Answers

Module 1: Physical supply and use tables

Exercise 1: Soda City

1. How much water does the electricity industry (ISIC 35) abstract from the environment?

   322 million meters cubed (322,000,000 m3)

2. How much water do households receive from other economic units?

   36 million meters cubed (36,000,000 m3)

3. How much water does the water supply industry (ISIC 36) distribute to users?

   119 million meters cubed (119,000,000 m3)

4. 4. How much water do the "other" industries (ISIC 38, 39, 45-99) return to the environment?

   Zero (0)

5. Which industry uses the 2nd greatest amount of water?

   The water supply industry (144,000,000 m3)

6. Which group of industries consumes the 2nd greatest amount of water?

   Other industries, ISIC 38, 39, 45-99 (11,000,000 m3)

7. In the manufacture of soft drink, the industry that consumes the most water, how do you think the water was consumed?

   The water is incorporated into the products – that is the bottles of soft drink. Water consumption is the water that is evaporated, transpired or incorporated into products.

Exercise 2: Northville

Physical use table

Gigalitres (=1,000,000 m3)

		Industries (by ISIC categories)							Households	Rest of the world	Total
		1-3	5-33, 41-43	35	36	37	38,39, 45-99	**Industry total**			**Total**
From the environment	**1 - Total abstraction (=1.a+1.b = 1.i+1.ii)**	**186**	**9**	**2**	**229**	**0**	**0**	**426**	**8**		**434**
	1.a Abstraction for own use	186	9	2	0	0	0	197	8		205
	1.b Abstraction for distribution	0	0	0	229	0	0	229	0		229
	1.i From inland water resources:	186	9	2	229	0	0	426	8		434
	1.i.1 Surface water	124	6	2	229	0	0	361	0		361
	1.i.2 Groundwater	62	3	0	0	0	0	65	8		73
	1.i.3 Soil water	0	0	0	0	0	0	0	0		0
	1.ii Collection of precipitation	0	0	0	0	0	0	0	0		0
	1.iii Abstraction from the sea	0	0	0	0	0	0	0	0		0
Within the economy	**2. Use of water received from other economic units**	**104**	**0**	**1**	**0**	**20**	**16**	**141**	**21**	**0**	**162**
	of which:							0			
	2.a Reused water	0	0	0	0	0	0	0	0	0	0
	2.b Wastewater to sewerage	0	0	0	0	20	0	20	0	0	20
	2.c Distributed water	104	0	1	0	0	16	121	21	0	142
3. Total use of water (=1+2)		**290**	**9**	**3**	**229**	**20**	**16**	567	**29**	**0**	**596**

Note: grey cells indicate zero entries by definition.

Physical supply table

Gigalitres (=1,000,000 m3)

		Industries (by ISIC categories)							Households	Rest of the world	Total
		1-3	5-33, 41-43	35	36	37	38,39, 45-99	**Industry total**			**Total**
Within the economy	**4. Supply of water to other economic units**	**0**	**0**	**0**	**142**	**0**	**9**	**151**	**11**	**0**	**162**
	of which:										
	4.a Reused water	0	0	0	0	0	0	0	0	0	0
	4.b Wastewater to sewerage	0	0	0	0	0	9	9	11	0	20
	4.c Distributed water	0	0	0	142	0	0	142	0	0	142
To the environment	**5. Total returns (= 5.a+5.b)**	**41**	**4**	**2**	**18**	**17**	**0**	**82**	**2**		**84**
	5.a To inland water resources	41	4	2	18	17	0	82	2		84
	5.a.1 Surface water	41	4	2	0	17	0	64	2		66
	5.a.2 Groundwater	0	0	0	18	0	0	18	0		18
	5.a.3 Soil water	0	0	0	0	0	0	0	0		0
	5.b To other sources (e.g. sea water)	0	0	0	0	0	0	0	0		0
6. Total supply of water (= 4+5)		**41**	**4**	**2**	**160**	**17**	**9**	**233**	**13**	**0**	**246**
7. Consumption (3-6)		**249**	**5**	**1**	**69**	**3**	**7**	**334**	**16**	**0**	**350**

Note: grey cells indicate zero entries by definition.

1. How much water does agriculture (ISIC 01) abstract from the environment?

   186 million meters cubed (186,000,000 m3)

2. Of the water abstracted by agriculture (ISIC 01) how much is from groundwater?

   62 million meters cubed (62,000,000 m3)

3. In Northville, who supplies the wastewater to the sewerage industry (ISIC 37)

   Households and other industries (ISIC 38, 39, 45-99)

4. How much water do households receive from other economic units?

   21 million meters cubed (21,000,000 m3)

5. How much water could potentially be supplied as reused water by the sewerage industry (ISIC 37) rather than be returned to the environment?

   17 million meters cubed (17,000,000 m3)

6. If the sewerage industry (ISIC 37) was to supply reused water to other industries (ISIC 38, 39, 45-99) with 5,000,000 m3 of reused water, in what column and line would the supply be recorded?

   Line 4.a (supply of reused water), column for sewerage industry (ISIC 37). Line and column subtotals and totals would also have to be adjusted.

7. If other industries (ISIC 38, 39, 45-99) were to use 5,000,000 m3 of reused water, in what column and line would the supply be recorded?

   Line 2.a (use of reused water) in the column for other industries (ISIC 38, 39, 45-99). Line and column subtotals and totals would also have to be adjusted.

8. Why do you think the water supply industry consumes 69,000,000 m^3 of water, the second most of all of the industries or households in Northville?

   In Northville, the use of open channels to supply water to agriculture, mentioned in the introduction to water supply and use in Northville, leads to the evaporation of water. These losses are not shown directly in the supply use tables but are included in the consumption by the water supply industry (ISIC 36). Water consumption is the amount of water evaporated, transpired or incorporated into products.

Exercise 3: Green Port

Physical use table

Gigalitres (=1,000,000 m^3)

		Industries (by ISIC categories)									
		1-3	5-33, 41-43	35	36	37	38,39, 45-99	**Industry total**	Households	Rest of the world	**Total**
From the environment	**1 - Total abstraction (=1.a+1.b = 1.i+1.ii)**	**240**	**24**	**5**	**466**	**0**	**24**	**759**	**3**		**762**
	1.a Abstraction for own use	240	24	3	0	0	24	291	3		294
	1.b Abstraction for distribution	0	0	2	466	0	0	468	0		468
	1.i From inland water resources:	240	24	5	461	0	24	754	0		754
	1.i.1 Surface water	240	24	5	461	0	24	754	0		754
	1.i.2 Groundwater	0	0	0	0	0	0	0	0		0
	1.i.3 Soil water	0	0	0	0	0	0	0	0		0
	1.ii Collection of precipitation	0	0	0	0	0	0	0	3		3
	1.iii Abstraction from the sea	0	0	0	5	0	0	5	0		5
Within the economy	**2. Use of water received from other economic units**	**200**	**30**	**0**	**0**	**108**	**30**	**368**	**141**	**0**	**509**
	of which:							0			
	2.a Reused water	18	0	0	0	0	2	20	0	0	20
	2.b Wastewater to sewerage	0	0	0	0	107	0	107	0	0	107
	2.c Distributed water	182	30	0	0	1	28	241	141	0	382
3. Total use of water (=1+2)		**440**	**54**	**5**	**466**	**108**	**54**	1127	**144**	**0**	**1271**

Note: grey cells indicate zero entries by definition.

Physical supply table

Gigalitres (=1,000,000 m^3)

		Industries (by ISIC categories)									
		1-3	5-33, 41-43	35	36	37	38,39, 45-99	**Industry total**	Households	Rest of the world	**Total**
Within the economy	**4. Supply of water to other economic units**	**27**	**0**	**2**	**380**	**20**	**15**	**444**	**65**	**0**	**509**
	of which:										
	4.a Reused water	0	0	0	0	20	0	20	0	0	20
	4.b Wastewater to sewerage	27	0	0	0	0	15	42	65	0	107
	4.c Distributed water	0	0	2	380	0	0	382	0	0	382
To the environment	**5. Total returns (= 5.a+5.b)**	**0**	**7**	**2**	**71**	**72**	**1**	**153**	**0**		**153**
	5.a To inland water resources	0	7	2	71	0	0	80	0		80
	5.a.1 Surface water	0	7	2	0	0	0	9	0		9
	5.a.2 Groundwater	0	0	0	71	0	0	71	0		71
	5.a.3 Soil water	0	0	0	0	0	0	0	0		0
	5.b To other sources (e.g. sea water)	0	0	0	0	72	1	73	0		73
6. Total supply of water (= 4+5)		**27**	**7**	**4**	**451**	**92**	**16**	**597**	**65**	**0**	**662**
7. Consumption (3-6)		**413**	**47**	**1**	**15**	**16**	**38**	**530**	**79**	**0**	**609**

Note: grey cells indicate zero entries by definition.

1. In Green Port, which industries abstract water from the environment?

   Agriculture (ISIC 01, manufacturing (10-33), electricity (ISIC 35), water supply (ISIC 36), and other industries (ISIC 38, 39, 45-99). Households, while not an industry, also abstract water.

2. How much water does agriculture (ISIC 01) receive from other economic units?

   200 million meters cubed (200,000,000 m3). Of this 18 million is reused water from the sewerage industry (ISIC 37) and 182 million is from the water supply industry (ISIC 36)

3. From which industries do the other industries (ISIC 38, 39, 45-99) receive water?

   The water supply (ISIC 36) sewerage (ISIC 37) and electricity (ISIC 35) all supply water to other industries (ISIC 38, 39, 45-99)

4. How much addition water (i.e. more than is currently supplied) could be supplied as reused water by the sewerage industry (ISIC 37)?

   72 million meters cubed (72,000,000 m3), the amount currently discharged to sea.

5. What two water sources (i.e. abstractions from the environment) are used in Green Port that are not used in Soda City or Northville?

   Collection of precipitation by households and the abstraction of sea water for desalinisation by the water supply industry (ISIC 36).

6. Which industry or household uses the most water?

   The water supply industry (ISIC 36), which uses 466 million meters cubed (466,000,000 m3) of water. Consumption is only 15 million meters cubed (15,000,000 m3) because most water (380,000,000 m3) is supplied to other users and another portion (71,000,000 m3) is lost in distribution through leaky pipes to groundwater.

7. Which industry or household consumes the most?

   The agriculture industry (ISIC 01) (413,000,000 m3).

8. Of the total water use, what percentage is accounted for by:

   Total water use is 1,271 million meters cubed (1,271,000,000 m3), so:

   Collection of precipitation by households of 3,000,000 m3 is 0.24%

   Use of reused water (supplied by ISIC 37) is 20,000 m3 or 2% of total water use (1,271,000 m3)

   Supply of water used first for cooling by the electricity industry (ISIC 35) of 3,000,000 m3 is 0.16%

   Losses by the water supply industry (ISIC 36) of 71,000,000 m3 is 5.59%