**Ecosystem Type: AGROECOSYSTEMS**

**Category: Recreation, Culture, and Aesthetics**

1. **Materials**

***Supplier*** – Agroecosystems such as home gardens provide cultural services (Calvet-Mir, Gomez-Baggethun, and Reyes-Garcia, 2012). Another cultural and recreational benefit that these ecosystems bring to communities is tourism (Pert et al., 2013). For example, agroecosystems are suppliers of reservoirs for recreational fishing (Coates et al., 2013). Local farming on agroecosystems also produce an environment for tourists to explore and provide aesthetics to a community (Pert et al., 2013).

***Driver*** – The ability of agroecosystems to supply materials for recreational, cultural, and aesthetic reasons can be impacted by nutrient loads. Nutrient inputs on these habitats may include excessive fertilizer use or manure inputs because they are often growing crops or landscapes for animal pastures (Randall and Mulla, 2001; Coates et al., 2013). Over fertilizing and application of manure can lead to eutrophication of nearby waterways (Pert et al., 2013). This can limit the available use of water reservoirs for recreational activities because of the harmful health risks of algal blooms that result from eutrophication.

***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 of reservoirs used for recreational and cultural activities is protected by species in upstream and adjacent 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 recreational and cultural activities, especially for downstream habitats (Randall and Mulla, 2001). Over fertilizing and application of manure can lead to eutrophication of nearby waterways (Pert et al., 2013). These wastes can also make the habitat an undesirable location for activities due to nuisances like smell.

***Demander*** – not applicable

1. **Mediation of Flows**

***Supplier*** – There are agroecosystem habitats that maintain the flow of water to sustain the benefits it provides for recreational and cultural activities. For example, aquaculture habitats capture the flow of water to create an environment that can be enjoyed for activities like fishing or simply for their aesthetics (Barron, Tharme, and Herrero, 2013; Boelee et al, 2013).

***Driver*** – The aesthetics agroecosystems provide by mediating flows of water and filtering out wastes 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. As a result, the degraded water resource becomes unusable for recreational activities because of the health risks.

***Demander*** – no literature review available at this time

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

***Supplier*** – The quality of agroecosystems for recreational and cultural uses such as for fishing relies upon the ecosystem’s ability to maintain the physical and biological structure of the habitat. Studies have found that these ecosystems are able to maintain the flow of water and filter out nutrients that could otherwise be degrading to the life cycle of species (Barron, Tharme, and Herrero, 2013; Boelee et al, 2013).

***Driver*** – The amount of fertilizer and manure applied to an agroecosystem impacts the ability of the habitat to maintain the quality of downstream ecosystems (Randall and Mulla, 2001), ultimately effecting spaces that can be enjoyed recreationally and culturally. For example, over fertilizing and application of manure can lead to eutrophication of nearby waterways used for fishing and farming (Pert et al., 2013).

***Demander*** – not applicable

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

***Supplier***—Certain cultures in developing countries still relate to and rely upon “traditional” agroecosystems, systems where plants are heavily managed by humans. The value placed on these ecosystems make them a desirable habitat to be protected with the local people and their culture in mind (Altieri, Anderson, and Merrick, 1987). Agroecological movements are occurring in all over the world, giving communities a sense of pride being able to restore local self-reliance and producing healthy foods with very little inputs (Altieri and Toledo, 2011).

***Driver*** – Water scarcity and nutrient inputs of surrounding lands can affect the quality of agroecosystems to provide positive experiences. Further, these positive experiences can be drastically affected by changes in the habitat. The combination of development and the modern trend of applying excessive nutrient inputs can degrade adjacent agroecosystems because this produces a greater risk for wastes flowing into the ecosystems (Solowey et al., 2013).

***Demander*** – not applicable

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

***Supplier*** – Research to improve approaches of managing agroecosystems has blended modern science with indigenous practices (Altieri, Funes-Monzote, and Petersen, 2012). This has helped enhance food security while conserving environmental resources for future use and enjoyment.

***Driver*** – Agroecosystem habitats enjoyed during activities like hiking, fishing, education, or for pure aesthetics are affected by changes in land use and management. For example, the modern practice of using an excessive amount of nutrients (e.g., fertilizers, manure) on agroecosystem habitats can lead to eutrophication of surrounding waterways (Randall and Mulla, 2001; Coates et al., 2013; Pert et al., 2013). This can limit the available use of water reservoirs for recreational activities because of the harmful health risks of algal blooms that result from eutrophication.

***Demander*** - not applicable

**Sources:**

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Altieri, M.A., Funes-Monzote, F.R., and Petersen, P. (2012) Agroecologically efficient agricultural systems for smallholder farmers: contributions to food sovereignty. *Agronomy for Sustainable Development, 32*(1), 1-13. <https://doi.org/10.1007/s13593-011-0065-6>.

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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.

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