



Global Conference on Aquaculture 2010

Farming the waters for People and Food

22-25 September 2010, Phuket, Thailand

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**Global Conference
on
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Guest lecture :
**Is feeding fish with fish a viable
practice?**

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22–25 September 2010, Phuket, Thailand



VIABLE ??

Practice commercially viable? – not the issue

Practice consistent with reducing hunger? – Yes an issue
More or less fish?
Wrong fish?

Practice consistent with sustaining the environment? Yes an
issue
Jeopardizes survival flora/fauna?

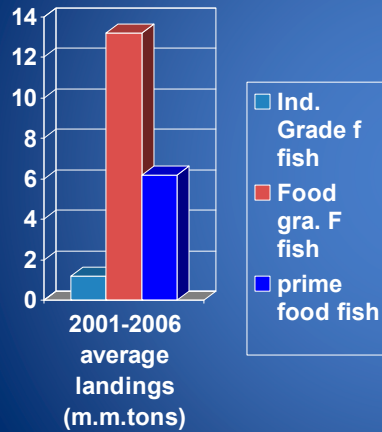
All Concerns considered?

- Reducing hunger/increasing consumption: more cheap food positive;
- But not enough: essential to increase incomes of the poor/consumer
- This practice affects income – so we need to study changes in income (employment)

Fish as feed: two systems

- Industrial feeds
- Industrial fishing
- Fish meal and oil
- Fish feeds
- Cultured fish/shrimps
- Farm made feeds
- Bycatch – trash fish
- Raw fish to fish farm
- Mix of raw fish and other ingredients at farm
- Cultured fish/shrimps

Industrial feeds: more or less fish as food?



- IG forage fish 100 %
 - FG forage fish: 90 %
 - Prime food fish: ??
 - Total fish used for fish oil/meal about 13 m.m.tons leading to 8 m.m. tons aquaculture produce
- Assuming 60 % for aquaculture

But: relatively expensive fish?

Additional aquaculture production

	Share of fishmeal used in aquaculture in 2008	Fishmeal inclusion rate	Feed conversion rate	Total cultured output for 1000 t forage fish
Salmon and trout	29	24	1.2	222
Shrimps	28	18	1.7	202
Marine fish	21	30	1.9	81
Other species	22	5	1.7	565
TOTAL	100			1070

Additional aquaculture employment

	Total production in million metric tons	Productivity of labour (mt per man year)	Total additional employment
Salmon and trout	1.78	100 12	17 760 148 000
Shrimps	1.62	1.3 1.3	1 240 000 1 240 000
Marine fish	0.65	5	129 600
Other species	4.52	10	452 000
TOTAL	8.57		3 237 360

Farm made feeds: more/less fish as food?

- Difficult: documentation of practice is scarce
- FAO report: 5 - 6 million tons low value fish used some years ago
 - Negative effects: reduces supply of food – at most 6 mt – for low income consumers; 5 mt reasonable?
 - Positiv effects: increases supply of food (about 3 m tons)
- Conclusion
 - Negative effects on volume of overall supply (about 1 – 2 m tons)
 - Produce: relatively expensive fish

Farm made feeds: more or less employment: exploratory calculation

- Add: directed fisheries ~ 0.1 m my
- Add: make fish feeds ~ 0.4 m my
- Deduct: fish retail ~ 0.7 m my
- Add: aquaculture ~ 1.0 m my

- Total: additional between 0.8 m my

Industrial feeds: environmental effects

- Industrial feeds:
 - With few exceptions major industrial fisheries for forage fish are now managed;
 - Naturally effects eco-system
 - But, unlikely that in future excessive fishing will cause extinction of forage fish stocks; or of other predators

- Conclusion: environmentally viable/acceptable

Farm made feeds & environment

- Major problem: low value fish (by-catch) contains juvenils of commercial species
- Solution found in "normal" fisheries management
- Legal restrictions on use of by-catch not solve problem
- But not a global issue: raw fish as part of farm made feeds is concentrated in some Asian countries

Summary of impacts on volumes of fish as food, on employment and on environment

PRACTICE	Prime fish	Cheap Fish as food	Empl. Man. Lab	Empl. other	Env. impact
Ind. feed	++++++	+	++++	+	Reasonable
Farm made feed	+++	----	++ ?	NSI	Not reasonable
Tuna fattening	-	NSI	NSI	NSI	Reasonable
Trimming	+	NI	NSI	NSI	Positive