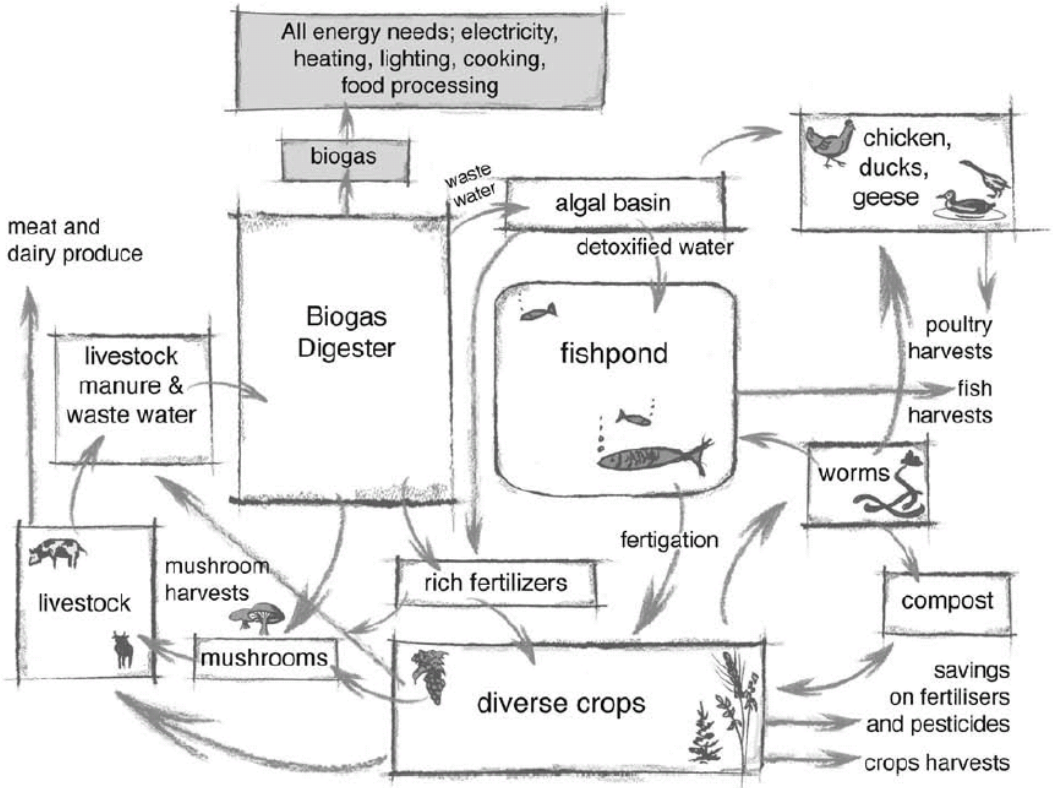
Handout – activity on:
Closed-loop economy



Sense & Sustainability: *Educating for a circular economy*, Ken Webster & Craig Johnson

Introduction of the dream farm:

It is an elegant and thorough imitation of living systems in operation, which has the potential to add more animal protein to organic systems and produce marked reductions in climate changing emissions at the same time. It is closed-loop thinking par excellence. **The key is biodigestion of animal waste.**

The anaerobic digester takes in livestock manure plus wastewater and generates biogas, which provides all the energy needed for heating, cooking and electricity.

The partially cleansed wastewater goes into the algal basin where the algae produce by photosynthesis all the oxygen needed to detoxify the water, making it safe for the fish.

The algae are harvested to feed chickens, ducks, geese and other livestock. The fishpond supports a compatible mixture of 5–6 fish species. Water from the fishpond is used to 'fertigate' crops growing in the fields or on the raised dykes.

Aquaculture of rice, fruit and vegetables can be done in floats on the surface of the fishpond. Water from the fishpond can also be pumped into greenhouses to support aquaculture of fruit and vegetables.

The anaerobic digester yields a residue rich in nutrients that is an excellent fertilizer for crops. It could also be mixed with algae and crop residues for culturing mushrooms after steam sterilisation. Mushrooms have magical properties to remove contaminants and pollution from the soil.

The residue from mushroom culture can be fed to livestock or composted. Crop residues are fed back to livestock. Crop and food residues are used to grow earthworms to feed fish and fowl. Compost and worm castings go to condition the soil. Livestock manure goes back into the anaerobic digester, thus closing the grand cycle.

The result is a highly productive farm that's more than self-sufficient in food and energy.