

Agriculture and irrigation development in GMS region and pressure on Mekong's water resources

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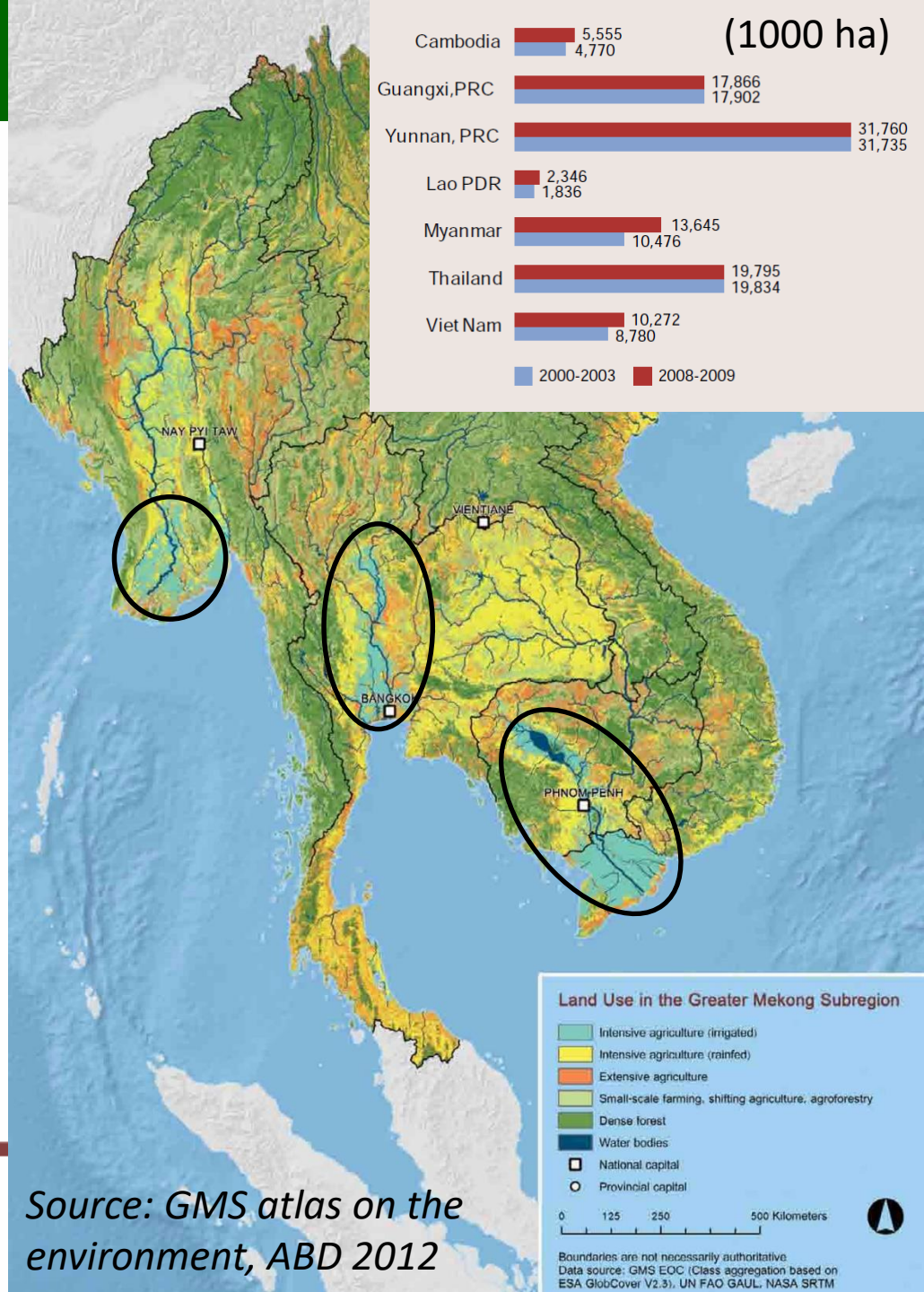
Overview

- Agriculture provides livelihoods for more than 70% of the Mekong Basin's population.
- It is an important engine of economic growth and poverty reduction in the GMS countries.
- The sector plays a very important role in food security for the region and the world.



Source: GMS atlas on the environment, ABD 2012

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GDP share of agriculture

	GDP share of Agriculture (%)		GDP per Capita ($/year)	
Country	2000	2010	2000	2010
Cambodia	37.90	36 .00	290.00	788.00
PRC				
Guangxi	26.80	17.50	561.84	2,986.56
Yunnan	20.70	12.81	560.00	2,327.00
Lao PDR	48.54	30.81	303.47	1,003.71
Myanmar	57.20	36.40	177.64	742.44
Thailand	9.02	12.42	1,983.32	4,992.43
Viet Nam	24.53	20.58	401.57	1,173.55

Source: GMS atlas on the environment, ABD 2012

Agriculture is still an important sector in contributing to GDP of Cambodia, Lao PDR, Myanmar, Viet Nam and Yunnan province in China (more than 20% of the total GDP)

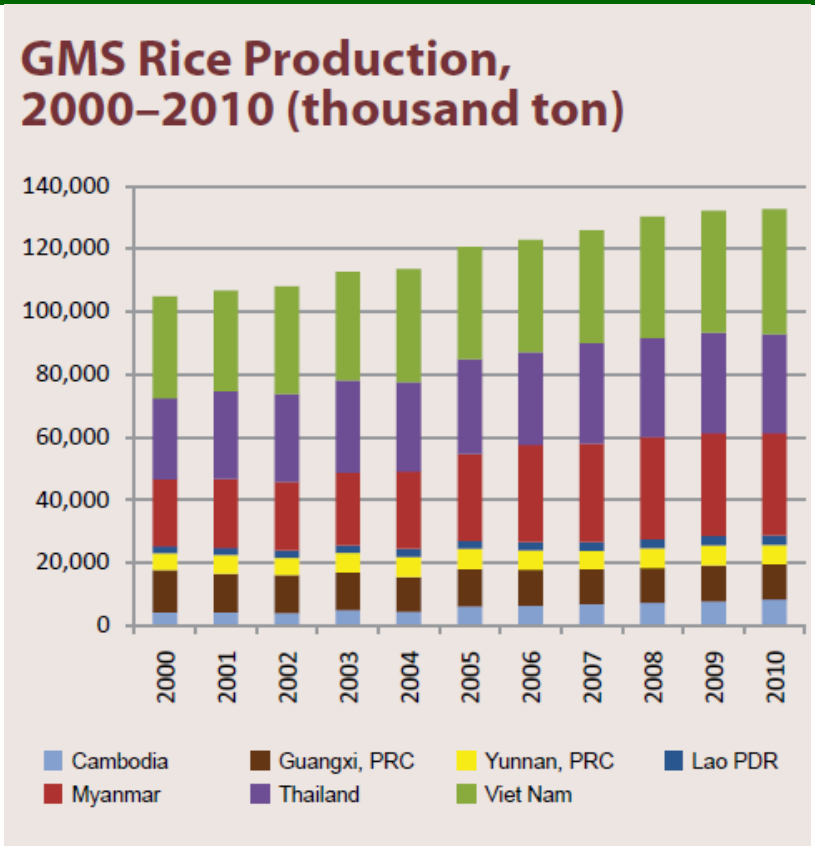
Major crops

- The Lower Mekong countries produced rice more than 100 million tons of paddy rice in 2014, almost 15% of the world total[1].
- The Mekong Basin is called as the "rice bowl of Asia"
- Other important export crops include cassava, corn, sugarcane, soy beans, coffee, rubber and fruits

[1]*Source: World Rice Statistics, International Rice Research Institute, 2014*

Trends in agriculture development

- Agriculture production and area in GMS will be expanded and intensify to produce more food for serving large population in the region and in the world.
- Shifting from traditional subsistence farming to modern commercial farming practices.
- Increasing agrochemical use, and mechanization
- Many farmers have switched from growing rice to producing commercial crops, such as fruits, vegetables, rubber, coffee and pulpwood.



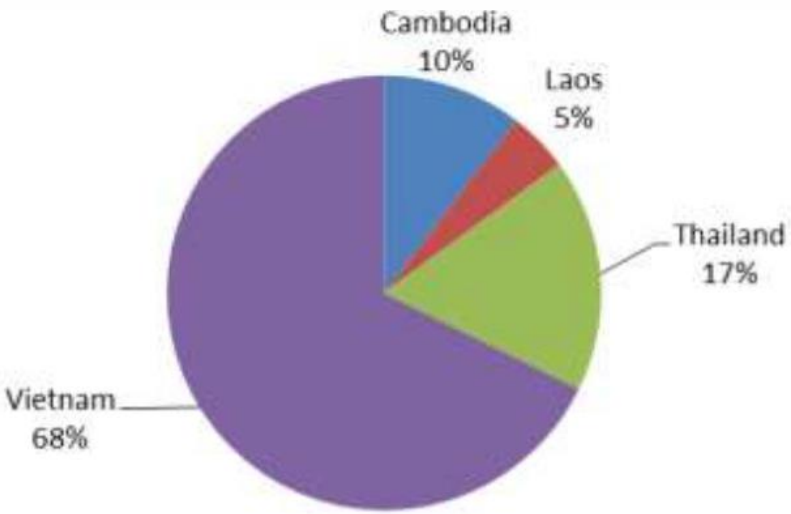
Source: GMS atlas on the environment, ABD 2012

- Increasing opting for ”green revolution” approaches and technologies rather than land expansion.

Irrigation development

- Irrigation development plays an important role in GMS country policies to increase rice production and exports, diversify food production, respond to food security needs and address rural poverty.
- The proportion of agriculture land in the Lower Mekong Basin that is irrigated is quite small, particularly in Cambodia and Lao PDR.
- Productivity in irrigated area is much higher than rain-fed cropping area. Yields in irrigated paddy in the dry and wet seasons are higher than those in rainfed paddy by 35-65 % and 20% respectively.

Share of irrigated area in the Lower Mekong basin at present state (2016)



Total irrigated area in the Lower Mekong Basin is estimated between 4-5 million ha

Source: Council study, interim report, MRC 2016

Irrigation development plan

- **Cambodia** has no development horizon that goes further than the current five year plan that will end in 2019. The country will remain dependent of the funding capacities of international donors and financial organizations to implement its development.
- **Laos** has proposed a clear strategy for the development of the large irrigation projects. Their development is to be connected to the development of the large dams for hydropower purpose.
- **Thailand** continue feasibility study on developing irrigation scheme in North-East Region (Klong-Chi-Mun basins) to reduce poverty of the poor and to serve food security.
- **Vietnam** has depicted it roadmap for the development of the sector. The Mekong delta area will foresee a decay of its irrigated agriculture driven by the urbanization growth, effects of the climate change (salinization and sea level rise) and upstream development.

Source: Council study, interim report, MRC 2016

Key pressures on Mekong's water resources

1) Excessive use of water resources

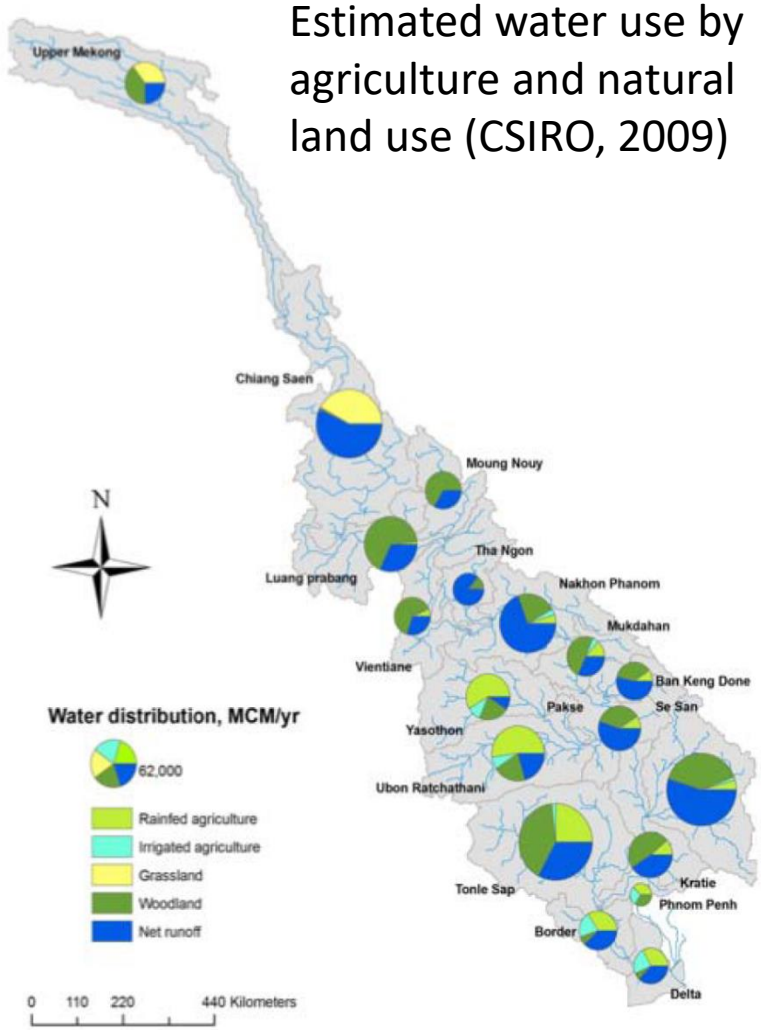
Agriculture is the largest user of water in all the Lower Mekong countries which consuming about 90-95% of total withdrawals or an estimated 41.8 billion m^3 of freshwater resources per year. Water demand for agriculture development in Cambodia, Lao PDR and Thailand is expected to increase significantly in the future, resulting increased competition between users and increased water scarcity.

Country	Total annual withdrawals (billion m^3)	% Agriculture	% Domestic	% Industry
Cambodia	33.23	94.0	4.5	1.5
Lao PDR	0.09	91.4	3.7	4.9
Thailand	113.30	90.4	4.8	4.8
Vietnam	2.18	94.8	1.5	3.7

Source: FAO-AquaStat (2017)

Key pressures on Mekong's water resources

Estimated water use by agriculture and natural land use (CSIRO, 2009)



MRC has projected that the irrigation area the Lower Mekong Basin in Definite Future Scenarios (DSF) in 2020 will be increased by 24% or about 1.1 million ha compared with Early Development (ED) in 2007.

Country	*ED - 2007*	*DFS - 2020*	*Incr.*
Cambodia	488 433	756 008	35%
Laos	209 116	309 068	32%
Thailand	809 671	1 582 554	49%
Vietnam	3 162 346	3 145 432	-1%
Total	4 669 566	5 793 062	***24%***

Source: Council study, interim report, MRC 2016

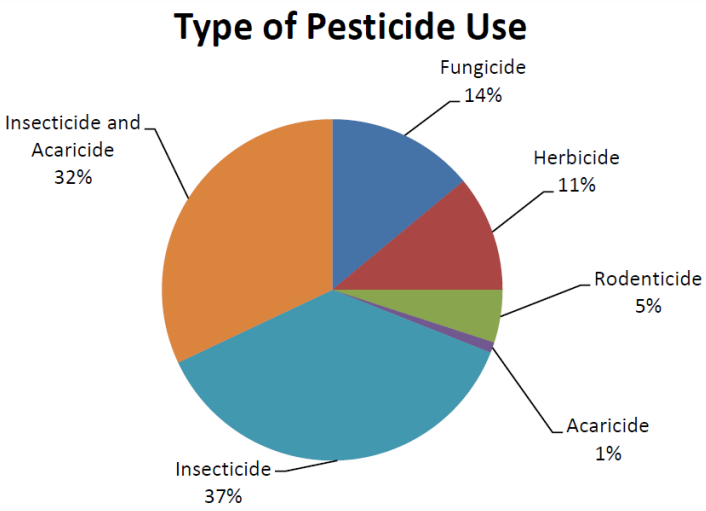
Key pressures on Mekong's water resources

2) Increasing waste water pollution

Excessive fertilizer and pesticide use as well as and waste water from agriculture land and agro-factories have caused negative impacts on water quality and health of biodiversity in the Mekong Basin.

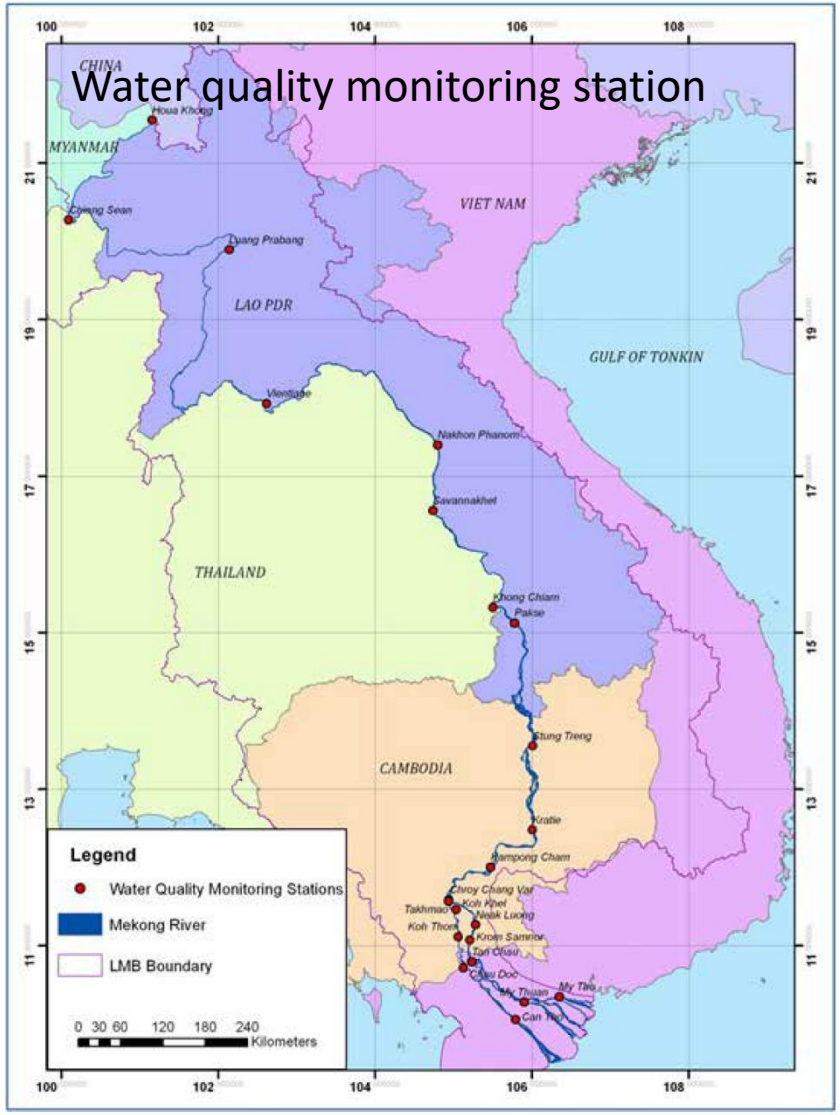
Fertilizer use in Cambodia by region, in kg /ha

Crops	Mekong Plain			Tonle Sap		
	2007	2009	2011	2007	2009	2011
Dry season rice	261.7	199.4	194.2	108.2	101.4	153.2
Wet season rice	127	200.1	142.8	79.4	103.5	84.4
Corn	112.6	129.9	176.8	161.1	52.3	55
Cash crops	179.7	206.9	170	46.1	50.4	67.3
Cassava	48.2	82.8	95.8	0	27.2	85.3
Vegetables	365	293.4	203.8	141.2	201.6	71.9
Others	188.2	221.4	161.5	135.6	134	158.3
Crops	**Coastal**			**Plateau/Mountain**		
	2007	**2009**	**2011**	**2007**	**2009**	**2011**
Dry season rice	0	182.2	179.4	50.4	61.3	177
Wet season rice	163.3	141	105.2	93.3	124.4	126.4
Corn	377.5	39.9	174.5	0	25.2	50.4
Cash crops	342.9	195.8	145.5	65	52.8	69.4
Cassava	0	35.5	70.9	0	90.1	30.9
Vegetables	566.1	118.2	235.7	340.1	257.4	225
Others	416.1	179.1	116.7	118.6	104	89.1



Source: CARDI, CSES 2007–2011

Status of water quality in the Mekong River



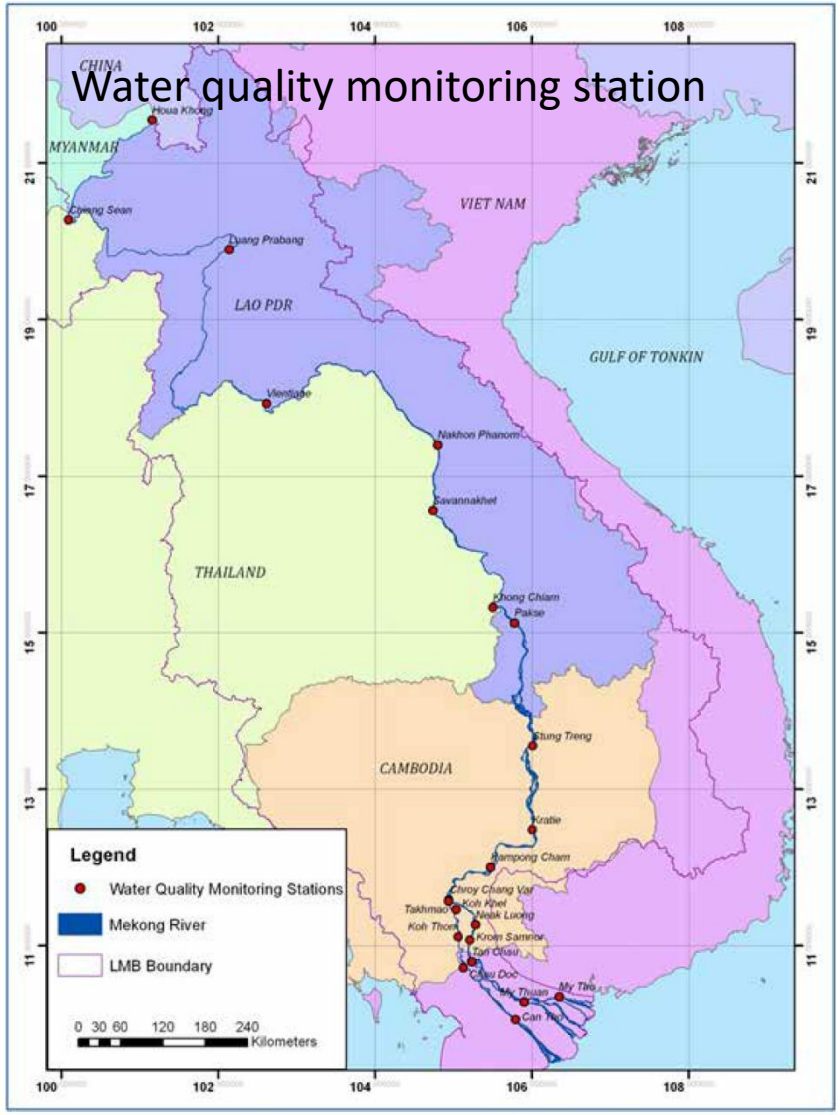
A	A: High;
B	B: Good;
C	C: Moderate;
D	D: Poor;
E	E: Very Poor

Water quality index for the protection of human health

No.	Station Names	Rivers	Countries	Class					
				2009	2010	2011	2012	2013	2014
1	Houa Khong	Mekong	Lao PDR	A	B	A	B	B	C
2	Chiang Sean	Mekong	Thailand	B	B	A	B	B	B
3	Luang Prabang	Mekong	Lao PDR	A	B	A	B	A	B
4	Vientiane	Mekong	Lao PDR	A	B	A	B	B	B
5	Nakhon Phanom	Mekong	Thailand	B	B	B	B	B	B
6	Savannakhet	Mekong	Lao PDR	A	A	A	B	B	C
7	Khong Chiam	Mekong	Thailand	B	B	A	B	B	B
8	Pakse	Mekong	Lao PDR	A	A	A	A	B	A
9	Stung Trieng	Mekong	Cambodia	A	A	A	A	A	A
10	Kratie	Mekong	Cambodia	A	A	A	A	A	A
11	Kampong Cham	Mekong	Cambodia	A	A	A	A	A	A
12	Chrouy Changvar	Mekong	Cambodia	A	A	A	A	A	A
13	Neak Loung	Mekong	Cambodia	A	A	A	A	A	A
14	Krom Samnor	Mekong	Cambodia	A	A	A	B	A	A
15	Tan Chau	Mekong	Viet Nam	C	B	B	A	A	A
16	My Thuan	Mekong	Viet Nam	B	C	A	A	B	A
17	My Tho	Mekong	Viet Nam	C	C	B	B	B	B
18	Takhmao	Bassac	Cambodia	A	A	A	A	B	C
19	Koh Khel	Bassac	Cambodia	A	B	A	B	B	A
20	Koh Thom	Bassac	Cambodia	A	A	A	B	B	A
21	Chau Doc	Bassac	Viet Nam	C	C	B	B	A	A
22	Can Tho	Bassac	Viet Nam	B	C	B	A	A	A

Source: 2014 LOWER MEKONG REGIONAL WATER QUALITY MONITORING REPORT, MRC

Status of water quality in the Mekong River



A	A: High;
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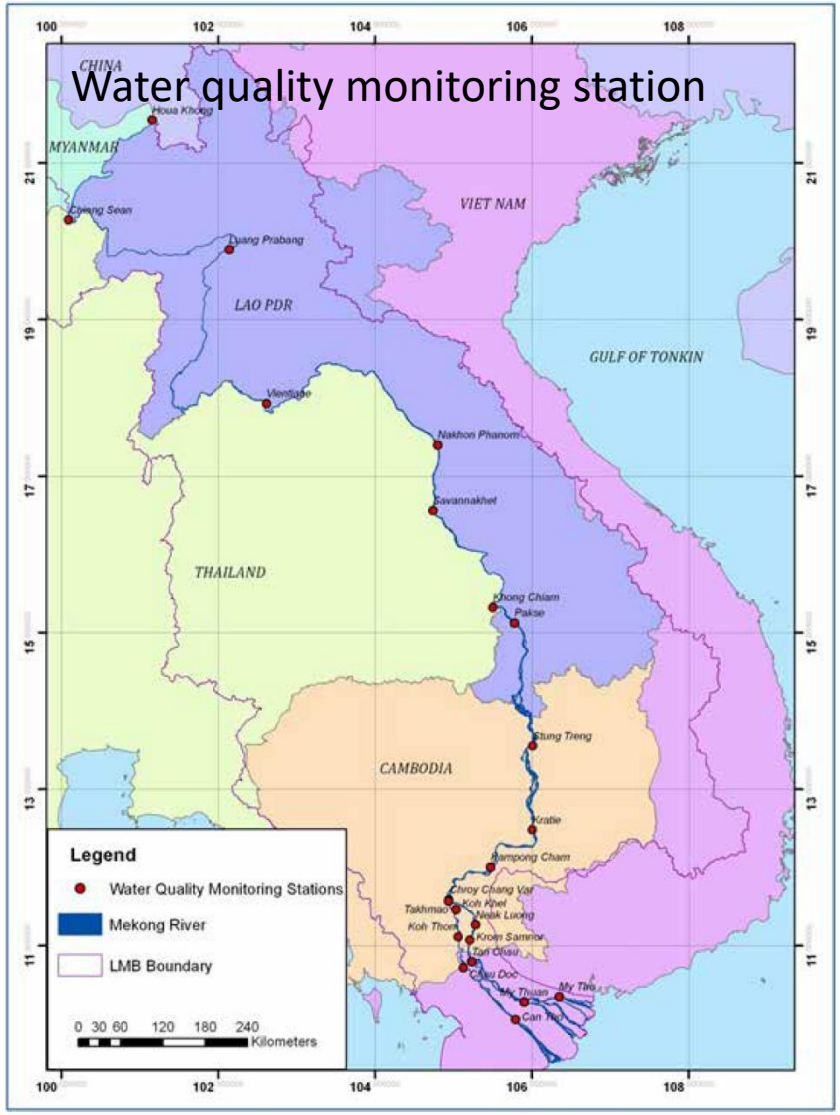
D	D: Poor;
E	E: Very Poor

Water quality index for the protection of aquatic life

No.	Station Names	Rivers	Countries	Class					
				2009	2010	2011	2012	2013	2014
1	Houa Khong/ Xieng Kok	Mekong	Lao PDR	A	A	A	B	B	B
2	Chiang Sean	Mekong	Thailand	B	B	A	B	B	A
3	Luang Prabang	Mekong	Lao PDR	A	B	A	A	B	B
4	Vientiane	Mekong	Lao PDR	A	A	A	A	B	B
5	Nakhon Phanom	Mekong	Thailand	A	B	A	B	B	A
6	Savannakhet	Mekong	Lao PDR	A	A	A	A	B	B
7	Khong Chiam	Mekong	Thailand	A	A	A	A	B	A
8	Pakse	Mekong	Lao PDR	A	A	A	A	B	B
9	Stung Trieng	Mekong	Cambodia	B	B	B	B	B	B
10	Kratie	Mekong	Cambodia	B	B	B	B	B	B
11	Kampong Cham	Mekong	Cambodia	B	B	B	B	B	A
12	Chrouy Changvar	Mekong	Cambodia	B	B	B	B	B	B
13	Neak Loung	Mekong	Cambodia	B	B	B	B	B	B
14	Krom Samnor	Mekong	Cambodia	B	B	B	B	B	B
15	Tan Chau	Mekong	Viet Nam	B	B	B	B	B	B
16	My Thuan	Mekong	Viet Nam	B	B	B	B	B	B
17	My Tho	Mekong	Viet Nam	C	C	C	B	C	C
18	Takhmao	Bassac	Cambodia	B	B	B	B	B	B
19	Koh Khel	Bassac	Cambodia	B	B	B	B	B	B
20	Koh Thom	Bassac	Cambodia	B	B	B	B	B	A
21	Chau Doc	Bassac	Viet Nam	B	B	B	B	B	B
22	Can Tho	Bassac	Viet Nam	C	C	C	C	C	B

Source: 2014 LOWER MEKONG REGIONAL WATER QUALITY MONITORING REPORT, MRC

Status of water quality in the Mekong River



A	A: No restriction;
B	B: Some restriction;
C	C: Severe restriction ;

Water quality index for agriculture use

No.	Station Names	Rivers	Countries	Class					
				2009	2010	2011	2012	2013	2014
1	Houa Khong/ Xieng Kok	Mekong	Lao PDR	A	A	A	A	A	A
2	Chiang Sean	Mekong	Thailand	A	A	A	A	A	A
3	Luang Prabang	Mekong	Lao PDR	A	A	A	A	A	A
4	Vientiane	Mekong	Lao PDR	A	A	A	A	A	A
5	Nakhon Phanom	Mekong	Thailand	A	A	A	A	A	A
6	Savannakhet	Mekong	Lao PDR	A	A	A	A	A	A
7	Khong Chiam	Mekong	Thailand	A	A	A	A	A	A
8	Pakse	Mekong	Lao PDR	A	A	A	A	A	A
9	Stung Trieng	Mekong	Cambodia	A	A	A	A	A	A
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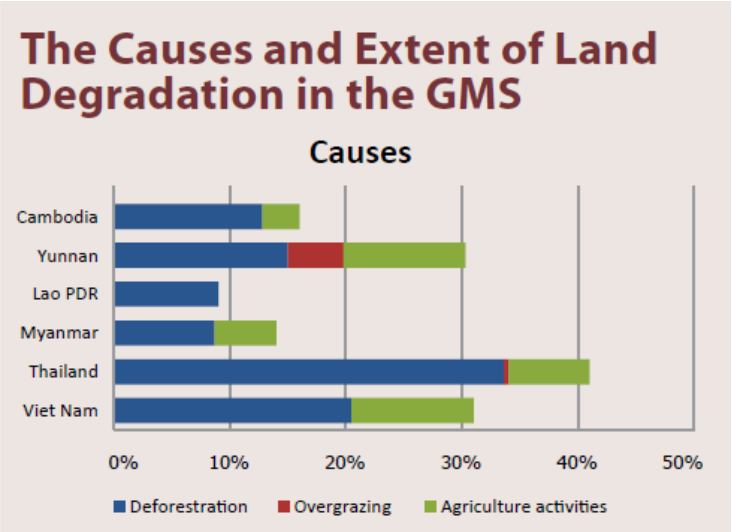
Source: 2014 LOWER MEKONG REGIONAL WATER QUALITY MONITORING REPORT, MRC

Key pressures on Mekong's water resources

3) Land degradation

- According to the Greater Mekong Environment Outlook (ADB 2012), land degradation affects between 10% and 40% of land in the GMS countries. Forest loss, agricultural intensification, and overgrazing are the main causes.

- Changes to natural landscapes associated with farming activities have disrupted hydrological cycle and ecological services by reducing the capacity of containing floods and controlling erosion and sedimentation into the rivers.



(Source: ABD 2012)

Highland rice field in Lao PDR
(Source: USDA 2011)

THANK YOU

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