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*Supplement of*

## **The predictability of reported drought events and impacts in the Ebro Basin using six different remote sensing data sets**

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Loc\_level codes:

- 1 Spain
- 2 Autonomous Community
- 3 Province
- 4 Comarca (local administrative division)
- 5 City/village
- 11 Ebro basin
- 12 Subabsin
- 13 Junta (management unit)
- 14 Comunidad de regantes (irrigation district)
- 15 River

\* records for areas within the Ebro basin but outside the selected study area for test 1 are in grey

data_reported	sector	type	data_start	data_end	data_ongoing	location	loc_level	source	description	notes
04/09/2001	agriculture	production reduction				Sep-01 Cariñena	4	periodico de aragon	30% reduction (55M kg less)	
27/03/2002	agriculture	water curtailments	Mar-02			Jul-02 Bardenas	14	periodico de aragon	insufficient water available at the start of the irrigation session	
11/04/2002	agriculture	production loss				Apr-02 Aragon	2	periodico de aragon	rainfed winter cereal (loss of 20%)	
26/04/2002	politic	acknowledgment	Apr-02			Ebro basin	11	periodico de aragon	acknowledgement of the impact by the MAGRAMA, Aragón, Navarra and La Rioja	
25/07/2002	environment	water quality	Jul-02	Jul-02		Zaragoza	5	periodico de aragon	flow below the minimum (30m3/s) to warranty water quality	
17/09/2002	agriculture	production loss				Matarraña, Bajo Aragón, Campo de Belchite	4	periodico de aragon	olive oil (loss of 40-70%)	
17/09/2002	agriculture	production loss				Medio y Bajo Cinca y La Litera	4	periodico de aragon	olive oil (loss of 40-70%)	
24/02/2005	livestock	lack of pastures				Feb-05 Aragon	2	periodico de aragon	after 5 months without rain, increased costs for farmers	
01/03/2005	agriculture	production loss	Oct-04			Mar-05 Zaragoza	3	periodico de aragon	production loss in vegetables, price increase	mentioned again on 06 Mar
03/03/2005	politic	mitigation measures	Mar-05			Aragon	2	periodico de aragon	DGA increases up to 50% the set-aside of land (rainfed and irrigated)	
03/03/2005	agriculture	production loss				Mar-05 Aragon	2	periodico de aragon	21% of cereal crops affected	
06/03/2005	livestock	lack of pasture, economic loss				Mar-05 Aragon	2	periodico de aragon	sheep	mentioned again 22 Mar
06/03/2005	agriculture	production loss				Mar-05 Aragon	2	periodico de aragon	herbaceous crops (600.000 has affected)	
16/03/2005	agriculture	water stress	Mar-05			Aragon	2	periodico de aragon	rainfed winter cereal (90% affected)	mentioned again 22 Mar
16/03/2005	agriculture	water curtailments	Mar-05			Riegos del Alto Aragon	14	periodico de aragon	irrigation quota reduced from 8000 to 2750 m3	mentioned again on 20 Mar, 19.07
17/03/2005	fire	increase in forest fires	Jan-05			Mar-05 Aragon	2	periodico de aragon	and anticipation of the fire mitigation campaign	mentioned again on 05 Apr
22/03/2005	urban water	risk declared (huesca)	Mar-05			Huesca	5	periodico de aragon	declaration of risk and preparation of an emergency plan	
22/03/2005	livestock	increased costs	Mar-05			Aragon	2	periodico de aragon	sheep and goats, additional food and water (lack of pastures and water ponds)	
22/03/2005	livestock	increased mortality	Mar-05			Aragon	2	periodico de aragon	lams	
22/03/2005	livestock	increased costs	Mar-05			Aragon	2	periodico de aragon	breeding cattle, additional food and water (lack of pastures and meadows)	mentioned again on 21 Apr
24/03/2005	politic	communication to UE	Mar-05	Mar-05		Spain	1	periodico de aragon	The Ministry communicates the drought situation to the UE	
01/04/2005	agriculture	water curtailments	Apr-05			Bardenas	14	periodico de aragon	Decision to cut water to the irrigation channel for two weeks	mentioned again on 12 Mar
15/04/2005	agriculture	insufficient water	Apr-05			Bardenas, Alto Aragon, Aragon y Cataluña	14	periodico de aragon	insufficient water for the irrigation campaign	
21/04/2005	drinking water	no supply	Apr-05			Apr-05 Yebrá de Basa (Huesca)	5	periodico de aragon	several months without supply	
21/04/2005	drinking water	no supply	Apr-05			Lascuarre, Orós (Huesca)	5	periodico de aragon	water tank trucks required	
26/04/2005	energy	production loss	Jan-05			Apr-05 Aragon	2	periodico de aragon	25% reduction for the period Jan-Mar	
28/04/2005	environment	increased mortality				Apr-05 Chimillas (Huesca)	5	periodico de aragon	fish and crabs in a reservoir	
30/04/2005	politic	situation classified as extreme	Oct-04			Apr-05 Aragon	2	periodico de aragon	INM describes the situation for the past 7 months as extreme drought	
30/04/2005	politic	mitigation measures	Apr-05			Aragon	2	periodico de aragon	DGA increases up to 75% the set-aside of land (irrigated)	
30/04/2005	politic	mitigation measures	Apr-05			Aragon	2	periodico de aragon	DGA allows herding	
04/05/2005	drinking water	no supply	May-05			Ribagorza	4	periodico de aragon	15 villages without normal supply from wells and springs, water tank trucks required	
04/05/2005	agriculture	crops lost	May-05	May-05		Los Monegros	4	periodico de aragon	rainfed winter cereal crops completely lost	
08/05/2005	livestock	increased costs				May-05 Aragon	2	periodico de aragon	increase in hay price	
08/05/2005	agriculture	water curtailments				May-05 Aragon	2	periodico de aragon	all irrigated systems	
14/05/2005	drinking water	no supply				May-05 Huesca	3	periodico de aragon	21 villages without normal supply from wells and springs, water tank trucks required	
14/05/2005	urban water	mitigation measures				May-05 Huesca	5	periodico de aragon	prohibition of filling swimming pools and watering gardens	mentioned again on 19.05, 02.06
14/05/2005	urban water	mitigation measures				May-05 Aragon	2	periodico de aragon	water saving campaigns	
14/05/2005	fire	increase in forest fires				May-05 Aragon	2	periodico de aragon	forest fires tripled for the period Jan-Apr	
15/05/2005	politic	farmer demonstration	May-05	May-05		Alto Aragon	14	periodico de aragon	asking for more reservoirs	
31/05/2005	politic	economic loss	May-05			May-05 Aragon	2	periodico de aragon	local government estimates the losses in agriculture and livestock farming in 173 M	
07/06/2005	agriculture	crops lost		Jun-05		Alto Jalon	14	periodico de aragon	rainfed cereal crops completely lost	
07/06/2005	agriculture	insufficient water				Jun-05 Alto Jalon	14	periodico de aragon	jalon river in Torrehermosa is almost dry, the irrigation campaign is not possible	
19/06/2005	recreation	insufficient water				Jun-05 Cinca	15	periodico de aragon	drought and aggregates extraction make rafting impossible for the first time	
22/06/2005	politic	mitigation measures	Jun-05			Spain	1	periodico de aragon	royal decree with aid measures published	
19/07/2005	agriculture	water curtailments				Jul-05 Bardenas	14	periodico de aragon		
19/07/2005	agriculture	water curtailments				Jul-05 Canal Urgel	14	periodico de aragon		
20/07/2005	agriculture	no water for irrigation	Jul-05			Alto Aragon	14	periodico de aragon		
26/07/2005	agriculture	economic loss				Jul-05 Aragon	2	periodico de aragon	irrigated crops (corn, rice, fodder and sunflower) accumulate losses of 136 MA	
02/08/2005	agriculture	production loss				Aug-05 Teruel	3	periodico de aragon	reduction in cereal production. Cultivated surface was also less	
03/08/2005	agriculture	production loss	Ago 05			Aragon	2	periodico de aragon	60% of cereal production lost (departamento aragonés de agricultura)	
06/08/2005	agriculture	yield reduction				Aug-05 Bardenas	14	periodico de aragon	insufficient water for irrigation of corn crops (expected yield reduction of 50%),	
11/08/2005	agriculture	yield reduction				Aug-05 Bardenas	14	periodico de aragon	surface already reduced 1/3	
14/08/2005	water quality	low flows				Aug-05 Aragon	2	periodico de aragon	alfalfa, less cuts (normally 6)	
19/08/2005	agriculture	irrigation water finished				Aug-05 Monegros	14	periodico de aragon	flow below security minimum (Aragon at Jaca, Isábena at Capella, Jalon at Grisen,	
24/08/2005	agriculture	production loss				Alto Aragon	14	periodico de aragon	Gállego at Zaragoza and Bubal)	
24/08/2005	agriculture	death of woody crops				Aug-05 Grio y Percepiles (Zaragoza)	5	periodico de aragon	objectives not reached	
25/08/2005	agriculture	water restrictions	Aug-05			Guatizalema y Gallego	15	periodico de aragon	80% of cereal crops lost	
26/08/2005	agriculture	yield reduction				Aug-05 Alto Aragon y Canal de Aragon y Cataluña	14	periodico de aragon	cherry trees dying because of lack of water	
08/09/2005	energy	production loss				Sep-05 Aragon	2	periodico de aragon	first restrictions to traditional irrigation (from river water)	
13/09/2005	agriculture	yield reduction				Sep-05 Campo de Borja	14	periodico de aragon	52% reduction of corn crops productivity (compared to 2004)	
17/09/2005	water quality	mitigation measures				Sep-05 Gallego	15	periodico de aragon	40% reduction during the period Jan-Aug (compared to 2004)	
04/10/2005	agriculture	yield reduction				Oct-05 Calatayud	14	periodico de aragon	25% yield reduction in grapes production, but ver good quality	
									CHE announces mitigation measures to prevent water quality problems	
									due to the ongoing industrial discharges and the low river flow	
									20% reduction in wine production (with respect to 2004) [several factors]	

					Aragon at Jaca, Jalon at Grisen, Isabena at Capella,				
09/10/2005	water quality	low flows			Oct-05 Gallego at Zaragoza, Noguera Ribagorzana at Pont Suert	15	periodico de aragon	flows below the security minimum	
11/10/2005	agriculture	suspension of winter irrigation	Oct-05	Feb-06	Gallego and Cinca	15	periodico de aragon	water reserved for urban supply	
11/10/2005	energy	suspension of flows for hydroelect	Oct-05		Gallego and Cinca	15	periodico de aragon	water reserved for urban supply	
11/10/2005	fish farms	production reduction	Oct-05		Gallego (Biescas) and Cinca (El Grado)	15	periodico de aragon	reduction agreed to reserve water for urban supply	
02/12/2005	agriculture	income reduction	Jan-05	Dec-05	Spain	1	periodico de aragon	income per work unit in agriculture decreased 8.2% in 2005	
13/12/2005	agriculture	yield reduction			Dec-05 Bajo Aragón	14	periodico de aragon	yield reduction in olive production	
23/12/2005	agriculture	yield reduction	Jan-05	Dec-05	Aragon	2	periodico de aragon	yield reduction of 60% in winter cereal	
23/12/2005	agriculture	production reduction	Jan-05	Dec-05	Aragon	2	periodico de aragon	corn had a reduction of cultivated surface of 26,000 has	
23/12/2005	agriculture	production reduction	Jan-05	Dec-05	Aragon	2	periodico de aragon	alfalfa, production reduction of 500,000 tons	
28/12/2005	agriculture	income reduction	Jan-05	Dec-05	Aragon	2	periodico de aragon	income reduction of 14% (with respect to 2004)	
12/02/2006	environment	population reduction			Feb-06 Aragon	2	periodico de aragon	partridge population reduction due to drought and lack of food	
18/02/2006	environment	low flows			Feb-06 Gallego y Martin	2	periodico de aragon	flow below minimum to warrant ecosystem functioning	
18/02/2006	energy	production reduction	Dec-05	Feb-06	Cinca-Esera	15	periodico de aragon	production reduced in 59%	
18/02/2006	energy	production reduction	Dec-05	Feb-06	Aragon-Gallego	15	periodico de aragon	production reduced in 30%	
18/02/2006	energy	production reduction	Dec-05	Feb-06	Aragon	2	periodico de aragon	production reduced in 27.6%	
04/03/2006	fire	increase in forest fires	Jan-05	Dec-05	Zaragoza	3	periodico de aragon	forest fires increased in 65% during 2005, increased in burned has	
04/03/2006	drinking water	increased number of populations w	Jan-05	Dec-05	Zaragoza	3	periodico de aragon	demand of water supply by the fire water tank trunks increased in 65% (44 population)	
16/03/2006	agriculture	economic loss	Jan-05	Dec-05	Riegos del Alto Aragon	14	periodico de aragon	agriculture had 50 M losses because of drought	
								processing and distributing companies (agricultural sector)	
								had 15M losses because of drought	
								reduction in volume of transactions, employment reduced by 15%, prices don't cover	
16/03/2006	primary	business reduction			Mar-06 Aragon	2	periodico de aragon	production losses, agriculture productivity reduced by 39%	
02/04/2006	agriculture	water curtailments			Mar-06 Riegos del Alto Aragon	14	periodico de aragon	water curtailments still ongoing	mentioned again on 8/04
06/04/2006	agriculture	income reduction	Jan-05	Dec-05	Aragon	2	periodico de aragon	reduction in agricultural cooperative's income (600 M, 100M less than 2004)	
08/04/2006	agriculture	water curtailments			Apr-06 Canal de Aragon y Cataluña	14	periodico de aragon		mentioned again on 07 June
08/04/2006	agriculture	water curtailments			Apr-06 Jalon	15	periodico de aragon		
30/05/2006	agriculture	damage			May-06 Aragon	2	periodico de aragon	winter cereal losses estimated in 30-50% by Asaja	
30/05/2006	livestock	lack of pasture, economic loss			May-06 Aragon	2	periodico de aragon	lack of pastures for sheep	
07/06/2006	environment	low flows	Jun-06	Jun-06	Ebro	15	periodico de aragon	Ebro at Zaragoza below environmental flow for some days	
07/06/2006	environment	low flows	Jun-06	Jun-06	Jalon at Grisen, Matarraña at Nonaspe, Jiloca at Morata	15	periodico de aragon	flow below environmental/security flow	mentioned again on 10/07
07/06/2006	environment	low flows	Jun-06	Jun-06	Gallego at Bubal and Zaragoza	15	periodico de aragon	flow below environmental/security flow	mentioned again on 10/07
10/06/2006	energy	production reduction			Jun-06 Jalon	15	periodico de aragon	four plants at Jalon river closed for four days due to lack of water	
10/06/2006	energy	production reduction			Jun-06 left bank	6	periodico de aragon	current production 75% less than a normal year	
10/06/2006	energy	production reduction			Jun-06 esera	15	periodico de aragon	production 32% less than a normal year	
10/06/2006	energy	production reduction			Jun-06 cinca	15	periodico de aragon	production 30% less than a normal year	
10/06/2006	energy	production reduction			Jun-06 Gallego and Jalon	15	periodico de aragon	production 85% less than a normal year	
10/06/2006	agriculture	impossibility of harvesting			Jun-06 Aragon	2	periodico de aragon	impossibility of harvesting winter cereal in certain areas	
14/06/2006	agriculture	water curtailments			Jun-06 Canal de Aragon y Cataluña	14	periodico de aragon	insufficient water to complete the irrigation campaign	mentioned again on 28/06, 11/07, 29/07
24/06/2006	environment	increase in CO2 emissions	Jan-05	Dec-05	Aragon	2	periodico de aragon	need to substitute hydroelectricity with other sources	
24/06/2006	energy	reduction in production	Jan-05	Dec-05	Aragon	2	periodico de aragon	production reduced by 49% compared to average year	
								water restrictions in almost 120 villages and	
24/06/2006	drinking water	restrictions	Jan-05	Dec-05	Pyrenees	6	periodico de aragon	supply with water tank trucks to half of them	
29/06/2006	environment	low flows			Jun-06 Ebro	15	periodico de aragon	flow at river mouth below environmental flow	
29/06/2006	environment	low flows			Jun-06 Matarraña at Nonaspe, Piedra at Carena	15	periodico de aragon	flow below environmental limit	
11/07/2006	agriculture	economic losses			Jul-06 Aragon	2	periodico de aragon	2000 family farms close to bankruptcy	
11/07/2006	agriculture	water curtailments			Jul-06 Alto Aragon	14	periodico de aragon	water quotas reduced by 50%	
11/07/2006	agriculture	crop change			Jul-06 Riegos del Alto Aragon	14	periodico de aragon	40% of the surface of fodder, corn and rice crops substituted by winter cereal	
11/07/2006	agriculture	crop change			Jul-06 Bardenas	14	periodico de aragon	vegetable crops substituted by winter cereal	
11/07/2006	agriculture	income reduction			Jul-06 Bardenas	14	periodico de aragon	no new machinery bought and no expenses in maintenance unless unavoidable	
12/07/2006	livestock	increase of costs			Jul-06 Farlete	5	periodico de aragon	no pastures and no water (needs to be carried 15-20km by shepherds)	
13/07/2006	energy	increase of costs	Oct-04	Oct-05	Aragon	2	periodico de aragon	substitution of energy source (to thermal) produced an increase in cost of 206 M	
09/08/2006	agriculture	surface reduction			Ago 06 Aragon	2	periodico de aragon	some districts were not able to cultivate more than 20% of the surface	
15/08/2006	agriculture	yield reduction			Ago 06 Aragon	2	periodico de aragon	reduction of 6% in grape production	
19/08/2006	agriculture	production reduction			Ago 06 Aragon	2	periodico de aragon	reduction of 36% in rainfed winter cereal production (with respect to 6 year mean)	
19/08/2006	agriculture	crop change			Ago 06 Aragon	2	periodico de aragon	2500 has of rice crops less than 2004	
11/09/2006	energy	production reduction			Sep-06 Aragon	2	periodico de aragon	current production of hydroelectricity is less than a third of potential production	
31/10/2006	environment	low flows	Oct-06		Piedra at Carenas, Martin at Hajar, Matarraña at Nonaspe	15	periodico de aragon	river flow below the security minimum	mentioned again on 06/12, 19/12
31/10/2006	environment	low flows	Oct-06		Huerva at Mezalocha, Pena at Valderrobes	15	periodico de aragon	river flow below the security minimum	
31/10/2006	agriculture	production reduction			Oct-06 Teruel	3	periodico de aragon	reduction in olives production	
16/01/2007	urban water	mitigation measures	Jan-07		Ebro headwaters	6	periodico de aragon	low flow at Ebro headwaters, Zaragoza urban supply depends on it	
18/02/2007	social	migration	Jan-05		Jan-07 Monegrillo	15	periodico de aragon	population reduction due to impossibility of harvesting and sheep farms crisis (517 to 495)	
14/05/2007	agriculture	production reduction	Apr-06	Apr-07	Aragon	2	periodico de aragon	reduction in olive oil production of 16% for 2006-2007 campaign (compared to five year mean)	
24/06/2007	agriculture	crop change	Nov-06		Jun-07 Aragon	2	periodico de aragon	farmers plant cereal in irrigated areas instead of corn or fodder for the third year (decision in autumn)	
24/06/2007	agriculture	crop change	Oct-06		Jun-07 Riegos del Alto Aragon	14	periodico de aragon	half of the surface dedicated to cereal instead of more productive crops (normally is one third)	
24/06/2007	agriculture	crop change	Oct-06		Jun-07 Bardenas	14	periodico de aragon	30,000 has of cereal and 11,000 (14%) left fallow	
09/07/2007	agriculture	economic loss	Oct-04	Dec-06	Riegos del Alto Aragon	14	periodico de aragon	drought during 05-06 campaigns produced losses of 90M	
21/07/2007	environment	dry springs	Jul-07		Ordesa	6	periodico de aragon	(report of the irrigation district)	
06/08/2007	drinking water	supply interruption			Aug-07 Fornoles (Teruel)	5	periodico de aragon	acquirers still recovering from past drought	
								supply by water tank trucks required	
07/08/2007	drinking water	supply interruption			Aug-07 Alto Gallego (Ibor, Orna del Gallego)	5	periodico de aragon	supply by water tank trucks required	
30/10/2007	environment	low flows	Oct-07		Aragon at Jaca, Isabena at Capella, Piedra at Carenas,	15	periodico de aragon	flows below the security minimum	
13/11/2007	agriculture	reduced discharge	Nov-07		Martin at Hajar, Matarraña at Nonaspe, Huerva at Zaragoza	15	periodico de aragon	Reservoir withdrawal comissions decide to reduce discharge	
13/11/2007	agriculture	water stress			Cinca and Gallego	2	periodico de aragon	young trees under water stress because of lack of water (dry soil up to 1 m depth)	
					Nov-07 Aragon	2	periodico de aragon	not enough soil moisture to plant cereal (required for seed germination)	
13/11/2007	agriculture	dry soil			Nov-07 Aragon	2	periodico de aragon	in most parts of the region	
14/11/2007	environment	low flows	Nov-07	Nov-07	Mequinenza-Ribarroja reservoirs	5	periodico de aragon	flows below the security minimum for the past weeks	

14/11/2007	energy	reduction in production			Nov-07	Mediano, El Grado, Bubal, Lanuza reservoirs	15	periodico de aragon	insufficient water in reservoir	
20/11/2007	agriculture	low production	Oct-07		Nov-07	Zaragoza area	5	periodico de aragon	low vegetable production because of drought during the past five weeks (water from the channel is interrupted because of maintenance works)	
01/12/2007	agriculture	water curtailments	Dec-07			Ebro basin	11	periodico de aragon	CHE implementes water saving measures that affect the agriculture	
05/12/2007	agriculture	yield reduction			Dec-07	Aragon	2	periodico de aragon	olives are too small to be sold as table olives (only 5% can be destined to this use)	
05/12/2007	agriculture	tree damage			Dec-07	Aragon	2	periodico de aragon	19,000 has of almond trees affected, 30% of mortality, 95M in losses	
05/12/2007	agriculture	lack of pasture, economic loss			Dec-07	Aragon	2	periodico de aragon	300,000 euro of daily losses in sheep farming because of lack of pastures	
09/12/2007	agriculture	production reduction			Dec-07	Teruel	3	periodico de aragon	truffles: less production (wild and cultivated), only Gudar and Javalambre had good production due to rains in August	
18/12/2007	agriculture	production reduction			Dec-07	Campo de Belchite	4	periodico de aragon	20% reduction in olive oil production due to drought and winter frost (compared to 2006)	
24/12/2007	social	rogations	Dec-07	Dec-07		Altoaragon	14	periodico de aragon	to ask for rain	
10/01/2008	agriculture	economic loss	Jan-05	Dec-05		Ebro basin	11	periodico de aragon	income loss in the agricultural sector of 405 M (source Perez y Perez 2009)	
10/01/2008	energy	economic loss	Jan-05	Dec-05		Ebro basin	11	periodico de aragon	income loss in hydroelectricity production of 72 M (source Perez y Perez 2009)	
10/01/2008	agriculture	economic loss	Jan-05	Dec-05		Ebro basin	11	periodico de aragon	income loss in agrofood chain of 271 M (source Perez y Perez 2009)	
10/01/2008	employment	employment reduction	Jan-05	Dec-05		Ebro basin	11	periodico de aragon	employment reduced in 11,275 jobs	
28/01/2008	energy	production reduction	Jan-07	Dec-07		Aragon	2	periodico de aragon	less than 2200Gw were produce (average year is 2700Gw)	
28/01/2008	energy	production reduction	Jan-07	Dec-07		Jalon	12	periodico de aragon	69,8 Gw were produced (57% of average production)	
28/01/2008	energy	production reduction	Jan-07	Dec-07		Aragon-Gallego	12	periodico de aragon	449,5 M kw (72% of average production)	
28/01/2008	energy	production reduction	Jan-07	Dec-07		Noguera-Ribagorzana	12	periodico de aragon	162,6 M kw (74% of average production)	
05/02/2008	environment	low flows			Feb-08	Aragon river	15	periodico de aragon	flow 2/3 of the required for ecosystem health	
05/02/2008	environment	low flows			Feb-08	Esera	15	periodico de aragon	flow 1/3 of the environmental flow	
10/02/2008	employment	employment reduction	Jan-06	Dec-06		Ebro basin	11	periodico de aragon	5500 people less working in agriculture in the area at the end of this period	
10/02/2008	employment	employment reduction	Jan-07	Dec-07		Ebro basin	11	periodico de aragon	7700 people less working in agriculture in the area at the end of this period	
10/02/2008	agriculture	economic loss	Jan-05	Dec-05		La Hoya, Somontano, Los Monegros	4	periodico de aragon	income reduction of 50M (source: report by Riegos del Alto Aragon)	
10/02/2008	agriculture	indus economic loss	Jan-05	Dec-05		La Hoya, Somontano, Los Monegros	4	periodico de aragon	economic activity reduction of 30%, income reduction of 15M (source: report by Riegos del Alto Aragon)	
10/02/2008	agriculture	indus economic loss	Jan-06	Dec-06		La Hoya, Somontano, Los Monegros	4	periodico de aragon	income reduction of 10M (source: report by Riegos del Alto Aragon)	
10/02/2008	agriculture	indus economic loss	Jan-06	Dec-06		La Hoya, Somontano, Los Monegros	4	periodico de aragon	activity remains low	
10/02/2008	agriculture	crop change			Feb-08	Riegos del Alto Aragon	14	periodico de aragon	farmers decide to plant barley in irrigated areas due to low water availability	
10/02/2008	agriculture	crop delay			Feb-08	Riegos del Alto Aragon	14	periodico de aragon	broccoli crops have two months delay in growth because they could only receive irrigation once (in Nov)	
10/02/2008	environment	tree mortality			Feb-08	Teruel and pre-pyrenees	3	periodico de aragon	tree deaths because of dryness	
11/02/2008	energy	production reduction		Jul-08	Feb-08	Ebro basin	11	periodico de aragon	agreed reduction in turbine discharge, production is at 40%	improvement mentioned 18.08
						Bilesa (Cinca-Cinqueta), Aratores and Castiello (Aragon), San Mateo (Gallego), El Grado I (Cinca), Huermeda, La Morca				
12/02/2008	energy	production reduction			Feb-08	and La Morana (Jalon), Rivera (Martin), Castielfabib	15	periodico de aragon	production stopped in 10 hydroelectrical plants due to lack of water	
12/02/2008	water managemens	saving measures		Feb-08		Aragon	2	periodico de aragon	flows reduced in the main rivers to save water for the summer low flows	
12/02/2008	livestock	unrest			Feb-08	Aragon	2	periodico de aragon	farmers claim for mitigation measures to the crisis in their sector caused by drought and high cereal prices	
13/02/2008	environment	low flows	Feb-08		Feb-08	Aragon and Gallego	15	periodico de aragon	flows will be reduced by 500/s below the security minimum each month to save water	
15/02/2008	politic	mitigation measures	Feb-08		Feb-08	Ebro basin	11	periodico de aragon	Government decree with drought mitigation measures approved	
16/02/2008	drinking water	supply by water tank truck			Feb-08	Towns in the pyrenees	5	periodico de aragon	supply aquifers dry since the summer	
20/2/2008	drinking water	supply problems			Feb-08	183 towns	5	periodico de aragon	especially in the left bank	
20/02/2008	agriculture	unrest			Feb-08	Valdealgrofa	5	periodico de aragon	more than 200 demonstrated claiming for government assistance	
01/03/2008	fire	increase in the number of fires			Mar-08	Aragon	2	periodico de aragon	because of drought and high temperatures. 112 forest fires	
07/03/2008	agriculture	economic loss	Jan-07	Dec-07		Bajo Aragon Historico, Caspe y Belchite	4	periodico de aragon	in Jan-Feb (10 year average 51) and 116 non-forest fires	
11/03/2008	agriculture	water curtailments	Mar-08			Riegos del Alto Aragon	14	periodico de aragon	losses of 21M during the past campaign, especially in olive and almond trees	
18/03/2008	environment	tree mortality			Mar-08	Valtorres (Zaragoza)	5	periodico de aragon	irrigation season start with the lowest quota in 60 years (2400m3/ha)	
20/03/2008	agriculture	loss of profit	Jan-07	Dec-07		Riegos del Alto Aragon	14	periodico de aragon	DGA removes pine trees killed by the lack of precipitations	mentioned again on 07.04
21/03/2008	water quality	diminution of water quality			Mar-08	Aragon	2	periodico de aragon	324 M of profit loss for not being able to plant corn last season	
27/03/2008	environment	low flows			Mar-08	Esera at Eriste, Isábena at Capella, Gallego at Bubal	15	periodico de aragon	because of lower flows	
01/04/2008	environment	low flows			Apr-08	Esera, Gallego at Bubal, Soton at Ortila	15	periodico de aragon	flow significantly below the security minimum	
04/04/2008	drinking water	water tank trucks required			Apr-08	Aragon	2	periodico de aragon	flows below the security minimum	
06/04/2008	drinking water	dry wells			Apr-08	Blesa (Teruel)	5	periodico de aragon	water tank trucks start to distribute water to some towns	
06/04/2008	livestock	dry ponds			Apr-08	Farlete and Monegrillo	5	periodico de aragon	supply by water tank trucks required	mentioned again on 8.05
08/04/2008	environment	CO2 emissions	Jan-07	Dec-07		Spain?	1	periodico de aragon	farmers need to carry water for the sheep, 5000 sheep sold	
10/04/2008	livestock	crisis			Apr-08	Aragon	2	periodico de aragon	emissions from the energy and industrial sectors increased by 3% (compared to 2006)	
13/04/2008	politic	political tension			Apr-08	Spain	2	periodico de aragon	sheep farming in crisis due to the increase of the cereal prices and drought (lack of pastures)	mentioned again on 11.04
30/04/2008	agriculture	water curtailments			Apr-08	Canal Aragon y Cataluña	14	periodico de aragon	other regions claim water transfers from the ebro	
04/05/2008	agriculture	crop yield reduction			May-08	Bajo Aragon	15	periodico de aragon	cereal crops affected by drought (mentioned in interview, affected during the winter?)	
04/05/2008	wildlife	population reduction	Jan-07	Dec-07		Ordesa	4	periodico de aragon	reduction in population of frogs in the national park in the ravines fed by acquifers (not recovered from previous drought)	
15/08/2008	agriculture	yield reduction			Aug-08	Cinco Villas (and Bajo Ebro and Caspe)	5	periodico de aragon	reduction in cereal production (12.5% less in Aragon compared to 2007)	mentioned again 30.09 (mainly in valle del Ebro, Bajo Cinca and Caspe)
12/08/2009	agriculture	yield reduction		Aug-09		Aragon	2	periodico de aragon	yield reduced because of drought, frost and hail	
09/02/2011	agriculture	sprout problems			Feb-11	Riegos del Alto Aragon	14	periodico de aragon	problems in sprouting of winter cereal because of drought	mentioned again several times
						Aragón (in particular La Litera, Cinca Medio, Monegros and Bajo Cinca, Alto Aragón. In Zaragoza the most affected are Ribera Baja de Ebro, Bajo Aragón-Caspe, Comarca Zaragoza,				
07/03/2011	agriculture	damage			Mar-11	Ribera Alta del Ebro, Campo de Borja, Cinco Villas...)	4	periodico de aragon	damge to 60% of herbaceous crops surface	
09/03/2011	agriculture	damage			Mar-11	Aragon	2	periodico de aragon	woody crops	
09/03/2011	livestock	lack of pasture, increase of expenses			Mar-11	Aragon	2	periodico de aragon		mentioned again on 9.10
15/07/2011	water quality	low flows			Jul-11	Matarraña at Nonaspe, Arba de Luesia dry at Biota.	15	periodico de aragon	flows significantly below the minimum to warranty water quality	
02/08/2011	livestock	lack of pasture, increase of expenses			Aug-11	Pyrenees	6	periodico de aragon	farmers need to buy food for the animals	
02/08/2011	agriculture	water curtailments	Jul-11		Aug-11	Bardenas	14	periodico de aragon		mentioned again 25.08
03/08/2011	agriculture	water stress			Aug-11	Bardenas	14	periodico de aragon	affects mainly corn, alfalfa, rice, vegetables and sunflower. Most of the crops require irrigation until september	

05/08/2011	water quality	low flows	Jul-11		Aug-11	Ebro at Zaragoza	15	periodico de aragon	flow below the security minimum (tree times in two weeks)	
10/08/2011	energy	reduction in production			Aug-11	Aragon	2	periodico de aragon	due to low flows.	mentioned again on 23.08
15/08/2011	agriculture	water curtailments	Jul-11	Aug-11		Alto Aragon	14	periodico de aragon	less water to alfalfa to favour corn and rice (29.09),	mentioned again on 25.08
15/08/2011	agriculture	water curtailments			Aug-11	Canal de Aragon y Cataluña	14	periodico de aragon	50% fodder irrigated only at intervals of 16 days (01.10)	mentioned again on 25.08
23/08/2011	recreation	rafting not possible			Aug-11	gallego	14	periodico de aragon	because of low flows	
24/08/2011	water supply	to villages			Aug-11	3 Villages in Teruel	5	periodico de aragon	supply with water tank trucks to villages with external supply (well),	
15/09/2011	environment	forest mortality			Sep-11	Soto Cantalobos (Zaragoza)	5	periodico de aragon	summer increase of population	mentioned again on 28.09
09/10/2011	agriculture	production reduction			Oct-11	Caspe (Zaragoza)	5	periodico de aragon	cereal production half of a normal year, irrigated 20% lower, almonds 80% lower	
09/10/2011	agriculture	lack of soil moisture			Oct-11	Aragon	2	periodico de aragon	impedes the use of machinery to prepare the fields for the new crops	mentioned again on 25.10
09/10/2011	water supply	to villages	Oct-11		Oct-11	villages in the Pyrenees (eg Roda de Isabena)	5	periodico de aragon	because of dry aquifers, villages require supply by water tank trucks	mentioned again on 19.10
09/10/2011	water restriction:	to water garden, fill swimming pools etc			Oct-11	Ainsa (Huesca)	5	periodico de aragon	to save water for nearby villages	
11/10/2011	forest fires	restrictions			Oct-11	Aragon	2	periodico de aragon	period of restrictions extended	mentioned again on 18.10
						Aragon (especially Cinco Villas district (Zaragoza); Jiloca (Teruel); Bajo Cinca, Jacetania, La Hoya and Ribagorza (Huesca))			problems of supply in villages that depend on aquifers, wells, springs.	
19/10/2011	water supply	to villages			Oct-11	Aragon	4	periodico de aragon	Water tank trucks required	
04/03/2012	water supply	to villages	Aug-11	Nov-11		Jiloca	15	periodico de aragon	water tank trucks required	
20/10/2011	hunting	reduction in numer and weakness of animals			Oct-11	Aragon	2	periodico de aragon	partidge bird chiks mortality because of lack of water, risk of over hunting	
20/10/2011	environment	alteration			Oct-11	Aragon	2	periodico de aragon	because of weakness of animals	mentioned again on 5.11
20/10/2011	agriculture	losses in rainfed agriculture	Oct-10	Oct-11		Aragon	2	periodico de aragon	migratory birds delay, no mushrooms, flower blossoming out of season	
20/10/2011	agriculture	losses in irrigated agriculture	Oct-10	Oct-11		Aragon	2	periodico de aragon	90M euros	
20/10/2011	agriculture	losses in livestock production	Oct-10	Oct-11		Aragon	2	periodico de aragon	62M euros (because of the reduction in the surface of corn and rice crops)	
21/10/2011	society	rogations	Oct-11			Epila	5	periodico de aragon	18M euros (ovine), 1.5M euros (bovine), 1.5 (apiculture)	mentioned again on 25.10
23/10/2011	wildlife	fishes rescued	Oct-11			Huerva	14	periodico de aragon	to ask for rain	
									not enough water for the fishes, risk of death because of lack of oxigen.	
28/10/2011	environment	reduced flow	Oct-11		Dec-11	Cinca, Gallego and Ebro from Mequinzena	14	periodico de aragon	Technicians intervene to save local species	
29/10/2011	livestock	increased costs			Oct-11	Aragon	2	periodico de aragon	reservoir withdrawal commission decides to reduce the environmental flow,	again on 30.12
29/10/2011	agriculture	damage			Oct-11	Aragon	2	periodico de aragon	new reduction for Gallego and Cinca on (30.12)	mentioned again on 23.02, 04.03
04/01/2012	agriculture	sprout problems			Jan-12	Riegos del Alto Aragon	14	periodico de aragon	because of lack of pastures, lack of rain since July	ongoing on 12.03.12, again on 27.03
22/12/2011	agriculture	crop change	Dec-11			Riegos del Alto Aragon	14	periodico de aragon	olive trees and nut trees, lack of rain since July	mentioned again on 08.01, 10.02
12/01/2012	agriculture	crop change	Jan-11			Riegos del Alto Aragon	14	periodico de aragon	a week of irrigation aproved	mentioned again on 22.03.12
									recommendation of planting winter cereal to save water	
08/02/2012	water supply	reduced quality	Jun-11	Aug-12		Zaragoza	5	periodico de aragon	spring crops (rice and wheat) replaced with wheat to save water (25% increase)	
17/02/2012	fire	increased risk	Mar-12			Aragon	2	periodico de aragon	supply from Yesa interrupted due to lack of water. Substituted by other sources of	mentioned before, finished 07.08
21/02/2012	fire	fires	Feb-12			Zaragoza (province) and Cinco Villas	4	periodico de aragon	less quality	
21/02/2012	social	rogations	Feb-12			Zaragoza	5	periodico de aragon	period of restrictions brought 1 month forward	
26/02/2012	agriculture	irrigation campaign delayed	Feb-12			Canal de Aragon y Cataluña	14	periodico de aragon	fires because of dryness	
27/02/2012	agriculture	damage			Feb-12	Huesca	3	periodico de aragon	to ask for rain	
28/02/2012	agriculture	low quota	Mar-12			Riegos del Alto Aragon	14	periodico de aragon	used to be the 1st of March, decision to delay it	
04/03/2012	agriculture	damage			Mar-12	Teruel	3	periodico de aragon	40-50% of rainfed cereal crops affected (23.05 40-50% of winter cereal lost)	
04/03/2012	water supply	to villages			Mar-12	La Puebla de Valverde (Teruel)	5	periodico de aragon	start of the irrigation compaign with the lowest quotas in 40 years	
04/03/2012	water supply	to villages			Mar-12	La Portellada (Teruel)	5	periodico de aragon	almond trees losing the flowers, small olives and grapes	
04/03/2012	agriculture	water curtailments	Oct-11			Lower Ebro (from Mequinzena)	15	periodico de aragon	dry spring, water tank trucks required	
05/03/2012	agriculture	water curtailments	Mar-12			Canal de Aragon	14	periodico de aragon	pluted aquifer, water tank trucks required	
10/03/2012	fire	fire	Mar-12			Cantanea (Pyrenees)	6	periodico de aragon	water curtailments to irrigation	
11/03/2012	agriculture	truffle recolection problems			Mar-12	Huesca	3	periodico de aragon	irrigation campaign started with quotas half at 50% (compared to normal year)	
13/03/2012	fire	fires	Jan-12	Feb-12		Aragon	2	periodico de aragon	fire in winter, extreme dryness favours fast expansion of the fire	
13/03/2012	agriculture	damage			Mar-12	Aragon	2	periodico de aragon	problems in the sector, truffels require moisture to reproduce (little rain since Dec)	again on 22.03
13/03/2012	fire	fire risk	Mar-12			Aragon	2	periodico de aragon	172 fires	
16/03/2012	livestock	increased costs			Mar-12	Huesca	2	periodico de aragon	especially on wheat, broad beans and coliflower	
18/03/2012	agriculture	economic losses			Mar-12	Aragon	2	periodico de aragon	maxim alert level will be activated 3 months in advance (mid March)	
18/03/2012	apiculture	flowering reduced			Mar-12	Aragon	2	periodico de aragon	lack of pastures	
									irreversible damage, losses of 355M in cereal and fodder	again on 21.03
									shorter flowering period, loss of flowers, less nectar	
21/03/2012	economy	economic losses			Mar-12	Spain	1	periodico de aragon	1500M estimated losses in the primary sector (mainly in winter cereal and extensive	again on 21.03
21/03/2012	agriculture	water curtailments			Mar-12	Riegos del Alto Aragon	14	periodico de aragon	livestock farming)	ongoing on 31.03, 02.04, 28.04
25/03/2012	agriculture	damage			Mar-12	Epila	5	periodico de aragon	drought affected rainfed crops such as vine, olive trees and almond trees since 2011	
									last year 12.000 temporal workers were employed to harvest cherries, this year only	
12/04/2012	economy	jobs reduction	Apr-12			Caspe (Zaragoza) (among other cases)	5	periodico de aragon	3000 are required	
18/04/2012	fire	fires	Jan-12	Mar-12		Aragon	2	periodico de aragon	280 fires, aprox 2700 has burned (mainly in Ribagorza , 19.04)	
19/04/2012	agriculture	yield reduction	Mar-11	Sep-11		Aragon	2	periodico de aragon	17.2% yield reduction in vine, reduction in olive oil production	
26/04/2012	livestock	increase of costs			Apr-12	Spain	1	periodico de aragon	increased demand of hay because of lack of fodder and pastures	
28/04/2012	agriculture	crop losses			Apr-12	Riegos del Alto Aragon	14	periodico de aragon	first harvest of corn crops lost	
03/05/2012	social	rogations	Mar-12	Mar-12		Lecera	5	periodico de aragon	to ask for rain	
06/05/2012	environment	wetland birds			May-12	Villarquemado wetland	5	periodico de aragon	birds at risk during nidification period	
25/05/2012	agriculture	crops loss			May-12	Robres (Monegros)	5	periodico de aragon	winter cereal production completely lost	
14/06/2012	agriculture	yield reduction			Jun-12	Aragon	2	periodico de aragon	rice production 39% less than 2011	
31/07/2012	environment	increase of macrophytes			Jul-12	Ebro basin	11	periodico de aragon	because of lack of high flows that clean the rivers	
03/08/2012	water supply	water tank trucks required			Aug-12	Teruel	3	periodico de aragon	supply required in 7 towns (13.08, 10 towns)	
20/08/2012	water supply	water tank trucks required			Aug-12	Aragon	2	periodico de aragon	around 30 towns	
27/08/2012	agriculture	yield reduction	Aug-12			Somontano, Campo de Borja y Calatayud	4	periodico de aragon	reduction around 15-20%	
									because of drought trees break easily during a strong wind episode, creating chaos in	
11/09/2012	environment	fragile trees			Sep-12	Zaragoza	5	periodico de aragon	Zaragoza city	
									official figures: 254M (89M in irrigated agriculture and 165M in rainfed agriculture),	
17/09/2012	agriculture	economic loss	Oct-11	Sep-12		Aragon	2	periodico de aragon	corrected to 277M (12.10)	
									30% of land left fallow (70M lost),	
23/09/2012	agriculture	production reduction	Oct-11	Sep-12		Riegos del Alto Aragon	14	periodico de aragon	reduction affects mainly rice and (long cycle) corn crops	
23/09/2012	agriculture	production reduction	Oct-11	Sep-12		Riegos del Alto Aragon	14	periodico de aragon	first cuts of alfalfa very weak (due to lack of rain during the spring)	
28/09/2012	livestock	demostration	Sep-12	Sep-12		Aragon	2	periodico de aragon	to claim for changes in the PAC, fair prices and measures against drought	
									110M losses in rainfed cereal and fodder, 1M tons cereals less than 2011,	
12/10/2012	agriculture	economic losses	Oct-11	Oct-12		Aragon	2	periodico de aragon	252M losses in rainfed and irrigated cereal	

12/10/2012 agriculture	economic losses	Oct-11	Oct-12	Hoya Huesca	4 periodico de aragon	48.4M losses in irrigated and rain fed cereal
12/10/2012 agriculture	economic losses	Oct-11	Oct-12	Cinco Villas	4 periodico de aragon	33.7M losses in irrigated and rain fed cereal
12/10/2012 agriculture	economic losses	Oct-11	Oct-12	Monegros	4 periodico de aragon	24.5M losses in irrigated and rain fed cereal
12/10/2012 agriculture	economic losses	Oct-11	Oct-12	Aragon	2 periodico de aragon	10M losses in ovine and caprine, 6M in breeding cows
13/10/2012 agriculture	yield reduction	Oct-11	Oct-12	Teruel	3 periodico de aragon	low production of saffron because of drought and high temperatures
15/10/2012 environment/hur	season start deleyed			Oct-12 Borja	4 periodico de aragon	start of the season delayed as some species had problems to breed
15/10/2012 agriculture	yield reduction	Oct-11	Oct-12	Aragon	2 periodico de aragon	because of drought
28/10/2012 turism	delayed mushrooms season	Oct-11	Oct-12	Pyrenees	6 periodico de aragon	18% reduction in vine and 45% in olives
						affects the turism. Solved with mid autumn rains
						winter cereal (wheat and barley) 350,000 tons less,
						corn 2ton/ha less (13% reduction), lower quality in fruit,
20/12/2012 agriculture	production reduction	Oct-11	Oct-12	Huesca	3 periodico de aragon	reduced production of nuts in drought areas, 16% reduction in vine production