Water in artificial reservoir – A produced asset? - Issue 16 -

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Outline

- Background
- Example of current treatment
- Consequences of changing treatment
- Conclusion and future work
- Questions

Previous discussion

The issue of water in artificial reservoir as a produced asset was discussed in several occasions, namely during:

- Drafting of the System of Environmental-Economic Accounting for Water (SEEAW)
- Update of the System of National Accounts (SNA) 2008.
- Expert Group Meeting on the International Recommendations on Water Statistics (IRWS) held in New York, USA, 5-7 November 2008

Background

- Reservoirs impact greatly on the availability of water in downstream areas
- Reservoirs affect hydrological cycle of water:
  - Increase evaporation
  - Change stream flow
  - Affect the water quality
  - Trap sediment
  - Change the migration patterns of organisms
- Water in artificial reservoirs is managed and controlled on a continuous basis

Recording of water in SNA, SEEA SEEAW

- Asset classification
  - Non-produced assets
    - Natural resources

      EA.131 Water resources

      EA.1311 Surface water

      Water in artificial reservoirs
- Flow accounts
  - Flow from the economy only when water is abstracted from reservoir

⇒ changes to the natural hydrological regime are flows within the environment and only appear in the asset accounts (other changes in volume)

SNA definition of produced assets

- Produced assets are non-financial assets that have come into existence as outputs from production processes that fall within the production boundary of the SNA. (2008 SNA paragraph 10.9a.)
- Growth and regeneration of crops, trees, livestock or fish which are controlled by, managed by and under the responsibility of institutional units constitute a process of production in an economic sense. Growth is not considered a purely natural process that lies outside the production boundary (2008 SNA paragraph 6.136).

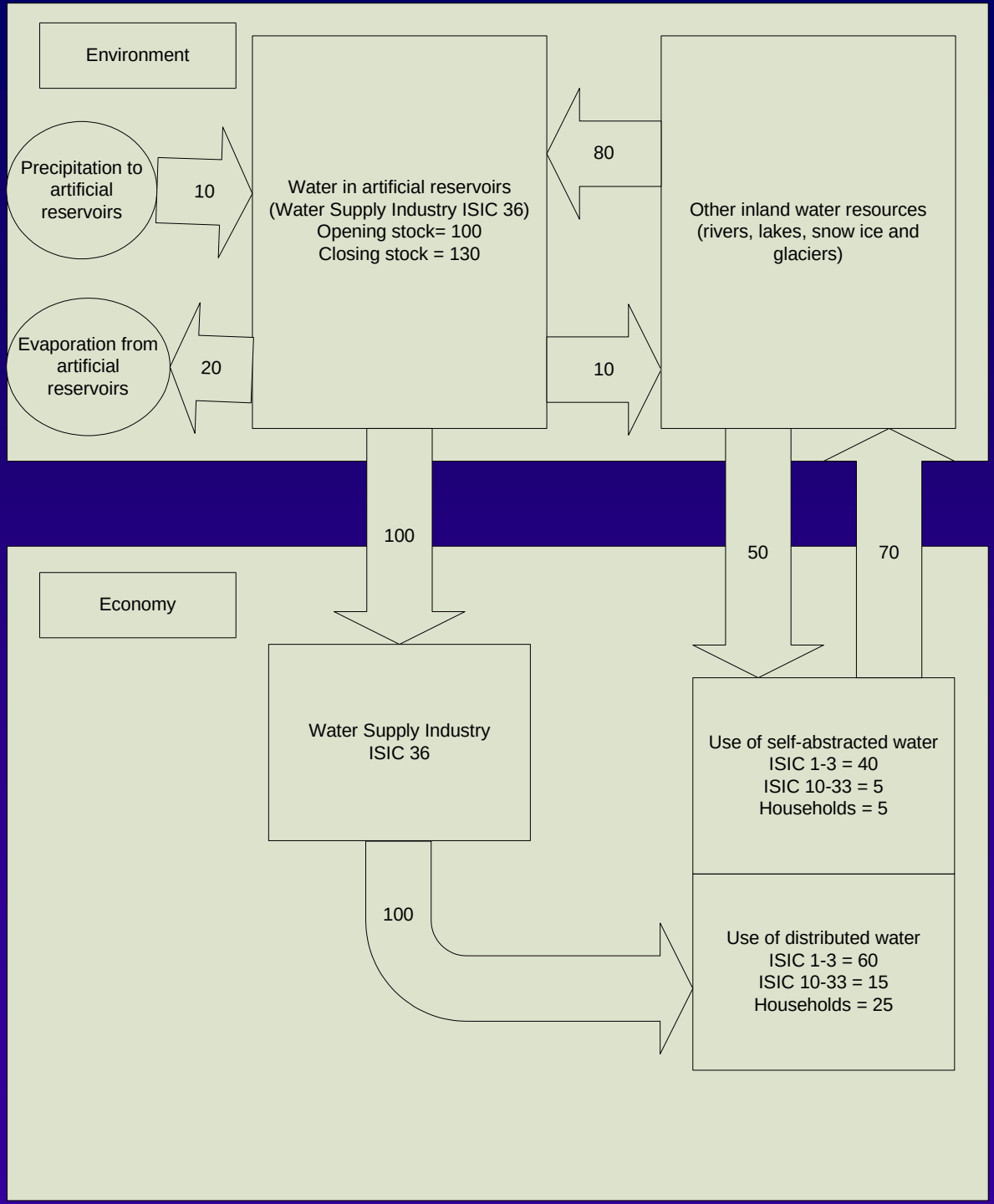
Definition of inventories in 2008 SNA

- Inventories are stocks of outputs that are still held by the units that produced them prior to their being further processed, sold, delivered to other units or used in other ways and stocks of products acquired from other units that are intended to be used for intermediate consumption or for resale without further processing

Water as an inventory?

- Similar arguments used for cultivated biological assets can be used for water in artificial reservoirs
- Water recharge is enhanced by the reservoirs
- Water in the reservoirs is owned and the regeneration is continuously managed and controlled
- Recharge of water in artificial reservoirs constitutes a process of production and not a pure natural process

Example of current treatment



Asset account

				Physical units
		EA.1311 Reservoirs	Other inland water resources	Total
1. Opening Stocks		100		
Increases in stocks				
	2. Returns (from the		70	70
	3. Precipitation	10		10
	4. Inflows			
	4.b. from other	150	10	160
Decreases in stocks				
	5. Abstraction	100	50	150
	6. Evaporation/Actual	20		20
	7. Outflows			
	7.c. to other resources	10	80	90
9. Closing Stocks		130		

The categories of the asset accounts are the same but are reclassified form other changes in volume accounts to the capital account

Physical supply-use tables – current treatment

Use table

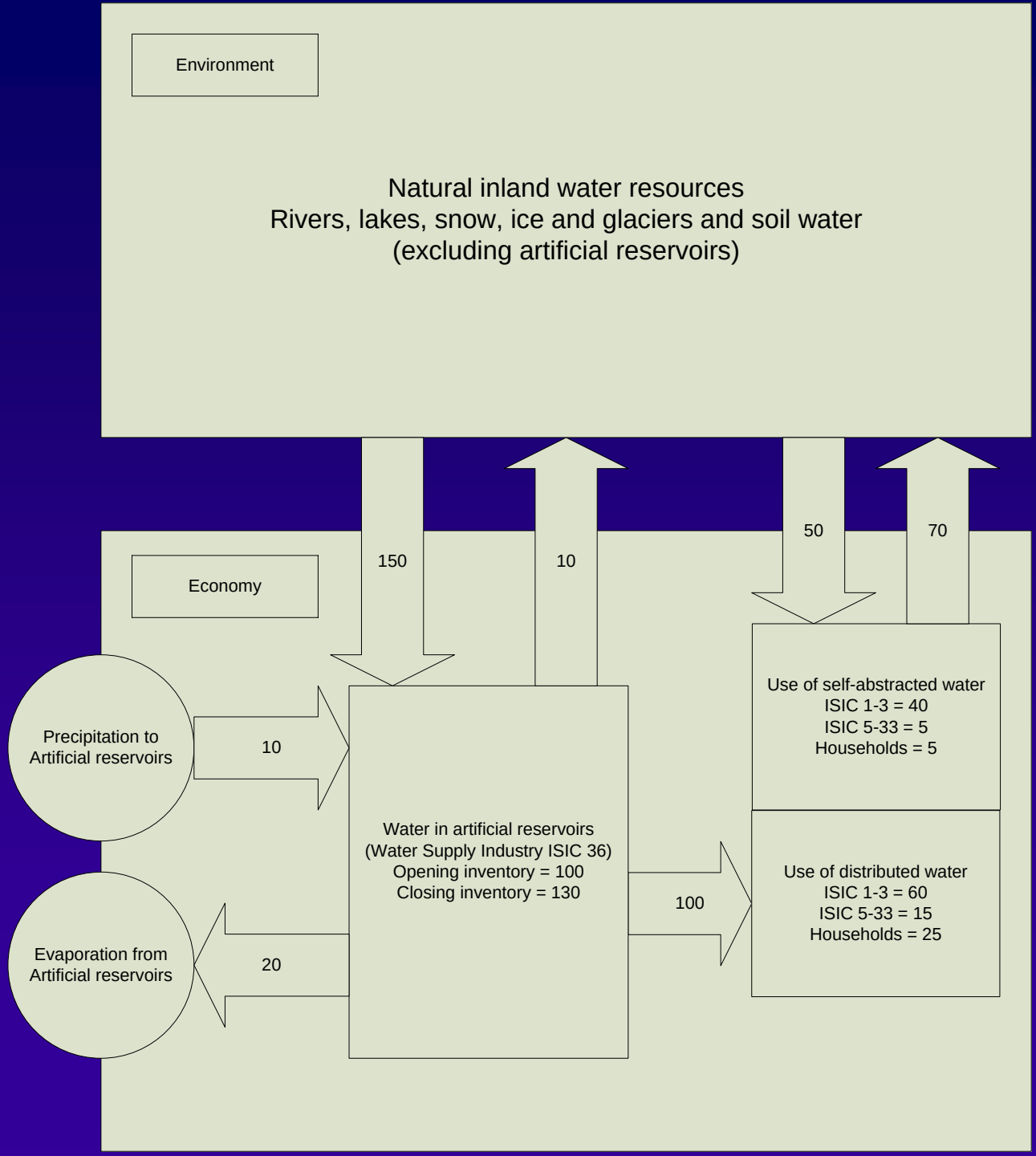
Physical units

		Industries (by ISIC categories)				Households	Total
		01-09	10-33	36	Total		
From the environment	**1 - Total abstraction**	**40**	**5**	**100**	**145**	**5**	**150**
	1.a Abstraction for own use	40	5		45	5	50
	1.b Abstraction for			100	100		100
	From water resources:						
	1.i Artificial reservoirs			100	100		100
	1.ii Other inland water	40	5		45		45
Within the economy	**2. Use of water received from other economic units**	**60**	**15**		**75**	**25**	**100**
3. Total use of water (=1+2)			**20**	**100**	**220**	**30**	**250**

Physical supply-use tables – current treatment

Supply table							
							Physical units
		Industries (by ISIC categories)				House holds	Total
		01-09	10-33	36	Total		
Within the economy	**4. Supply**			**100**	**100**		**100**
	of which :						
	Water for delivery			100	100		100
To the environment	**5. Total returns (= 5.a+5.b)**	**58**	**2**		**60**	**10**	**70**
	5a. To artificial reservoirs						
	5b. To other sources	58	2		60	10	70
6. Total supply of water (= 4+5)		**58**	**2**	**100**	**160**	**10**	**170**
7. Consumption (=3-6)		**42**	**18**	**0**	**60**	**20**	**80**

Changing treatment - Example 1: Increases in stocks



Physical supply and use tables – water as a produced asset (e.g. 1)

Use table

Physical units

		Industries (by ISIC categories)				Households	Changes in inventories (ISIC 36)	Total
		01-09	10-33	36	Total			
From the environment	**1 - Total abstraction**	**40**	**5**	**160**	**205**	**5**		**210**
	1.a Abstraction for own	40	5		45	5		50
	1.b Abstraction for			160	160			160
	1.i From water							
	Other inland water	40	5	150	195	5		200
	1.ii From other sources							
	precipitation			10	10			10
Within the economy	**from other economic units**	**60**	**15**		**75**	**25**	**30**	**130**
3. Total use of water (=1+2)		**100**	**20**	**160**	**280**	**30**	**30**	**340**

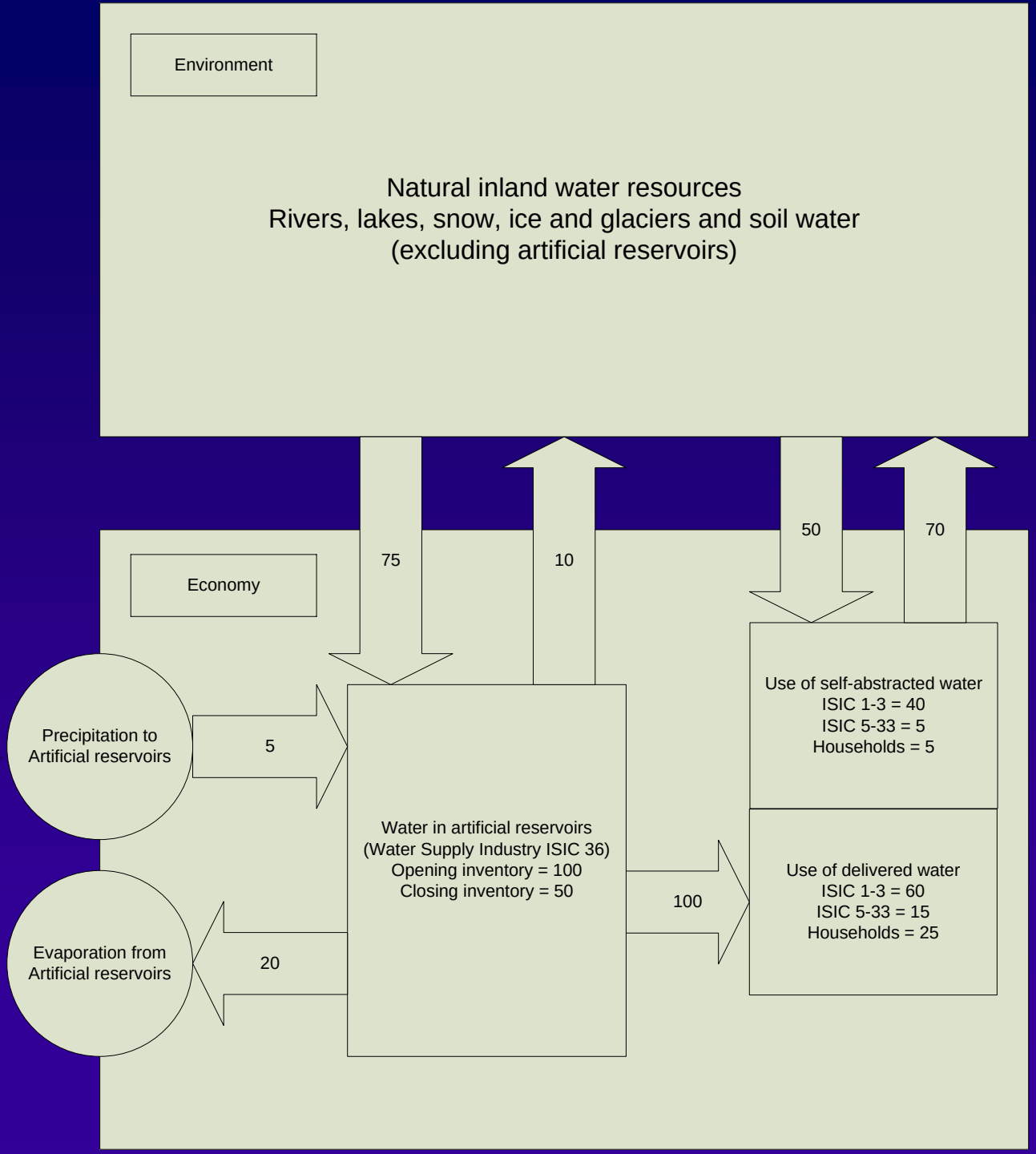
Physical supply and use tables – water as a produced asset (e.g. 1)

Supply table

Physical units

		Industries (by ISIC categories)				Households	Changes in inventories (ISIC 36)	Total
		01-09	10-33	36	Total			
Within the economy	**4. Supply**			**130**	**130**			**130**
	of which:							
	Water for delivery			100	100			100
	Water for storage			30	30			30
To the environment	**5. Total returns to other sources**	**58**	**2**	**10**	**70**	**10**		**80**
6. Total supply of water (= 4+5)		**58**	**2**	**140**	**200**	**10**		**210**
7. Consumption (=3-6)		**42**	**18**	**20**	**80**	**20**	**30**	**130**
Of which: Changes in inventories							30	30
Note: grey cells indicate zero entries by definition.								

Changing treatment - Example 2: decreases in stocks



Physical supply and use tables – water as a produced asset (e.g. 2)

Use table

Physical units

		Industries (by ISIC categories)				Households	Changes in inventories (ISIC 36)	Total
		01-03	10-33	36	Total			
From the environment	**1 - Total**	**40**	**5**	**80**	**125**	**5**		**130**
	1.a Abstraction	40	5		45	5		50
	1.b Abstraction			75	75			80
	1.i From water							
	Other inland	40	5	75	120	5		125
	1.ii From other							
	Collection of precipitation			5	5			5
Within the economy	**2. Use of water received from other economic**	**60**	**15**		**75**	**25**	**-50**	**50**
3. **Total use of water** (=1+2)		**100**	**20**	**80**	**200**	**30**	**-50**	**180**

Physical supply and use tables – water as a produced asset (e.g. 2)

Supply table

Physical units

		Industries (by ISIC categories)				Households	Changes in inventories (ISIC 36)	Total
		01-03	10-33	36	Total			
Within the economy	**4. Supply**			**50**	**50**			**50**
	of which:							
	Water for delivery			100	100			100
	Water for storage			-50	-50			-50
To the environment	**5. Total returns (=**	**58**	**2**	**10**	**70**	**10**		**80**
	5a. To artificial							
	5b. To other sources	58	2	10	70	10		80
6. Total supply of water (= 4+5)		**58**	**2**	**60**	**120**	**10**		**130**
7. Consumption (=3-6)		**42**	**18**	**20**	**80**	**20**	**-50**	**50**
Of which: Changes in inventories							-50	-50

Implication of changes in the SUT

- Output and value added of the industry owning the reservoir changes (both physical and monetary)
- Changes in inventories appears in the new treatment (physical and monetary)
- Indicators of water consumption changes (physical)

Remaining issues

- Should we consider other artificial bodies as inventories?
- How should the line be drawn between what is an inventory and what is a natural asset?
- What is the practice of business accounting?

Questions

1. Do you agree that water in artificial reservoir is conceptually a produced asset? If yes, then:
   (a) Do you agree with changing the classification of assets for water resources and treat water in artificial reservoirs as a produced asset?
   (b) Do you agree with recording the net recharge of water in artificial reservoirs in the capital account rather than in the other changes in volume of asset account?
   (c) Do you agree that the output of the industry owning the artificial reservoir is the net recharge and not the water abstracted for sale?