

MODEL 4: ADDS 2 WATER SHORTAGE SHARING METHODS TO MODEL 3

- OPTIMIZES FARM INCOME FOR FULL AND REDUCED WATER SUPPLY
- FOR UPSTREAM PRIORITY AND PROPORTIONAL SHARING OF SHORTAGES

4 MODELS TOTAL

4.1: FULL (100% OF 2006) SUPPLY
UPSTREAM PRIORITY FOR SHARING SHORTAGES

L O O P S r us_priority
 s normal

S O L V E S U M M A R Y

MODEL	TE_04	OBJECTIVE	Tot_b_v
TYPE	NLP	DIRECTION	MAXIMIZE
SOLVER	CONOPT	FROM LINE	266

**** SOLVER STATUS 1 Normal Completion
**** MODEL STATUS 1 Optimal
**** OBJECTIVE VALUE 8183.1390

RESOURCE USAGE, LIMIT	0.016	1000.000
ITERATION COUNT, LIMIT	5	2000000000
EVALUATION ERRORS	0	0

---- VAR hectares_v land in production by rule-province-crop-scen (1000 Ha - marginal is \$US per Ha)

	LOWER	LEVEL	UPPER	MARGINAL
us_priority.1-Mousil.1-wheat .normal	.	47.4000	47.4000	112.7500
us_priority.1-Mousil.2-cotton.normal	.	0.4500	0.4500	815.9200
us_priority.2-Basra .1-wheat .normal	.	16.9000	16.9000	146.2500
us_priority.2-Basra .2-cotton.normal	.	.	.	1146.5000

---- VAR T_hectares_v total land in prodn by rule-province-scen (1000 Ha - marginal is \$US per Ha)

	LOWER	LEVEL	UPPER	MARGINAL
us_priority.1-Mousil.normal	.	47.8500	+INF	.
us_priority.2-Basra .normal	.	16.9000	+INF	.

---- VAR uses_crop_v total water use by rule-province-crop-scen (million m^3 - marginal \$US per 1000 m^3)

	LOWER	LEVEL	UPPER	MARGINAL
us_priority.1-Mousil.1-wheat .normal	.	564.0600	+INF	.
us_priority.1-Mousil.2-cotton.normal	.	8.1000	+INF	.
us_priority.2-Basra .1-wheat .normal	.	228.1500	+INF	.
us_priority.2-Basra .2-cotton.normal	.	.	+INF	.

---- VAR uses_v total water use by rule-province-scen (million m^3 - marginal is \$US per 1000 m^3)

	LOWER	LEVEL	UPPER	MARGINAL
us_priority.1-Mousil.normal	.	572.1600	572.1600	.
us_priority.2-Basra .normal	.	228.1500	228.1500	.

---- VAR ag_ben_k_v total farm income by rule-province-crop-scen (\$US 1000s - no marginals shown)

	LOWER	LEVEL	UPPER	MARGINAL
us_priority.1-Mousil.1-wheat .normal	-INF	5344.3500	+INF	.
us_priority.1-Mousil.2-cotton.normal	-INF	367.1640	+INF	.
us_priority.2-Basra .1-wheat .normal	-INF	2471.6250	+INF	.
us_priority.2-Basra .2-cotton.normal	-INF	.	+INF	.

---- VAR ag_ben_v total farm income by rule-scen (\$US 1000s - no marginals shown)

	LOWER	LEVEL	UPPER	MARGINAL
us_priority.normal	-INF	8183.1390	+INF	.

	LOWER	LEVEL	UPPER	MARGINAL
---- VAR Tot_b_v	-INF	8183.1390	+INF	.

Tot_b_v total farm income re-calc for each rule-scen (objective) (\$US 1000s - no marginals shown)

4.2: REDUCED (50% OF 2006) SUPPLY UPSTREAM PRIORITY FOR SHARING SHORTAGES

L O O P S r us_priority
 s dry

S O L V E S U M M A R Y

MODEL	TE_04	OBJECTIVE	Tot_b_v
TYPE	NLP	DIRECTION	MAXIMIZE
SOLVER	CONOPT	FROM LINE	266

**** SOLVER STATUS 1 Normal Completion
**** MODEL STATUS 1 Optimal
**** OBJECTIVE VALUE 4081.8028

RESOURCE USAGE, LIMIT	0.000	1000.000
ITERATION COUNT, LIMIT	5	2000000000
EVALUATION ERRORS	0	0

---- VAR hectares_v land in production by rule-province-crop-scen (1000 Ha - marginal is \$US per Ha)

	LOWER	LEVEL	UPPER	MARGINAL
us_priority.1-Mousil.1-wheat .dry	.	32.9458	47.4000	.
us_priority.1-Mousil.2-cotton.dry	.	0.4500	0.4500	645.3738
us_priority.2-Basra .1-wheat .dry	.	.	16.9000	.
us_priority.2-Basra .2-cotton.dry	.	.	.	914.6667

---- VAR T_hectares_v total land in prodn by rule-province-scen (1000 Ha - marginal is \$US per Ha)

	LOWER	LEVEL	UPPER	MARGINAL
us_priority.1-Mousil.dry	.	33.3958	+INF	.
us_priority.2-Basra .dry	.	.	+INF	.

---- VAR uses_crop_v total water use by rule-province-crop-scen (million m^3 - marginal is \$US per 1000 m^3)

	LOWER	LEVEL	UPPER	MARGINAL
us_priority.1-Mousil.1-wheat .dry	.	392.0550	+INF	.
us_priority.1-Mousil.2-cotton.dry	.	8.1000	+INF	.
us_priority.2-Basra .1-wheat .dry	.	.	+INF	.
us_priority.2-Basra .2-cotton.dry	.	.	+INF	.

---- VAR uses_v total water use by rule-province-scen (million m^3 - marginal is \$US per 1000 m^3)

	LOWER	LEVEL	UPPER	MARGINAL
us_priority.1-Mousil.dry	.	400.1550	400.1550	9.4748
us_priority.2-Basra .dry	.	EPS	EPS	10.8333

---- VAR ag_ben_k_v total farm income by rule-province-crop-scen (\$US 1000s - no marginals shown)

	LOWER	LEVEL	UPPER	MARGINAL
us_priority.1-Mousil.1-wheat .dry	-INF	3714.6388	+INF	.
us_priority.1-Mousil.2-cotton.dry	-INF	367.1640	+INF	.
us_priority.2-Basra .1-wheat .dry	-INF	.	+INF	.
us_priority.2-Basra .2-cotton.dry	-INF	.	+INF	.

---- VAR ag_ben_v total farm income by rule-scen (\$US 1000s - no marginals shown)

	LOWER	LEVEL	UPPER	MARGINAL
us_priority.dry	-INF	4081.8028	+INF	.

	LOWER	LEVEL	UPPER	MARGINAL
---- VAR Tot_b_v	-INF	4081.8028	+INF	.

Tot_b_v total farm income re-calc for each rule-scen (objective) (\$US 1000s - no marginals shown)

4.3: RETURN TO FULL (100% OF 2006) SUPPLY PROPORTIONAL SHARING OF SHORTAGES

L O O P S r prop_sharing
 s normal

S O L V E S U M M A R Y

MODEL	TE_04	OBJECTIVE	Tot_b_v
TYPE	NLP	DIRECTION	MAXIMIZE
SOLVER	CONOPT	FROM LINE	266

**** SOLVER STATUS 1 Normal Completion
**** MODEL STATUS 1 Optimal
**** OBJECTIVE VALUE 8183.1390

RESOURCE USAGE, LIMIT	0.016	1000.000
ITERATION COUNT, LIMIT	5	2000000000
EVALUATION ERRORS	0	0

---- VAR hectares_v land in production by rule-province-crop-scen (1000 Ha - marginal is \$US per Ha)

	LOWER	LEVEL	UPPER	MARGINAL
prop_sharing.1-Mousil.1-wheat .normal	.	47.4000	47.4000	112.7500
prop_sharing.1-Mousil.2-cotton.normal	.	0.4500	0.4500	815.9200
prop_sharing.2-Basra .1-wheat .normal	.	16.9000	16.9000	146.2500
prop_sharing.2-Basra .2-cotton.normal	.	.	.	1146.5000

---- VAR T_hectares_v total land in prodn by rule-province-scen (1000 Ha - marginal is \$US per Ha)

	LOWER	LEVEL	UPPER	MARGINAL
prop_sharing.1-Mousil.normal	.	47.8500	+INF	.
prop_sharing.2-Basra .normal	.	16.9000	+INF	.

---- VAR uses_crop_v total water use by rule-province-crop-scen (million m³ - marginal is \$US per 1000 m³)

	LOWER	LEVEL	UPPER	MARGINAL
prop_sharing.1-Mousil.1-wheat .normal	.	564.0600	+INF	.
prop_sharing.1-Mousil.2-cotton.normal	.	8.1000	+INF	.
prop_sharing.2-Basra .1-wheat .normal	.	228.1500	+INF	.
prop_sharing.2-Basra .2-cotton.normal	.	.	+INF	.

---- VAR uses_v total water use by rule-province-scen (million m³ - marginal is \$US per 1000 m³)

	LOWER	LEVEL	UPPER	MARGINAL
prop_sharing.1-Mousil.normal	.	572.1600	572.1600	.
prop_sharing.2-Basra .normal	.	228.1500	228.1500	.

---- VAR ag_ben_k_v total farm income by rule-province-crop-scen (\$US 1000s - no marginals shown)

	LOWER	LEVEL	UPPER	MARGINAL
prop_sharing.1-Mousil.1-wheat .normal	-INF	5344.3500	+INF	.
prop_sharing.1-Mousil.2-cotton.normal	-INF	367.1640	+INF	.
prop_sharing.2-Basra .1-wheat .normal	-INF	2471.6250	+INF	.
prop_sharing.2-Basra .2-cotton.normal	-INF	.	+INF	.

---- VAR ag_ben_v total farm income by rule-scen (\$US 1000s - no marginals shown)

	LOWER	LEVEL	UPPER	MARGINAL
prop_sharing.normal	-INF	8183.1390	+INF	.

	LOWER	LEVEL	UPPER	MARGINAL
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---- VAR Tot_b_v -INF 8183.1390 +INF .

Tot_b_v total farm income re-calc for each rule-scen (objective) (\$US 1000s - no marginals shown)

4.4: REDUCED (50% OF 2006) SUPPLY AND PROPORTIONAL SHARING OF SHORTAGES

L O O P S r prop_sharing
 s dry

S O L V E S U M M A R Y

MODEL	TE_04	OBJECTIVE	Tot_b_v
TYPE	NLP	DIRECTION	MAXIMIZE
SOLVER	CONOPT	FROM LINE	266

**** SOLVER STATUS 1 Normal Completion
**** MODEL STATUS 1 Optimal
**** OBJECTIVE VALUE 4236.7786

RESOURCE USAGE, LIMIT	0.016	1000.000
ITERATION COUNT, LIMIT	5	2000000000
EVALUATION ERRORS	0	0

---- VAR hectares_v land in production by rule-province-crop-scen (1000 Ha - marginal is \$US per Ha)

	LOWER	LEVEL	UPPER	MARGINAL
prop_sharing.1-Mousil.1-wheat .dry	.	23.3597	47.4000	.
prop_sharing.1-Mousil.2-cotton.dry	.	0.4500	0.4500	645.3738
prop_sharing.2-Basra .1-wheat .dry	.	8.4500	16.9000	.
prop_sharing.2-Basra .2-cotton.dry	.	.	.	914.6667

---- VAR T_hectares_v total land in prodn by rule-province-scen (1000 Ha - marginal is \$US per Ha)

	LOWER	LEVEL	UPPER	MARGINAL
prop_sharing.1-Mousil.dry	.	23.8097	+INF	.
prop_sharing.2-Basra .dry	.	8.4500	+INF	.

---- VAR uses_crop_v total water use by rule-province-crop-scen (million m^3 - marginal is \$US per 1000 m^3)

	LOWER	LEVEL	UPPER	MARGINAL
prop_sharing.1-Mousil.1-wheat .dry	.	277.9800	+INF	.
prop_sharing.1-Mousil.2-cotton.dry	.	8.1000	+INF	.
prop_sharing.2-Basra .1-wheat .dry	.	114.0750	+INF	.
prop_sharing.2-Basra .2-cotton.dry	.	.	+INF	.

---- VAR uses_v total water use by rule-province-scen (million m^3 - marginal is \$US per 1000 m^3)

	LOWER	LEVEL	UPPER	MARGINAL
prop_sharing.1-Mousil.dry	.	286.0800	286.0800	9.4748
prop_sharing.2-Basra .dry	.	114.0750	114.0750	10.8333

---- VAR ag_ben_k_v total farm income by rule-province-crop-scen (\$US 1000s - no marginals shown)

	LOWER	LEVEL	UPPER	MARGINAL
prop_sharing.1-Mousil.1-wheat .dry	-INF	2633.8021	+INF	.
prop_sharing.1-Mousil.2-cotton.dry	-INF	367.1640	+INF	.
prop_sharing.2-Basra .1-wheat .dry	-INF	1235.8125	+INF	.
prop_sharing.2-Basra .2-cotton.dry	-INF	.	+INF	.

---- VAR ag_ben_v total farm income by rule-scen (\$US 1000s - no marginals shown)

	LOWER	LEVEL	UPPER	MARGINAL
prop_sharing.dry	-INF	4236.7786	+INF	.

	LOWER	LEVEL	UPPER	MARGINAL
---- VAR Tot_b_v	-INF	4236.7786	+INF	.

Tot_b_v total farm income re-calc for each rule-scen (objective) (\$US 1000s - no marginals shown)