**Ecosystem Type: AGROECOSYSTEM**

**Category: Clean and Plentiful Waters**

1. **Materials**

***Supplier*** – Agroecosystems contain species that help clean and retain water resources for human use and consumption (Reicosky and Forcella, 1998). For example, aquaculture agroecosystems can filter domestic waste water resources that would have otherwise drained into downstream waterways (Coates et al., 2013). These waterways are now cleaner and improved for continued use.

***Driver*** – Overabundance of wastes that flow into agroecosystems can affect the materials they provide to support clean and plentiful waters. Wastes might include an excess of fertilizers (Randall and Mulla, 2001) or manure (Coates et al., 2013). Nutrient surpluses can result in eutrophication of waters (Pert et al., 2013), which degrades the habitat quality for agroecosystem species to survive and provide ecosystem services.

***Demander*** – not applicable

1. **Nutrition**

***Supplier*** – not applicable

***Driver*** -not applicable

***Demander*** - not applicable

1. **Energy**

***Supplier*** – not applicable

***Driver*** – not applicable

***Demander*** – not applicable

1. **Mediation of Waste, Toxics, and Other Nuisances**

***Supplier*** – Water quality is protected by species in agroecosystems that help mediate wastes found in runoff or waste water. For example, aquaculture agroecosystems can filter domestic waste water resources that would have otherwise drained into downstream waterways (Coates et al., 2013).

***Driver*** – The amount of fertilizer and manure applied to an agroecosystem impacts the ability of the habitat to provide services that support clean and plentiful waters (Randall and Mulla, 2001). Over fertilizing and application of manure can lead to eutrophication of nearby waterways (Pert et al., 2013).

***Demander*** – not applicable

1. **Mediation of Flows**

***Supplier*** – Agroecosystems contain resources that control the flow of water and sediment, maintaining the available supply of clean water (Reicosky and Forcella, 1998; Dabney, Delgado, and Reeves, 2007). Since these habitats are controlled by humans, agroecosystems that are managed using drainage ditches can allow for water to drain back into downstream and other nearby waterways (Needelman et al., 2007).

***Driver*** – Agroecosystems managed on poorly draining landscapes can affect this habitat’s ability to clean and flush out water to support nearby waterways (Needelman et al., 2007). Further, these ecosystems depend on water for productivity, which limits the available water that could flow into nearby waterways. Rather, this ecosystem extracts water for crop and pasture production (Fleiner et al., 2013).

***Demander*** – not applicable

1. **Maintenance of Physical, Chemical, and Biological Indicators**

***Supplier*** – Crops in agroecosystems play a critical role in maintaining water quality because of their ability to cycle nutrients (Reicosky and Forcella, 1998). Agroecosystems also encourage alternative practices to improve the use of water resources, such as drip irrigation, which not only maintains the growth of species on the terrestrial habitat, but also retains the physical structure of the nearby waterways (Belder et al., 2007).

***Driver*** – The species that support clean and plentiful waters in agroecosystems are affected by changes in nutrient inputs and soil saturation (Randall and Mulla, 2001; Lloyd et al., 2013). For example, over application of fertilizer on these ecosystems can create issues in the downstream waterways, such as eutrophication and oxygen loss resulting from polluted runoff. The effects are exacerbated if an agroecosystem’s soil is saturated, which forces water to overflow into adjacent waterways carrying with it nutrients and other application wastes.

***Demander*** – not applicable

1. **Spiritual, Symbolic, Religious, and Social Experiences**

***Supplier*** – Agroecosystems provide spiritual and social experiences because they supply clean and plentiful waters. For example, aquacultures are suppliers of clean water and provide enjoyment for managers of these landscapes (Barron, Tharme, and Herrero, 2013; Boelee et al, 2013).

***Driver*** – not applicable

***Demander*** – not applicable

1. **Physical and Intellectual Interactions w/ Biota, Ecosystems, and Land/Seascapes**

***Supplier*** – Agroecosystems supply clean and plentiful waters for experiential uses of landscapes. For example, these ecosystems contain resources that control the flow of water maintaining the available supply of clean water that can be used to support habitats like aquaculture and pastures (Reicosky and Forcella, 1998; Dabney, Delgado, and Reeves, 2007; Barron, Tharme, and Herrero, 2013). Water used in both of these systems can be enjoyed along trails or resources for boating.

***Driver*** – not applicable

***Demander*** - not applicable

**Sources:**

Belder, P. et al. (2007) Can drip irrigation improve the livelihoods or smallholders? Lessons learned from Zimbabwe: Global Theme on Agroecosystems Report no. 33. *International Crops Research Institute for the Semi-Arid Tropics,* Bulawayo, Zimbabwe. Retrieved from <http://oar.icrisat.org/2386/1/Can_drip_irrigation_improve1.pdf>.

Coates, D. et al. (2013) Water-related Ecosystem Services and Food Security. In Boelee, E. (Ed.) *Managing Water and Agroecosystems for Food Security.* Boston, MA: Library of Congress Cataloging-in-Publication Data.

Dabney, S.M., Delgado, J.A., and Reeves, D.W. (2007) Using Winter Cover Crops to Improve Soil and Water Quality. *Communications in Soil Science and Plant Analysis, 32*(7-8), 1221-1250. <https://doi.org/10.1081/CSS-100104110>. [abstract only]

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Reicosky, D.C. and Forcella, F. (1998) Cover crop and soil quality interactions in agroecosystems. *Journal of Soil and Water Conservation, 53*(3), 224-229.