**Ecosystem Type: AGROECOSYSTEM**

**Category: Natural Hazard Mitigation**

1. **Materials**

***Supplier*** – The incidents that occur from natural hazards such as droughts and flooding from climate change can be managed by materials supplied by agroecosystems. For example, reservoirs created from aquacultures and terrestrial species grown on pastures can reduce the negative impact that flooding has on downstream sites (Coates et al., 2013). These landscapes can also capture water to maintain a supply for later use in times of drought (Reicosky and Forcella, 1998; Dabney, Delgado, and Reeves, 2007; Barron, Tharme, and Herrero, 2013).

***Driver*** – The ability for these ecosystems to manage the flow of materials (e.g., water) to support natural hazard mitigation depends on environmental factors such as soil drainage (Lloyd et al., 2013). Agroecosystems that contain soils with poor drainage can have a negative effect on flood control because those surfaces will mimic impervious surfaces, which can accelerate runoff into downstream properties.

***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*** – Plants and animals in agroecosystems help mediate wastes that come from flood events such as chemicals in waste waters (Coates et al., 2013). These ecosystems can also trap sediments that are carried along in runoff (Coates et al., 2013), protecting the downstream properties from nuisances that occur from excess soils built up.

***Driver*** – Agroecosystems that are poorly managed can actually be a source of nuisances that affect downstream properties from natural hazards like flooding. Agriculture on wet soils limits this ecosystem’s ability to capture and allow flood waters to infiltrate. Sedimentation exacerbated by intensified storm events can also occur from the eroded soils of poorly managed agroecosystems (Pert et al., 2013).

***Demander*** – not applicable

1. **Mediation of Flows**

***Supplier*** – Agroecosystems maintain the flow of water, which helps minimize the impacts that events from natural hazards have on society. For example, these ecosystems can trap water so that the resource is maintained during droughts to protect food supplies (e.g., the world’s production of protein sources; Boelee et al., 2013). Agroecosystems also regulate the hydrological cycle, making water available to other plants and habitats because some species have deep roots that can pull from the moist soil layers (Descheemaeker et al., 2013).

***Driver*** – The capacity for soil drainage in an agroecosystem habitat affects its ability to mediate flows of water that result from natural hazards. The flow of water in these soils is especially important because agroecosystems are suppliers of food and other commodities. Flooding from intensified storm events can greatly affect the growth of different crops on the land (Barron, Tharme, and Herrero, 2013). Soils that retain water can over saturate the normal habitat for species, causing them to die.

***Demander*** – not applicable

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

***Supplier*** – Flood events carry with them wastes such as nutrients and bacteria that can be absorbed by crops and other species grown in agroecosystems (Reicosky and Forcella, 1998). This helps maintain the water quality of the downstream properties during a natural hazard.

***Driver*** – The capacity for soil drainage in an agroecosystem habitat affects its ability to regulate the physical, chemical, and biological changes that result from natural hazards. For example, agriculture on wet soils limits this ecosystem’s ability to capture and allow flood waters to infiltrate. As a result, sedimentation of downstream waters is exacerbated by intensified storm events on poorly managed agroecosystems (Pert et al., 2013). This can cause more erosion and negatively impact the landscape for property owners.

***Demander*** – not applicable

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

***Supplier*** – not applicable

***Driver*** – not applicable

***Demander*** – not applicable

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

***Supplier*** – not applicable

***Driver*** – not applicable

***Demander*** - not applicable

**Sources:**

Barron, J., Tharme, R.E., and Herrero, M. (2013) Drivers and Challenges for 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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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.