While there are many papers and explanations of water filtration, it seems that people have yet to explore gravity exclusion principles as part of their process (aside from AguaClara). When searching for such research, topics simply related to general gravity filtration are returned. In addition, information regarding treating water for fish is popular as well.

Traditional treatment involves treating drinking water with chemicals, and filtering with mediums such as mesh or cloth. Our team has determined that these would not be suitable for an AguaClara plant as the same build up found from the current slit method would present itself with the mesh or cloth. In addition, those materials would require replacement more regularly.

In some systems, anthracite is used to create larger particles for the water to encounter before reaching the sand phase. Perhaps this is something our group could explore in the gravity exclusion zone in some capacity.

Moving bed filters seem to be popular in aqua-ponics and pose the benefit of not requiring backwash. The filter media is able to catch catch bacteria and continuously move. That being said, the system is more complex and expensive to run.

Because it seems that outside of our organization, these principles have not been tested, our group must rely primarily on building on our own knowledge and being creative.

References:

<https://www.cdc.gov/safewater/sand-filtration.html>

* Slow sand filtration is used

<https://www.iwapublishing.com/news/filtration-processes>

* Anthracite sometimes used to create varied particle size so filtration first through larger then smaller particles
* Angular particles preferable to rounded particles to catch more
* “buoyant media filters” use mesh
* moving bed filters do not need to be stopped for backwash, they work by carrying sand naturally down, then the sand carried up through a tube and deposits are released.

<https://pentairaes.com/learn-about-aquaculture/biological-filters-pros-and-cons-of-different-types-tt128/>

* moving bed filters

<http://www.fao.org/docrep/field/003/AC012E/AC012E06.htm>

<https://www.mrwa.com/WaterWorksMnl/Chapter%2018%20Filtration.pdf>

<https://ac.els-cdn.com/S0144860905001184/1-s2.0-S0144860905001184-main.pdf?_tid=85b370a0-44a7-4549-b73c-2db23b2342f2&acdnat=1540398330_3e8e582ef5514b99c3b5477037502a31>