Scenarios and analysis

Three scenarios were examined for the normal year of 2006. The scenarios are based on raising agricultural water productivities to various levels by more investment, improving water management, agricultural practices and regional cooperation.

Mapping biophysical AWP allowed investigating the following three scenarios:

S1: The Conservative Scenarios: Increasing AWP in the areas of the basin with less than 0.75 kg/m^3 to 0.75 kg/m^3. This scenario is attainable without investment but with better management of the existing resources.

a. Water savings by increasing AWP while fixing the total biophysical crop productivity/production. The saved water can be used to support other demanding sectors.
b. Increasing crop productivity/production by increasing AWP while fixing the amount of water consumed in agriculture.

S2: The Recommended Scenario: Increasing AWP in areas of the basin that are less than 1.0kg/m^3 to 1.0 kg/m^3. This scenario is attainable but with moderate investment and better management of water, land and crops.

a. Water savings by increasing AWP while fixing the total biophysical crop production. The saved water can be used to support other demanding sectors.
b. Increasing crop production/production due to increasing AWP while fixing the amount of water consumed in agriculture.

S3: The Optimistic Scenario: Increasing AWP in the basin to high 1.25 kg/m^3. This scenario requires substantial investment in agriculture and water resources management in addition to cooperation between basin countries especially in coordination cropping patterns based on comparative advantages.

a. Water savings by increasing AWP while fixing the total biophysical crop productivity/production. The saved water can be used to support other demanding sectors.
b. Increasing crop productivity/production due to increasing AWP while fixing the amount of water consumed in agriculture.

7.1. Water savings by improving AWP according to the three scenarios while fixing the total crop production

This is calculated from water productivity maps by fixing the total production in each of the tree countries in the basin and calculating the amount of water (ET) needed to maintain the production if water productivity is raised to 0.75, 1.0 and 1.25 kg/m^3. Increasing the biophysical return for water used allows savings while maintaining the total production. Water saving for each scenario was calculated as the difference between actual plant-water consumption in 2006 and the consumption that would have occurred had the lower levels of AWP been increased to the above levels.

Table 7 shows the estimated savings in water consumption (ET) in 2006 in both rainfed and irrigated systems by the three scenarios while fixing the cop production in the three countries and the basin (excluding Iran).

Table 1: Water savings (m^3) by raising AWP to according to the three scenarios while fixing the total production in the three countries and the basin.

		Water savings in m^3		
Agricultural System	**Country**	**Scenario S1. Conservative AWP @ 0.75 kg/m^3**	**Scenario S2. Recommended AWP @ 1.00 kg/m^3**	**Scenario S3. Optimistic AWP @ 1.25 kg/m^3**
Rainfed	**Turkey**	1,719,438,040	2,777,249,566	3,411,936,482
	Syria	1,021,152,288	1,334,609,925	1,522,684,508
	Iraq	1,794,622,195	2,249,385,518	2,542,003,067
Total (Rainfed)		4,535,212,522	6,361,245,009	7,476,624,057
Irrigated	**Turkey**	980,764,705	1,952,354,710	2,535,308,714
	Syria	544,145,932	693,055,569	782,783,781
	Iraq	6,997,901,605	7,751,215,249	8,206,120,406
Total (Irrigated)		8,522,812,242	10,396,625,529	11,524,212,900
Grand Total		**13,058,024,764**	**16,757,870,538**	**19,000,836,957**

At the basin level in the normal year of 2006, raising AWP according to scenarios 1, 2, and 3 would have saved up to 13.0, 16.7 and 19.0 BCM respectively. In the rainfed agriculture savings would have been about 4.5, 6.3 and 7.4 BCM for scenarios S1, S2, and S3 respectively while for irrigated agriculture the saving would have been 8.5, 10.3 and 11.5 BCM for scenarios S1, S2, and S3 respectively. This water savings however, may only come at a cost in improving water management and agricultural practices, which in turn require more investment especially in scenarios S2 and S3. This cost has not been calculated at this stage.

7.2. Production increase by improving AWP according to the three scenarios while fixing the total water consumed

This is calculated from water productivity maps by fixing the total evapotranspiration in each of the tree countries in the basin and calculating the total crop production if water productivity is raised to 0.75, 1.0 and 1.25 kg/m^3. Increasing the biophysical return for water allows production increases while maintaining the total water consumed. Production increases for each scenario was calculated as the difference between actual production in 2006 and the production that would have achieved had the lower levels of AWP been increased to the above three levels.

Table 8 shows the estimated crop production gains in 2006 in both rainfed and irrigated systems by the three scenarios while fixing the amount of water consumed in the three countries and the basin (excluding Iran).

Table 2: Crop production gains (ton) by raising AWP to according to the three scenarios while fixing the total water consumed in the three countries and the basin.

		Crop production increase (tons)		
Agricultural System	**Country**	**Scenario S1. Conservative AWP @ 0.75 kg/m^3**	**Scenario S2. Recommended AWP @ 1.00 kg/m^3**	**Scenario S3. Optimistic AWP @ 1.25 kg/m^3**
Rainfed	**Turkey**	1,289,579	2,777,250	4,264,921
	Syria	765,864	1,334,610	1,903,356
	Iraq	1,345,967	2,249,386	3,177,504
Total (Rainfed)		**3,401,409**	**6,361,245**	**9,345,780**
Irrigated	**Turkey**	735,574	1,952,355	3,169,136
	Syria	408,109	693,056	978,480
	Iraq	5,248,426	7,751,215	10,257,651
Total (Irrigated)		**6,392,109**	**10,396,626**	**14,405,266**
Grand Total		**9,793,519**	**16,757,871**	**23,751,046**

At the basin level in the normal year of 2006, raising AWP according to scenarios S1, S2, and S3 would have increased crop production by 9.8, 16.7 and 23.7 mill tons respectively. In the rainfed agriculture production gains would have been about 3.4, 6.3 and 9.3 mill tons for scenarios S1, S2, and 3 respectively while for irrigated agriculture the gains would have been 6.3, 10.3 and 14.4 mill tons for scenarios S1, S2, and S3 respectively. These gains water in crop production however, may only come at cost in improving water management and agricultural practices, which in turn require more investment especially in scenarios S2 and S3. This cost has not been calculated at this stage.