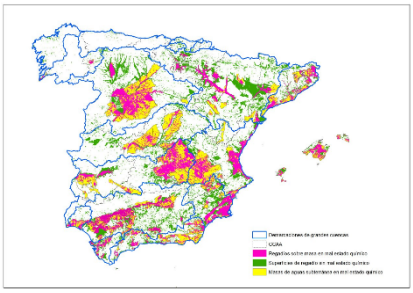


Demarcaciones de grandes cuencas = Major river basins districts CCAA = Autonomous Communities Superficie de regadío sobre masa en mal estado cuantitativo = Irrigated area on a body of water with low water levels Superficie de regadío sin mal estado cuantitativo = Irrigated area on a body of water that does not have low water levels Masas de agua subterránea en mal estado cuantitativo = Groundwater bodies with low water levels

Graph 1. Map of irrigated areas on groundwater bodies with low water levels

About 32.88% of the current irrigated crops are located in groundwater bodies with low water levels (Graph 4). Of particular concern are the inland basins of **Catalonia**, with **82.49%** of their irrigated crops located in groundwater bodies with low water levels, followed by the **Andalusia Mediterranean** basins with **69.38%**. Jucar, Segura, and the Balearic Islands exceed 50%. In terms of crops, the **vineyard** stands out with 58.20% and the **olive grove** with 58.20%. These crops, traditionally rainfed, are being irrigated to increase productivity. In addition, is noteworthy the correlation between crops with high water demand and aquifers with low water levels, such as citrus fruit, with 49.92% of the area, and non-citrus fruit trees, including the booming tropical crop sector, with 28.06% of the cultivated area on water bodies in poor condition.

3.2 IRRIGATED CROPS ON AQUIFERS WITH "POOR CHEMICAL CONDITIONS"



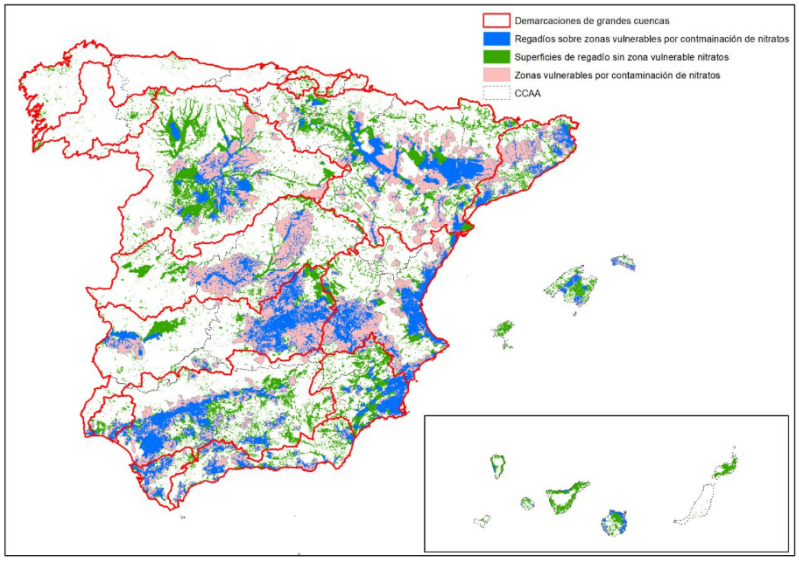
Demarcaciones de grandes cuencas = Major river basins districts
CCAA = Autonomous Communities
Superficie de regadío sobre masa en mal estado químico = Irrigated area on a body of water with poor chemical conditions
Superficie de regadío sin mal estado químico = Irrigated area on a body of water that does not have poor chemical conditions
Masas de agua subterránea en mal estado químico = Groundwater bodies with poor chemical conditions

Graph 5. Map of irrigated areas on groundwater bodies with poor chemical conditions

45.52%, almost half of the irrigated area, is located on aquifers with poor chemical conditions (Graph 5). Some of the reasons for these poor conditions are the agricultural industry itself and the use of pesticides or fertilizers. In terms of crops, **citrus crops** (72.04%), followed by **vineyards** (52.36%), are prominent in aquifers with poor chemical conditions. In terms of basins, the **Tinto, Odiel and Piedras** basin stands out with 83.00%. This means that four out of five hectares do not comply with quality standards. It is followed by the Balearic Islands (71.66%) and the Guadiana basin (66.19%), with two out of three hectares.

3.3 IRRIGATED CROPS LOCATED IN NITRATE VULNERABLE ZONES

In addition to the nitrate quality standards included in the previous section, regulation (Directive 91/676/EEC) specifically identifies nitrate-vulnerable zones where the use or discharge of nitrates may increase the pollution of aquifers and/or other surface waters.



Demarcaciones de grandes cuencas = Major river basins districts

Regadíos sobre zonas vulnerables por contaminación de nitratos = Irrigated crops vulnerable to nitrate pollution

Superficie de regadío sin zona vulnerable nitratos = Irrigated area with no nitrate vulnerable zones

Zonas vulnerables por contaminación de nitratos = Zones vulnerable to nitrate pollution

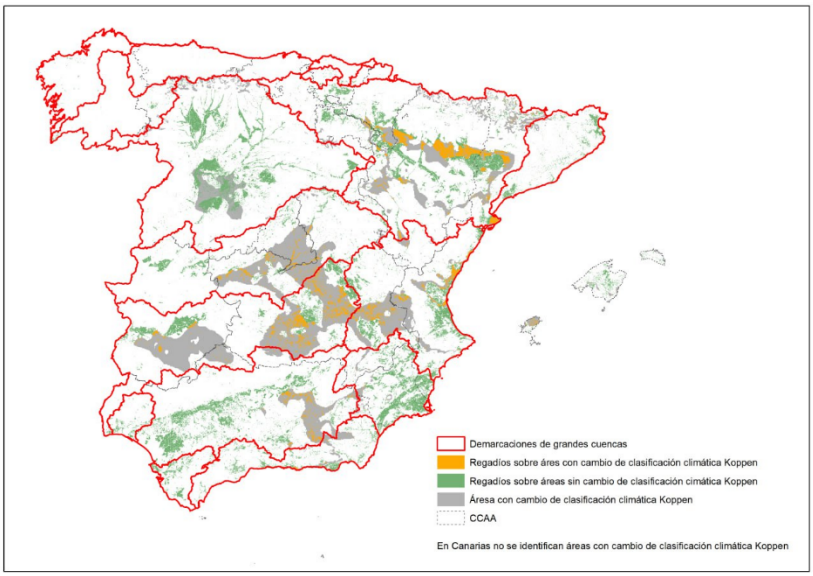
CCAA = Autonomous Communities

Graph 6. Map of irrigated crops located in nitrate vulnerable zones

56.69% of irrigated areas are located in nitrate vulnerable zones (Graph 6). In terms of crops, 83.84% of **citrus trees** are in these sensitive areas, and in terms of river basins, the **Jucar** basin is the one with the most irrigated land in nitrate vulnerable zones with 84.35%, followed by **Guadalete-Barbate** with 82.10% and the **inland basins of Catalonia** with 74.59%.

3.4 IRRIGATED CROPS IN AREAS WHERE CLIMATE HAS ALREADY CHANGED (KÖPPEN CLASSIFICATION).

This section analyzes the climate change observed in Spain during the last 70 years, according to the evaluation of the State Meteorological Agency of Spain, based on the Köppen-Geiger classification. It also identifies the irrigated areas in Spain that overlap with the areas where the climate has already changed. **The results show a progressive expansion of arid climates and a retreat of temperate and cold climates in Spain over the last 7 decades.** According to the Köppen system, **arid and semi-arid climates are more prone to drought. They may experience a decrease in the quantity and quality of water available for irrigation.** The map below (Graph 7) superimposes the irrigation area in Spain with the areas where the effects of climate change can be seen:



Demarcaciones de grandes cuencas = Major river basins districts

Regadíos sobre áreas con cambio de clasificación climática Köppen = Irrigated crops on areas with a Köppen climate classification change

Regadíos sobre áreas sin cambio de clasificación climática Köppen = Irrigated crops on areas with no Köppen climate classification change

CCAA = Autonomous Communities

En Canarias no se identifican áreas con cambio de clasificación Köppen = Canary Islands show no change in Köppen classification

Graph 7. EVOLUTION OF KÖPPEN CLIMATES IN SPAIN FROM 1951 TO 2020

15.83% of the irrigated land is in areas where the climate has changed and has become warmer in the last 70 years. The **Guadiana, Ebro, Tagus, and Jucar river basins have the highest percentages of irrigated land in areas where the climate has changed, with 29.92%, 27.74%, 27.49% and 21.72%, respectively**. In terms of crops, **vineyards** are most notably (41.38%), followed by **rice** (24.52%).

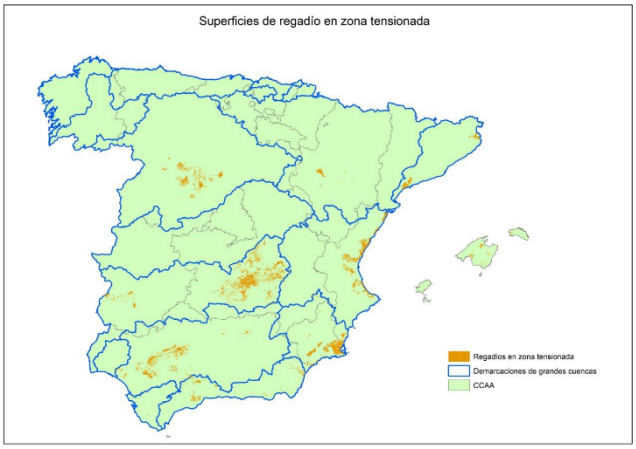
3.5 AREAS WHERE WATER REDUCTION IS A PRIORITY

3.5.1 STRESSED AREAS

Irrigated areas that meet three criteria: on aquifers with low water levels + aquifers in poor condition + areas vulnerable to nitrates.

Some 16.23% of the irrigated land in Spain is located in stressed areas (areas with a high water demand and little water supply) (Figure 8). By basin, **the Guadiana is the most affected with 38.06%, Segura (27.44%), Balearic (26.88%), Jucar (25.78%), Andalusian Mediterranean (25.44%), inland Catalonia (24.91%)**

and Guadalquivir (19.34%). By Autonomous Community**, Castile-La Mancha is the worst** with 36.10% of its irrigated land in stressed areas, followed **by the Region of Valencia** with 32.88% and the **Region of Murcia** with 31.21%. **In these communities, about a third of the irrigated land is in stressed areas**. These areas meet the criteria that confirms their aquifers are in terrible condition, industrial agriculture has a greater impact, and water reduction is a priority. They are followed by the Balearic Islands (26.88%) and Andalusia (17.75%), where one in four and five hectares, respectively, are chronically unsustainable.



Superficie de regadío en zona tensionada = Irrigated land in stressed areas
Regadíos en zona tensionada = Irrigated crops is stressed areas
Demarcaciones de grandes cuencas = Major river basins districts
CCAA = Autonomous Communities

Graph 8. Irrigated crops in stressed areas

3.5.2. CRITICAL AREAS

Irrigated areas that meet four criteria: over aquifers with low water levels + aquifers in poor condition + areas vulnerable to nitrates + areas where climate has changed because of climate change.

3.67% of irrigated crops in Spain are located in critical areas (Graph 9). These are the first irrigated areas to be eliminated, according to Greenpeace's analysis.

The Guadiana Basin has been particularly affected by climate change in recent decades. Therefore, the **Guadiana basin leads by far** this classification. 22.62% of its irrigated land meets the four criteria. The Jucar (6.59%) and Duero (4.26%) basins follow, but not closely.

Regarding Autonomous Communities, **Castile-La Mancha is particularly noteworthy, with 21.27% of irrigated crops in critical areas, one in five irrigated hectares.** the Region of Valencia, with 7.59% of irrigated land in such an extreme situation, Castilla y Leon, 4.10%, and Extremadura, 3.78%, follow, but not closely.

Critical areas are concentrated mainly **inland** because these areas are **more prone to change due to global warming**, and their climatic classification has changed accordingly. Conversely, **more arid areas have not changed their classification**, as

in the case of the Region of Murcia. Therefore, to **establish historical trends**, it is useful to **include the climate change criterion**. Nonetheless, **reducing, or rationalizing irrigation must be a priority for all stressed areas.**

Superficie de regadío en zona crítica = Irrigated land in critical areas

Regadíos en zona crítica = Irrigated crops in critical area

Demarcaciones de grandes cuencas = Major river basins districts

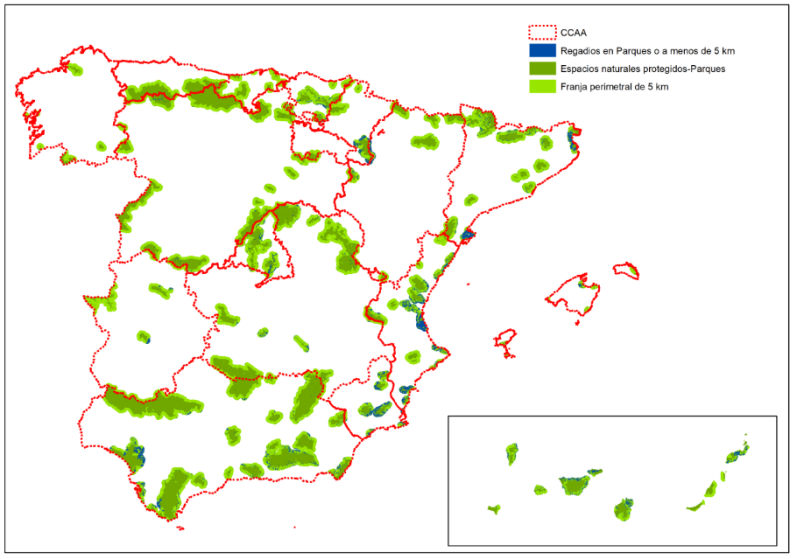
CCAA = Autonomous Communities

Graph 9. Irrigated land in critical areas

BOX: IRRIGATED CROPS IN PROTECTED AREAS

1.6% of irrigated land is in natural or national parks, the most valuable nature conservation areas. The **percentage of irrigated land in natural or national parks increases to 13.8% if a buffer zone of 5 km is included**. **In other words, 1 in 7 irrigated hectares is in areas of high ecological interest** (Graph 10).

All these vulnerable areas should be in better condition, but some are particularly worrying. The **Mar Menor**, the **Tablas de Daimiel**, and **Doñana** are under extreme pressure from agriculture. This is extremely serious because of their enormous value for biodiversity.



CCAA = Autonomous Communities
Regadíos en Parques o a menos de 5 km = Irrigated lands in parks or within 5 km
Espacios naturales protegidos - parques = Protected natural areas - parks
Franja perimetral de 5 km = 5 km perimeter strip

Graph 10. Map of irrigated areas and vulnerable areas of the most important protected natural spaces. Source: Own elaboration based on the SISOE 2017 and the official mapping of protected areas. (MITECORD and Autonomous Communities).

4 SOCIAL IMPACTS OF THE IRRIGATED AGRICULTURE BUBBLE

When Spain joined the European Union and the CAP policy, agriculture and livestock went from being based on guaranteed prices to a subsidy system to support farmers. These **incentives, which have been and continue to be distributed according to the physical size of farms**, have led to a huge reduction in the number of farms (53.8% compared to 1982), no expansion of arable land used (1% growth), a sharp increase in livestock (52.7%) and a huge reduction in the volume of work generated (52.3% compared to 1982), according to the 2009 Census of Agriculture. The 2020 agricultural census confirms this trend. **Small family-owned farms are disappearing**

and being replaced by larger farms with a more business-like approach, and with significant social, economic, landscape and environmental consequences.

In addition, export subsidies have artificially lowered prices and flooded the world market without considering the impact on small producers in importing countries. Since farm size varies widely across the EU, the distribution of payments is very uneven. In the EU, **80% of these payments will go to just 20% of farms**. This shows **how subsidies tend to concentrate in a few hands.**

The primary sector (agriculture, livestock, forestry, and fishing) accounted for 2.7% of Spain's GDP in 2021, reaching 32,875 million euros. This has been an upward trend since 2012, even during periods of drought. In 2021, Spain was the fourth largest exporter of agri-food and fishery products in the EU27, with 60,118 million€. This figure is well above the 35.9 that Spain exported in 2012.

The distribution of profits threatens the survival of family and professional agriculture. **We see an increasing number of commercial and investment companies that are not family-run**, that seek to maximize economic benefits, have no roots in the areas, and care little about their farm's social or environmental impact.

Other risks include **rising production costs, low profitability compared to large farms, lack of generational replacement, and the continuing masculinization of the countryside.**

As arable land is increasingly concentrated in larger farms, **the number of paid workers has grown exponentially**, reaching 37%, according to the 2020 agricultural census. This workforce includes day laborers, whether permanent or not, and seasonal workers, **a high percentage of whom are migrants** who have been and continue to be **victims of labor and social rights violations.**

The **rural environment** is not and cannot be a thing of the past because our present and future depend on it. It **is our food source and can protect us from the worst impacts of climate change and biodiversity loss**.

5 WHO IS ACCOUNTABLE

The **intensive agri-food industry** and the **authorities** are responsible for the current situation. The agri-food industry has plundered and polluted Spain's water, while the authorities have stood by and even encouraged this plunder. Spain has become a hub of agricultural production that only increases the wealth of large corporations, **investment funds** have set their eyes in Spain, depleting its natural resources.

- **The river basin authorities,** especially the Hydrographic Confederations, continue to grant new exploitation rights and allow formulas for the expansion of irrigable areas, which will lead to more water scarcity.
- **The Common Agricultural Policy (CAP)** has consolidated the concentration of capital in large corporations and hence, the expansion of irrigated industrial agriculture.
- **Large corporations and investment funds** seek only the maximum profits.
- **The authorities**, especially the Ministry of Agriculture, Fisheries and Food, promote false solutions linked to new technologies (irrigation modernization) and favor investment trends that do not intend to limit access to water.

Since Spain has so much water…

… it can export it:

Spain leads the fruit and vegetable trade worldwide. According to the Harmonized Commodity Description and Coding System, in 2021, Spain was the sixth largest exporter in the world and the second largest in Europe, after the Netherlands. However, **if we limit the ranking to fruits and vegetables, Spain is the world's leading exporter, responsible for 9.4% of world exports** (20,844 million dollars). The main destinations are Germany (27.5%), France (17.7%), and the United Kingdom (12.6%). **This model exports water from a country at risk of desertification to humid countries in the form of fruits and vegetables. When food is exported, so is the water** used to produce it.

… or waste it:

The United Nations estimates that one-third of all the food produced in the world (more than one billion tons) is lost or wasted from the field to the table. **Spanish households waste more than 1 million tons of food per year**, about 28 kilograms per person. A study by the Pontifical University of Comillas estimates that **the water used to produce the wasted food** is 2,095 hm3 for the whole of Spain, **equivalent to 131 liters of water lost per person per day** (translated as water footprint). This only includes food left over after meals, expired food, and food that spoils before it is consumed; it does not include food that is discarded before it gets to the consumer's table.

According to the Ministry of Agriculture, for 2021-2022, part of the harvest was discarded before it reached the market because of agricultural surpluses and low market prices due to product saturation. **The Spanish government estimates that 64 million kilos of edible fruits and vegetables were not marketed.** Other sources, such as the 2020 Report on Food Waste in Spanish Households, estimate that 45% of fruit and vegetable production is wasted. This means that annually Spain grows and harvests 7.9 million tons of fruits and vegetables that are directly discarded.

6 CONCLUSIONS

- **SPAIN URGENTLY NEEDS TO REDUCE IRRIGATED AGRICULTURE. The areas with aquifers in poor condition and where climate change is altering the climate must be abandoned first and, within these areas, those that are illegal. The authorities must perform a socio-economic analysis of the farms in collaboration with those involved in the sector.**

  16.2% of the current irrigated area (516,803 hectares) is in stressed zones (aquifers with low water levels and poor chemical conditions, and zones at risk of nitrate contamination). The most stressed agricultural areas are concentrated mainly in Castile-La Mancha, the Region of Valencian, and

the Region of Murcia (in these three communities, about a third of the irrigated land is in stressed areas), followed by the Balearic Islands and Andalusia. In terms of basins, the Guadiana ranks first, followed by the Segura, Balearic, Jucar, and Andalusian Mediterranean basins.

Of the 16.2%, 3.7% are already in critical areas (116,708 hectares). These areas meet the 3 criteria described above plus climate has already been modified (especially the Guadiana basin, followed by Jucar and Duero). Regarding Autonomous Communities, Castile-La Mancha has one in five irrigated hectares in critical areas, followed by the Region of Valencia, Castilla y Leon, and Extremadura.

- Spain's water is **scarce, polluted, and poorly managed.**
- Spain is the second most water-stressed European country, and 75% of its territory is at risk of desertification. Climate change will bring less rain and more heat (more evapotranspiration); therefore, **Spain will have less and less water available.** This year (2023), with reservoirs at 48% in May, clearly indicates this.
- **Nearly 80% of Spain's water is used for irrigation.** In 2020-21, total water consumption was 28,400 hm3, of which 22,012.49 hm3 was used in the agricultural sector, mostly for irrigation.
- Irrigated agriculture continues to grow. Even though Spain has less and less water, irrigated crops are only increasing. **From 2004 to 2021, "legal" irrigated crops increased by at least 536,295 hectares, that's a 16% in land extension**. This represents 8% of the country's territory (40,000 km2, almost the size of Switzerland or the Netherlands).
- We mention only "legal" irrigated agriculture because **there is such a lack of water control (illegal wells and irrigation, etc.) that the real numbers would be much more worrying.**
- **Modernizing irrigation does not save water,** but rather increases consumption.
- **Irrigated agriculture is falling into the hands of investment funds** and large agribusinesses, wiping out traditional agriculture and creating significant social and environmental problems.
- **44% of the aquifers in Spain are in poor condition.** They are the future water reserves and we need to take special care of them given the future scenario.
- Some **13.8% of irrigated lands are in protected natural areas and in areas** of great ecological interest.
- Despite water scarcity problems, **Spain is increasingly exporting and wasting water through fruits and vegetables.**

7 OUR DEMANDS

7.1- Roadmap for matching irrigated agriculture to water availability to ensure water supply for the population, ecological flows, and other priority uses.

7.2. A just hydrological transition in which resources are distributed equitably and with sufficient quantity and quality. Drastic measures are needed to achieve this and to avoid future conflicts and confrontations between territories and activities.

7.3. A socially just and environmentally resilient CAP

7.4. Measures to be taken by the public administration (State or Autonomous Communities)

- Prohibit new intensive and industrial irrigated agriculture, especially in stressed areas.
- Eliminate subsidies for irrigation conversion in stressed areas.
- Establish a binding executive plan for the hydrological transition. This plan should include a reduction of irrigated agriculture in the aforementioned areas.
- Conduct a public registry of irrigated hectares using remote sensing systems at the municipal, county, and provincial levels to have the best available information on new irrigated land.
- Explain to the population the risks of expanding irrigated agriculture in a climate change scenario and why irrigated agriculture must be reduced.
- Assess the purchase of large irrigated farms, analyzing the impact on biodiversity, protected areas, and aquifers near human populations.
- Raise public awareness when large companies or investment funds acquire large irrigated areas or intend to convert land to irrigated land, and communicate this to neighboring communities.
- Promote organic agriculture.

7.5. Action to be taken by large and medium enterprises

- Halt investments to expand intensive and industrial irrigated agriculture in climate change scenarios with potential impacts on biodiversity, protected areas, and aquifers near human population centers.
- Companies and investment funds must have detailed information on the risks of further expanding intensive and industrial irrigated agriculture and why it should be restricted in Southern Europe in a climate change scenario.
- Large companies and investment funds must provide detailed public information when they purchase large tracts of irrigated land or land to be converted to irrigated land. They must also inform society and neighboring communities about the impact on a scarce resource such as water.