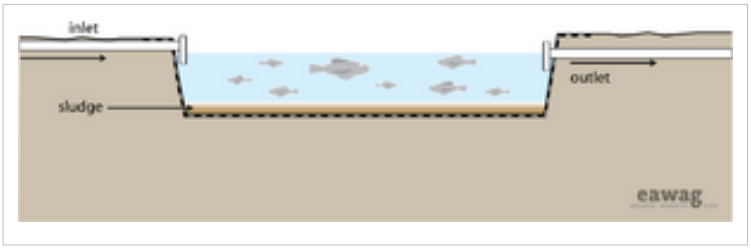
Aquaculture_Ponds

Application level		Management level	
Household		Household	
Neighbourhood	X	Shared	X
City	XX	Public	XX



Applicable to systems:	Languages / langues / idiomas
1, 5 , 6 , 7 , 8	

Inputs: Effluent

Outputs: -

Aquaculture refers to the controlled cultivation of aquatic plants and animals; this technology sheet refers exclusively to the raising of fish while the following page on Floating Macrophytes addresses the cultivation of plants. Fish can be grown in ponds where they feed on algae and other organisms that grow in the nutrient-rich water. Through feeding, the nutrients from the wastewater are removed and the fish are eventually harvested for consumption.

Three kinds of aquaculture designs for raising fish exist:

- Fertilization of fish ponds with excreta/sludge;
- Fertilization of fish ponds with effluent; and
- Fish grown directly in aerobic ponds.

When introducing nutrients in the form of effluent or sludge it is important to limit the additions such that aerobic conditions are maintained. BOD should not exceed 1g/m2d and oxygen should be at least 4mg/L. Fish introduced to aerobic ponds can effectively reduce algae and help control mosquito populations.

The fish themselves do not dramatically improve the water quality, but because of their economic value they can offset the costs of operating a treatment facility. Under ideal operating conditions, up to 10,000kg/ha of fish can be harvested. If the fish are not acceptable for human consumption, they can be a valuable source of protein for other high-value carnivores (like shrimp) or converted into fishmeal for pigs and chickens.

Advantages	Disadvantages/limitations
- Can provide a cheap, locally available protein source. - Low to moderate capital cost; operating costs should be offset by production revenue. - Potential for local job creation and income generation. - Can be built and maintained with locally available materials.	- Fish may pose a health risk if improperly prepared or cooked. - Requires abundance of fresh water. - Requires large land (pond) area. - May require expert design and installation.

Adequacy

A fish pond is only appropriate when there is a sufficient amount of land (or preexisting pond), a source of fresh water and a suitable climate. The water that is used to dilute the waste should not be too warm, and the ammonia levels should be kept low or negligible. Only fish that are tolerant of low dissolved oxygen levels should be chosen. They should not be carnivores and they should be tolerant to diseases and adverse environmental conditions. Different varieties of carp, milkfish and tilapia have been successful, but the specific choice will depend on local preference and suitability. This technology is only appropriate for warm or tropical climates with no freezing temperatures, and preferably with high rainfall and minimal evaporation.

Health Aspects/Acceptance

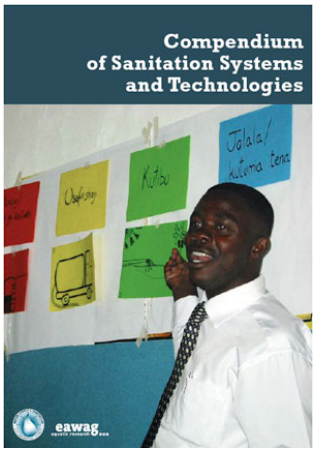
Where there is no other source of readily available protein, this technology may be embraced. The quality and condition of the fish will also influence local acceptance. There may be concern with contamination of the fish, especially during the harvesting, cleaning and preparation of the fish. If it is cooked well it should be safe, but it is advisable to move the fish to a clear-water pond for several weeks before they are harvested for consumption.

Maintenance

The fish need to be harvested when they reach an appropriate age/size. Sometimes after harvesting, the pond should be drained so that (a) it can be desludged and (b) it can be left to dry in the sun for 1 to 2 weeks to destroy any pathogens living on the bottom or sides of the pond.

Acknowledgements

The material on this page was adapted from: Tilley, E. et al. (2008). Compendium of Sanitation Systems and Technologies [2], published by Sandec [3], the Department of Water and Sanitation in Developing Countries of Eawag [4], the Swiss Federal Institute of Aquatic Science and Technology, Dübendorf, Switzerland. The publication is available in English, French, and will be made available in Spanish. Available in the IRC Digital Library [5]



Download the Eawag Compendium of Sanitation Systems and Technologies! [1]

References and external links

- Cointreau, S., et al. (1987). Aquaculture with treated wastewater: a status report on studies conducted in Lima, Perú. Technical Note 3. UNDP/World Bank, Washington D.C. USA. 1987.
- Cross, P. and Strauss, M. (1985). Health Aspects of Nightsoil and Sludge Use in Agriculture and Aquaculture. International Reference Centre for Waste Disposal, Dübendorf, Switzerland.
- Edwards, P. and Pullin, RSV. (eds) (1990). Wastewater-Fed Aquaculture. Proceedings: International Seminar on Wastewater Reclamation and Reuse for Aquaculture, Calcutta, India. (Compilation of topical papers)
- Iqbal, S. (1999). Duckweed Aquaculture-Potentials, Possibilities and Limitations for Combined Wastewater Treatment and Animal Feed Production in Developing Countries. Sandec, Dübendorf, Switzerland.
- Joint FAO/NACA/WHO Study Group (1999). Food safety issues associated with products from aquaculture. World Health Organization Technical Report Series No. 883. Available: http://www.who.int
- Mara, DD. (2004). Domestic Wastewater Treatment in Developing Countries. Earthscan, London. pp 253–261.

- Polprasert, C., et al. (2001). Wastewater Treatment II, Natural Systems for Wastewater Management. Lecture Notes. IHE, Delft. Available: http://www.who.int (Chapter 8 - Aquaculture and Reuse Aspects).
- Rose, GD. (1999). Community-Based Technologies for Domestic Wastewater Treatment and Reuse: options for urban agriculture. IDRC Ottawa. Available: http://idrinfo.idrc.ca
- Skillicorn, W., Journey, K. and Spira, P. (1993). Duckweed aquaculture: A new aquatic farming system for developing countries. World Bank, Washington, DC. Available: http://www.p2pays.org/ref/09/08875.htm (Comprehensive manual)

References

[1] http://www.eawag.ch/organisation/abteilungen/sandec/publikationen/compendium_e/index_EN
[2] http://www.eawag.ch/organisation/abteilungen/sandec/publikationen/publications_sesp/downloads_sesp/compendium_high.pdf
[3] http://www.eawag.ch/organisation/abteilungen/sandec/index_EN
[4] http://www.eawag.ch/index_EN
[5] http://www.irc.nl/docsearch/title/163208

Article Sources and Contributors

Aquaculture_Ponds *Source*: http://www.akvo.org/wiki/index.php?title=Aquaculture_Ponds *Contributors*: Marktielewestra, Niharika

Image Sources, Licenses and Contributors

Image:Aquaculture_ponds.png *Source*: http://www.akvo.org/wiki/index.php?title=File:Aquaculture_ponds.png *License*: unknown *Contributors*: Marktielewestra
Image:english_flag.gif *Source*: http://www.akvo.org/wiki/index.php?title=File:English_flag.gif *License*: unknown *Contributors*: Marktielewestra
Image:french_flag.gif *Source*: http://www.akvo.org/wiki/index.php?title=File:French_flag.gif *License*: unknown *Contributors*: Marktielewestra
Image:spanish_flag.gif *Source*: http://www.akvo.org/wiki/index.php?title=File:Spanish_flag.gif *License*: unknown *Contributors*: Marktielewestra
Image:Icon_aquaculture.png *Source*: http://www.akvo.org/wiki/index.php?title=File:Icon_aquaculture.png *License*: unknown *Contributors*: Marktielewestra
Image:compendium.jpg *Source*: http://www.akvo.org/wiki/index.php?title=File:Compendium.jpg *License*: unknown *Contributors*: Marktielewestra