



# SPECIAL RELEASE

## Physical Flow Accounts for Water Resources, CAR: 2008-2018

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*The physical flow accounts for water resources describe the flows of water to and from the environment and the economy. The accounts cover the entire process of water supply and use – from the initial abstraction of water from the environment into the economy, to the flows within the economy done by the different industries and households, and finally return flows from the economy back to the environment.*

### Scope and Coverage

The study derived eleven categories where the flow of water goes – from the source to the intended destination. These categories are based on how the water was intended to be utilized. These records were disaggregated as follows:

**Table 1. Regional Data Items**

Data Items Available in CAR
Irrigation
Aquaculture
Livestock and Poultry
Mining and Quarrying
Electricity Generation
Commercial
Industrial
Municipal
Recreation
Household
Water Collection, Treatment and Supply



## Data Limitation

Physical flow accounting focuses on the amount of abstracted water from the environment, how the water was utilized in the economy, and the amount of water that returned to the environment from the economy.

Abstractions, as recorded by the National Water Resources Board – Cordillera Administrative Region (NWRB-CAR), applied by an individual or corporation should be limited to the allowable abstraction set by the agency. However, since there is no actual way to monitor these abstractions, it was assumed that abstractions can go under and beyond the allowable abstraction. Therefore, abstractions in this study were limited to the registered individual or corporation with their granted volume of abstraction.

## Results and Discussion

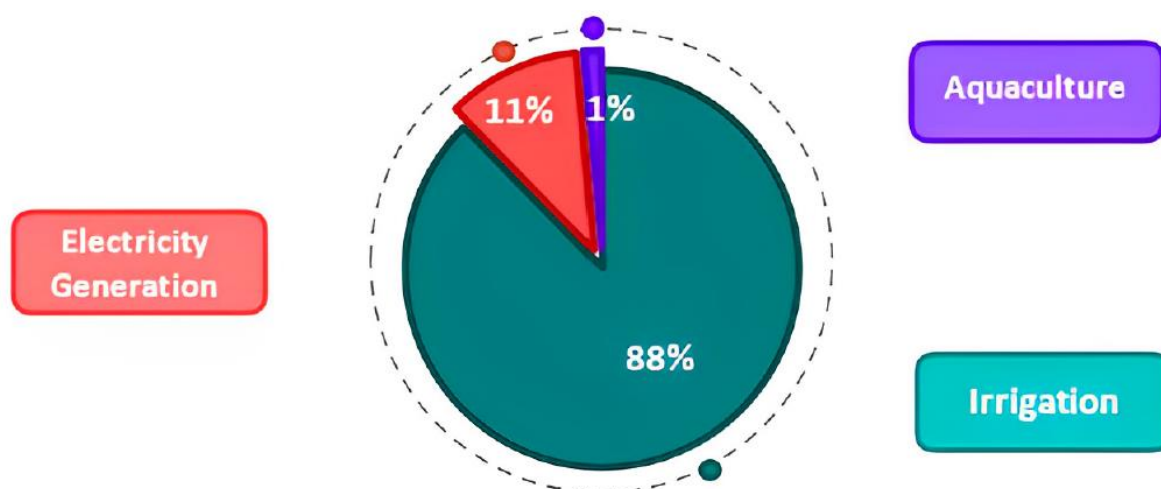
The System of Environmental-Economic Accounting Central Framework (SEEA-CF) describes three types of flows. These are: flows from the environment to the economy; flows within the economy; and flows from the economy to the environment. With the available data, flows from the environment to the economy were broadly covered in this study, illustrating the sectors and industries utilizing the abstracted water from the environment.

Flows from the environment to the economy covers five major sector/industry/district according to the usage of abstracted water, namely: Agriculture, Forestry, and Fishing (subdivided into Irrigation, Fishing, and Livestock), Mining and Quarrying, Electricity Generation, Others (subdivided into Commercial, Industrial, Municipal, and Recreation), and Water Supply.

### From the Environment to the Economy

As seen in figure 1, Irrigation posted the highest abstraction from surface water with an average of 88%. Electricity generation followed with 11% and Aquaculture with 1%. The remaining industries had minimal abstractions.

**Figure 1. Average Percent Distribution of Abstractions from Surface Water, CAR: 2008 – 2018**



Source: Philippine Statistics Authority – Regional Statistical Services Office Cordillera Administrative Region

**Table 2. Summary Table of All Abstractions from Surface Water in MCM, CAR: 2008 – 2018**

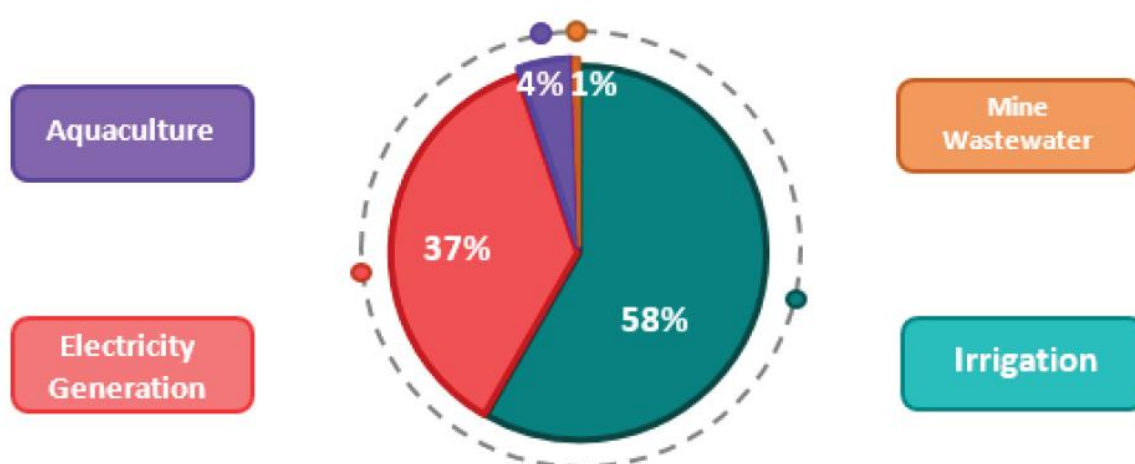
Abstractions from Surface Water in MCM									
Year	Agriculture, Forestry, and Fishing			Electricity Generation	Mining and Quarrying	Others			Total
	Irrigation	Aquaculture	Livestock and Poultry			Commercial	Industrial	Recreation	
2008	1,044.29	24.56	3.87	190.96	3.85	0.53	0.8982	0.0026	<b>1,268.96</b>
2009	1,316.31	24.56	3.86	192.76	4.52	0.53	0.9479	0.0026	<b>1,543.49</b>
2010	1,334.06	24.56	3.70	192.76	3.49	0.53	0.9802	0.0026	<b>1,560.08</b>
2011	1,382.48	24.56	3.96	192.76	3.55	0.53	1.1702	0.0026	<b>1,609.02</b>
2012	1,567.02	24.56	3.92	193.33	6.51	0.53	1.1702	0.0026	<b>1,797.04</b>
2013	1,626.00	24.56	3.96	193.63	0.40	0.53	1.1702	0.0026	<b>1,850.25</b>
2014	1,723.16	24.56	3.90	193.63	1.64	0.53	1.1702	0.0026	<b>1,948.59</b>
2015	1,759.88	24.56	3.92	193.63	1.76	0.53	0.8421	0.0026	<b>1,985.13</b>
2016	1,792.69	24.56	3.93	193.63	1.73	0.53	0.6778	0.0026	<b>2,017.75</b>
2017	1,678.85	24.56	3.87	193.63	1.43	0.53	0.6778	0.0026	<b>1,903.55</b>
2018	1,743.28	24.56	3.98	193.63	2.41	0.53	0.6778	0.0026	<b>1,969.07</b>
<b>Ave</b>	<b>1,542.55</b>	<b>24.56</b>	<b>3.90</b>	<b>193.12</b>	<b>2.85</b>	<b>0.53</b>	<b>0.9439</b>	<b>0.0026</b>	

Source: Philippine Statistics Authority – Regional Statistical Services Office Cordillera Administrative Region

## From the Economy back to the Environment

Figure 2 shows the average percent distribution of returns to surface water. Returns from Irrigation had the highest return with 58% share to the total returns, equal to 308.51 MCM. Returns from Electricity Generation followed with 37% at an average return of 193.12 MCM. Aquaculture and Mine Wastewater came next with an average return of 25.56 MCM and 2.85 MCM, respectively, equal to 4% and 1% contribution to the total returns. Household and Industrial yielded minimal returns.

**Figure 2. Average Percent Distribution of Returns to Surface Water, CAR: 2008 – 2018**



Source: Philippine Statistics Authority – Regional Statistical Services Office Cordillera Administrative Region

**Table 3. Summary Table of Returns from the Economy to the Environment in MCM, CAR: 2008 – 2018**

Returns to Surface Water in MCM							
Year	Electricity Generation	Aquaculture	Mine Waste water	Household	Industrial	Irrigation	Total
2008	190.96	24.56	3.85	2.47	0.40	208.86	<b>431.10</b>
2009	192.76	24.56	4.52	2.50	0.40	263.26	<b>488.00</b>
2010	192.76	24.56	3.49	2.93	0.46	266.81	<b>491.01</b>
2011	192.76	24.56	3.55	2.67	0.43	276.50	<b>500.47</b>
2012	193.33	24.56	6.51	2.22	0.38	313.40	<b>540.41</b>
2013	193.63	24.56	0.40	1.81	0.38	325.20	<b>545.99</b>
2014	193.63	24.56	1.64	1.78	0.36	344.63	<b>566.61</b>
2015	193.63	24.56	1.76	1.94	0.47	351.98	<b>574.34</b>
2016	193.63	24.56	1.73	1.87	0.57	358.54	<b>580.90</b>
2017	193.63	24.56	1.43	1.50	0.61	335.77	<b>557.51</b>
2018	193.63	24.56	2.41	1.56	0.57	348.66	<b>571.39</b>
<b>Ave</b>	<b>193.12</b>	<b>24.56</b>	<b>2.85</b>	<b>2.11</b>	<b>0.46</b>	<b>308.51</b>	

Source: Philippine Statistics Authority – Regional Statistical Services Office Cordillera Administrative Region

## Conclusion

### From the Environment to the Economy

Total abstraction at the end of the accounting period amounted to 1.969.07 million cubic meters. These abstractions that went to different sectors in the economy, are as follows:

- For Irrigation – Abstracted water from surface water amounted to 1.743.28 million cubic meters;
- For Aquaculture – Aquaculture abstracted from surface water amounting to 24.56 million cubic meters;
- For Livestock and Poultry – In 2018, abstractions from surface water for livestock and poultry recorded at 3.98 million cubic meters;
- For Mining and Quarrying – Mining and quarrying sector abstracted an amount of 2.41 million cubic meters from surface water in 2018;
- For Electric Generation – Abstracted water for electric generation from surface water posted 193.63 million cubic meters; and
- For Others – In 2018, abstractions for others amounted to 1.21 million cubic meters.

### From the Economy back to the Environment

Total returns at the end of the accounting period posted 571.39 million cubic meters that went to the surface water. These returns were attributed from the following:

- From Industries – Wastewater from industries amounted to 0.57 million cubic meters;
- From Households – Returns from households through sewerages posted 1.56 million cubic meters;
- From Electricity Generation – Electricity generation sector returned 193.63 million cubic meters;
- From Aquaculture – In 2018, returns from fishing posted 24.56 million cubic meters; and
- From Mining and Quarrying – Returns from mining and quarrying through mine tailings posted 2.41 million cubic meters.

**VILLAFE P. ALIBUYOG**

Regional Director

## Technical Notes

**Physical Flow Accounts** is the recording of physical flows. The different physical flows – natural inputs, products and residuals – are placed within the structure of a physical supply and use table; and from this starting point, measurement of the physical flows can be expanded and reduced to enable focusing on a range of different materials or on specific flows.

**Natural resources** include all natural biological resources (including timber and aquatic resources), mineral and energy resources, soil resources and water resources.

**Water Flow Accounts** describe flows of water, in physical units, encompassing the initial abstraction of water resources from the environment into the economy, to the water flows within the economy in the form of supply and use by industries and households, and finally, flows of water back to the environment.

**Abstraction** is the idea of “removing” or “pulling away”, to extract.

**Aquaculture** is the cultivation of aquatic organisms (such as fish or shellfish) especially for food.

**Irrigation** is the watering of land by artificial means to foster plant growth.

**Recreation** is a way of refreshing the mind or body after work or worry.

**National Water Resources Board** is an attached agency of the Department of Environment and Natural Resources responsible for ensuring the exploitation, utilization, development, conservation and protection of the country’s water resource, consistent with the principles of “Integrated Water Resource Management”.

**System of Environmental-Economic Accounting 2012 - Central Framework (SEEA Central Framework)** is a statistical framework consisting of a comprehensive set of table and accounts, which guides the compilation of consistent and comparable statistics and indicators for policymaking, analysis and research.

**Mining and Quarrying** is the extraction of solid fuels, petroleum, natural gas, minerals, salt, construction stone, and sand and clay; including their associated areas (slag heaps, dumps and storage areas, loading and unloading sites, shafts or head gear).

**Wastewater** is defined as water that is of no further immediate value for the purpose for which it was used or in the pursuit of which it was produced, because of quality, quantity or time of its occurrence.

### References:

United Nations (2014). System of Environmental-Economic Accounting 2012: Central Framework, United Nations, New York

Merriam-Webster Dictionary