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Water Quality in Rivers Affected by Caged Fish Farms and Rice Field Effluents

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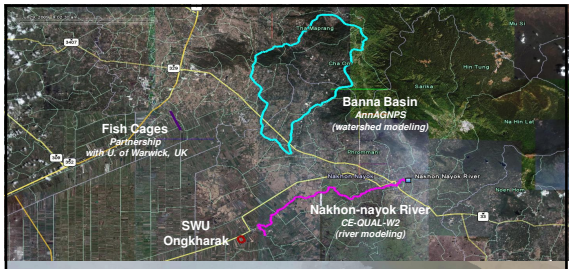


"Investigations into the water quality in rivers affected by caged fish farms and rice field effluents", *a partnership grant between The University of Warwick, UK, and Srinakharinwirot University, Thailand*, managed by British council

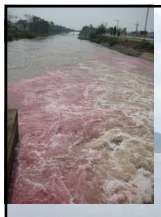
BACKGROUND

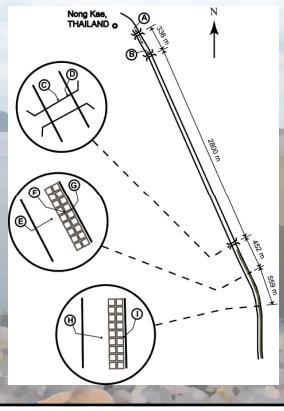
- In May 2008, at Klong 13, Nongkae district
- A large number of fish died
- More than 40 million Baht loss.
- What is the reason of the fish died

Fish cages at Nongkae, Klong 13

Rice paddy nearby

Dye Tracing and Water sampling





Location of dye injection (A)

Locations of water samplings (C-I)

Buffaloes went out for food

We went out for fish (cages)

How happy we are !

Back at sunset

Water quality of Klong 13, Nongkae district

Parameter	Unit	Typical Values	Tilapia Standard	Standard in Thailand	Field Measurement	
					Mid Stream	Bank
pH	-		6 -9 (but can withstand 5-10)	5-9 for aquatic life	7.7	7.6
Conductivity	mS/cm	150 - 300			199	201
Turbidity	NTU	0.5 for drinking			270	274
Dissolved Oxygen (DO)	mg/L	> 8 is excellent	Can survive very low concentrations of DO but should be >1mg/L	>3.0 for aquatic life	5.7	5.4
Temperature	°C		85-88 F (29-31 C) they can't tolerate low temperatures	23-32 for aquatic life	32	32

Water quality of Klong 13, Nongkae district (continued)

Parameter	Unit	Typical Values	Tilapia Standard	Standard in Thailand	Field Measurement	
					Mid Stream	Bank
Total Dissolved Solids (TDS)	mg/L				232	223
Total Suspended Solids (TSS)	mg/L			<25 for aquatic life	73	72
Biological Oxygen Demand (BOD)	mg/L	1 – 2 is very good		1.5	3	3
Chemical Oxygen Demand (COD)	mg/L	Lower is better			12.5	16.7

Water quality of Klong 13, Nongkae district (continued)

Parameter	Unit	Typical Values	Tilapia Standard	Standard in Thailand	Field Measurement	
					Mid Stream	Bank
Ammonia (NH_3-N)	mg/L		Many will die if suddenly transferred to water with > 2mg/L. >1mg/L causes losses	0.5	0.28	0.28
Total Phosphorus (TP)	mg/L	0.1			0.06	0.12
Total Coliforms	MPN/100 mL			5,000 class 2	680	1668

(Modified from: Sim Natasha , 2010)

Water quality of rice paddies

Types of rice paddies	Quality paramiters		
	Waste (m^3/rai/year)	BOD (mg/L)	BOD loading (kg/rai/d)
in-season rice field	820	2.4	0.005
double-crop rice field	488	5.5	0.007

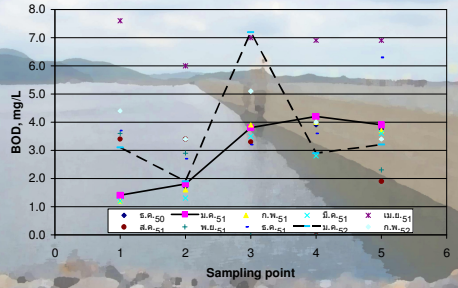
From Pollution Control Department (PCD)

1 rai = 1600 m^2

Water quality of Klong 13, Nongkae district

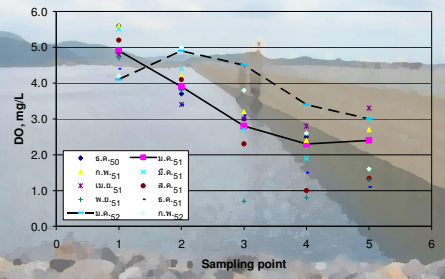
Parameter	Unit	Typical Values	Tilapia Standard	Standard in Thailand	Field Measurement	
					Mid Stream	Bank
Biological Oxygen Demand (BOD)	mg/L	1 – 2 is very good		1.5	3	3

While BOD at Klong 13 = 3 mg/L



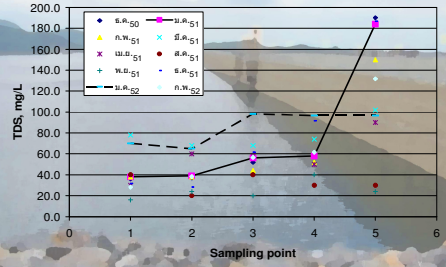
Data of the Nakhon-nayok river from Dec 2007 to Feb 2009

While DO at Klong 13 = 5.5 mg/L



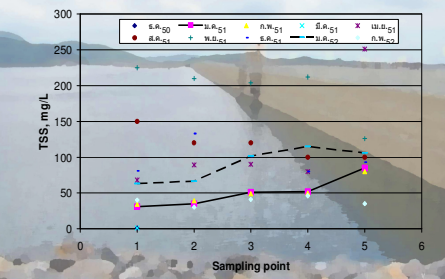
Data of the Nakhon-nayok river from Dec 2007 to Feb 2009

While TDS at Klong 13 = 230 mg/L

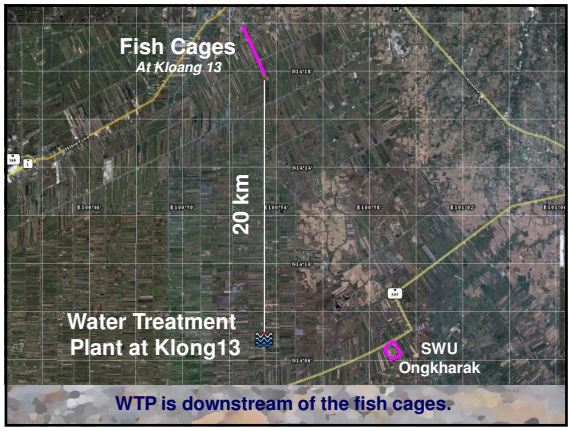


Data of the Nakhon-nayok river from Dec 2007 to Feb 2009

While TSS at Klong 13 = 73 mg/L



Data of the Nakhon-nayok river from Dec 2007 to Feb 2009



WTP is downstream of the fish cages.

CONCLUSIONS

- Water quality at Klong 13, Nongkae, is quite similar to that of the Nakhon-Nayok River
- DO was high due to fast flow rates at Klong 13
- TDS was also high probably because of organic pollution from somewhere (agricultural or domestic waste)
- Water treatment plant is downstream
- Awareness of water quality at Klong 13

END