

Lecture 8



Feeds and Feeding

Feed and feeding



☞ Boosting productivity

- ☞ In order to increase the natural productivity of a pond the farmer can fertilize the water
 - ☞ Make a compost heap so compost can be added to the pond. This will result in a boom of zooplankton and phytoplankton which the fish can feed on.
 - ☞ Composting is a simple and cost effective way to increase the natural productivity of a pond.
 - ☞ The compost can also be used on the crops the help grow your vegetables



Feed and feeding



❧ Making compost

- ❧ Build up alternating layers of
 - ❧ Plant matter – grass cuttings, weeds, leaves, twigs etc...)
 - ❧ Soil
 - ❧ Manure (Cattle, sheep, chicken etc...)
- ❧ Water between each layer
- ❧ Cover for faster compost
- ❧ Turn every 2 weeks



Feed and feeding



❧ Adding compost to the pond

❧ In order to have control over where and how the blooms will occur you need to build a compost cage.

❧ It should be build in a shallow corner, the cage will prevent the compost being washed away or mixed up in the water.

❧ The larger the pond the more compost cages you will need.

❧ A newly filled pond should get about 50kg of compost for every 100m² and then approximately 10kg for every 100m² per week.

❧ If you do not have enough compost, manure can also be used

❧ If you use chicken manure do not use more than 3kg/week

Feed and feeding



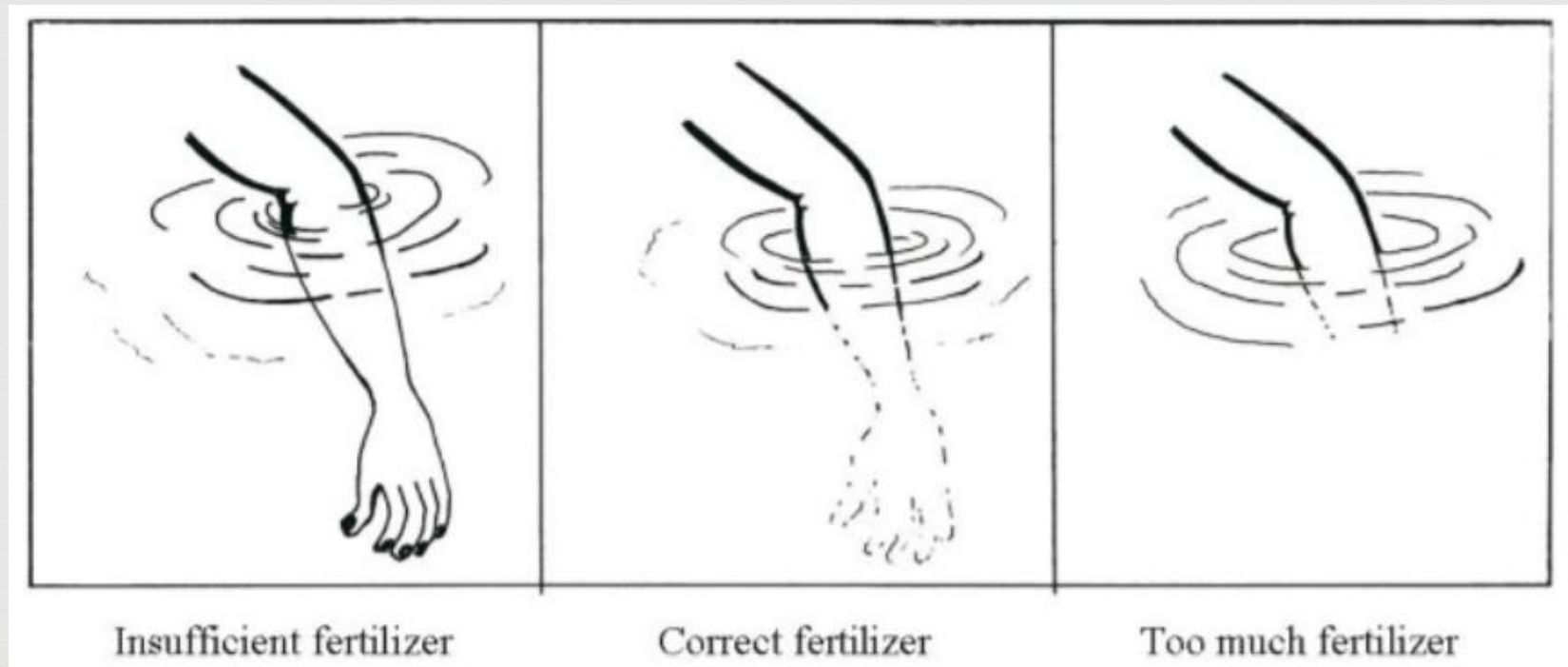
- ❧ When using compost or manure it is important not to use too much
 - ❧ This will cause the dam to become eutrophic
 - ❧ Too many nutrients will cause an algal bloom which can cause the water to become anoxic (No Oxygen)



Feed and feeding



- ✧ The water should be green but clear
 - ✧ A simple test is to submerge your arm in the water



Feed and feeding



Feed and feeding



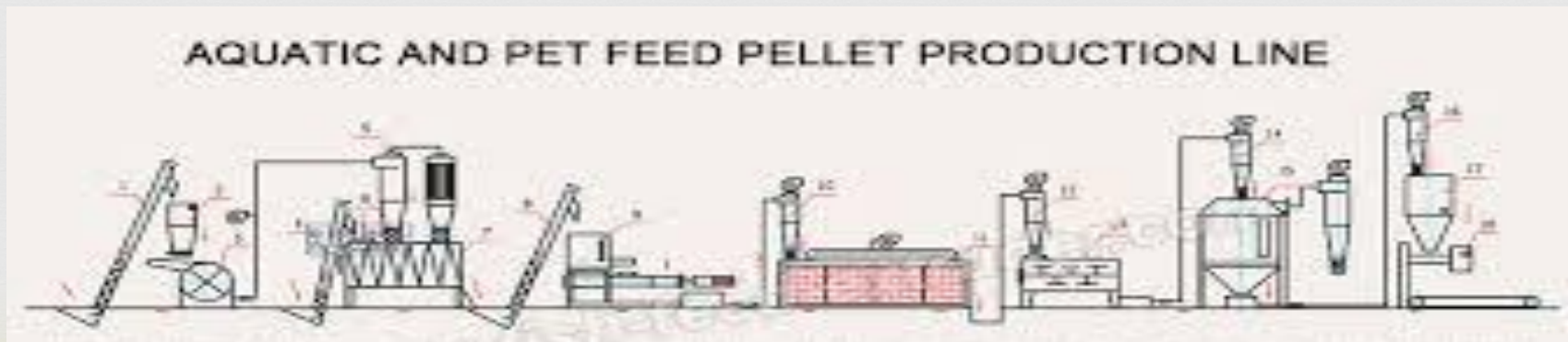
- ❧ There are many composts and fertilizers that can be used to boost the productivity of your pond
 - ❧ With proper use of fertilizer the yield of an extensive pond system can increase 2 to 5 fold.
- ❧ Some farmers may want to increase production even further and will need to add fish food.



Feed and feeding



- ❧ Fish food is expensive!
 - ❧ Use of feeds need to be done carefully and accurately
- ❧ Feeding fish and the increased density results in an increase on the biological load in the pond
 - ❧ Higher levels of management and water quality will need to be maintained
 - ❧ Increased water exchange and aeration maybe required



Feed and feeding



- ❧ Like all animals fish need energy for metabolism, movement and growth
 - ❧ This energy is provided by food
- ❧ The nutritional requirements of fish vary between species
 - ❧ Having the right diet for the right fish is best

Nutritional requirements of the juvenile stages of local aquaculture species:

Nutrient	Species			
	Tilapia	Common carp	Trout	Catfish
Protein	35%	25–38%	40%	40–42%
Lipid (fat)	8%	Up to 18%	12%	10–12%
Energy (Kcal/kg)	2500–4300	2700–3100	2800–3000	2800–3100

Various types of artificial feeds and their uses:

FEED TYPE	SIZE	ATTRIBUTES
Artemia or brine shrimp	Microscopic	Artificially newly-hatched livefood for fish fry. Contains all the feed requirements for swim-up fry. Dried eggs are available in cans that are easily stored until used.
Specialised dry micro-sized fry and larval feeds	Several microns only	In powder form for swim-up fry and very small juveniles. Can be laced with hormones or other treatments, such as to produce mono-sex tilapia.
Flakes	Thin, easily crumbled	Ideal high-protein feed for small fish and ornamental species.
Spirulina flakes or pellets	1–5 mm	Spirulina-based dry foods for vegetarian fish, like some tilapia and ornamental species.
Crumbles	0.1–1 mm	Residue of pellets, ideal for juvenile fish.
Pellets	0.5–1 mm	Fishmeal-based balanced diet for juveniles and fingerlings.
	1–3 mm	Used to stimulate growth of juveniles and sub-adult fish, with high protein content.
	3–5 mm	Reduced protein content for adult fish.
Floating	1–5 mm	For surface-feeding fish like trout.
Sinking	1–5 mm	For bottom-feeding fish like tilapia, carp and catfish.
Chicken or rabbit pellets	3–5 mm	Not designed for fish, but acceptable to most tilapia, carp or catfish species. May be more readily available than actual fish pellets.

Feed and feeding



- ❧ It is important to feed fish only as much as they will eat
 - ❧ Over feeding is a waste of money
- ❧ Over feeding can lead to poor water quality
 - ❧ This can cause mass mortality in the pond!!!



Feed and feeding



- ❧ Always monitor the fish when you feed them
 - ❧ Take time to examine their behaviour
 - ❧ How long does it take to eat all the food?
 - ❧ Feed in small batches, the fish should eat everything in 30 seconds or less
 - ❧ Feed until the feeding begins to slow down



Feed and feeding



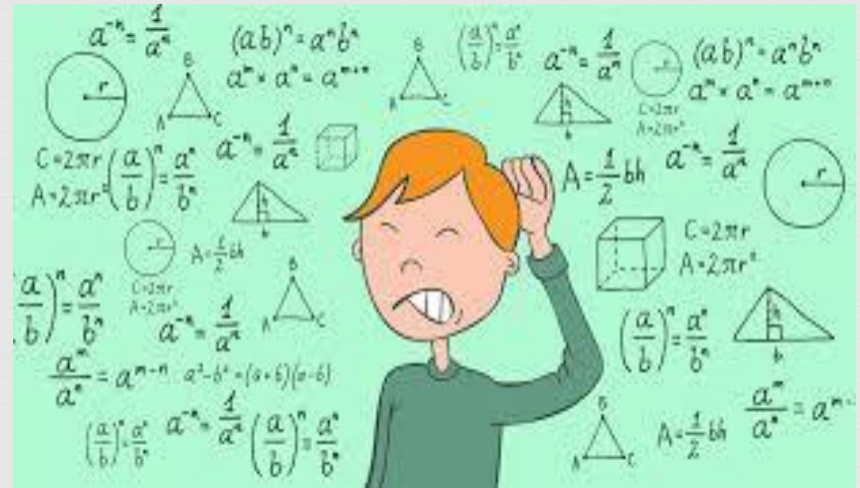
- ❧ A number of small feeds during the day is better than a single feed
 - ❧ For fry and fingerlings you need to feed every 2 hours
 - ❧ As they get bigger you can increase the time between feeds
 - ❧ Once the fish are above 200g 2-3 feeds a day is good
- ❧ If the fish are looking stressed reduce or stop feeding and check the water quality



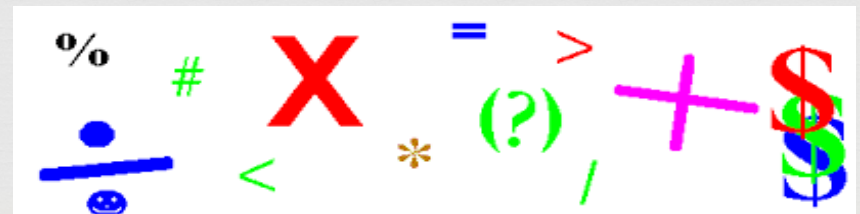
Feed and feeding



- Water quality and feed are linked
 - More feed = More waste = Less oxygen
 - Aeration
 - If oxygen saturation drops below 5mg/l it is best to stop feeding and figure out why.



- Knowing exactly how much you should be feeding your fish requires good management
- Calculated as % body mass per day

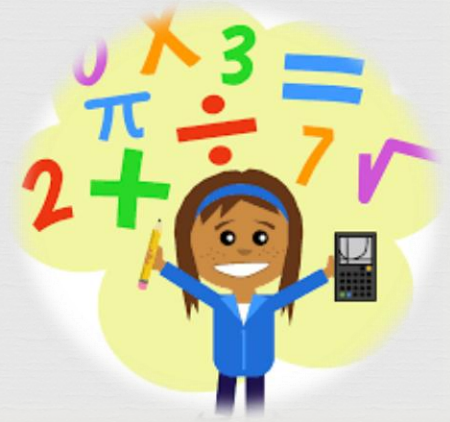


Feed and feeding



Example

- You have 20 fish in your pond.
 - Each fish is 250g in weight
 - $20 \times 250\text{g} = 5\text{kg}$
 - The total body mass of the fish in the pond is 5kg
 - The recommended feeding rate is 3% BM/Day
 - $5\text{kg} \times (3/100) = 0.15\text{kg}$ or 150g
 - You need to feed your fish 150g per day
 - BUT, you need to feed them 3 time per day
 - $150\text{g}/3 = 50\text{g}$ per feed.



Feed and feeding



☞ Fish grow....

☞ This means that you need to feed them more as they grow.

☞ Good stock management allows a farmer to know exactly how many fish there are and much they weigh

☞ A good farmer calculates the feed required every few days

Recommended feeding levels (% of body weight/day) for catfish at different temperatures (Hogendoorn *et al.*, 1983).

Temperature (°C)	Fish body weight (g)					
	1	5	25	50	100	200
21	3.6	2.5	1.7	1.4	1.2	1
23	5.1	3.7	2.6	2.3	2.0	1.7
25	6.5	4.7	3.4	3.0	2.6	2.3
27	7.4	5.4	3.9	3.4	3.0	2.6
29	7.9	5.6	4.0	3.5	3.0	2.6
31	8.0	5.5	3.8	3.2	2.7	2.3
33	7.8	5.1	3.4	2.8		