

SUSTAINABLE WATER RESOURCE USE IN SUNGAI MUDA-SUNGAI KEDAH RIVER BASINS MALAYSIA

FAO CLOSING WORKSHOP BANGKOK, THAILAND

**BANGKOK
23 AUGUST 2012**

SUSTAINABLE WATER RESOURCE USE IN SG KEDAH & SG MUDA

Case Study on Sustainable Water Resource Use in Sungai Kedah and Sungai Muda River Basins

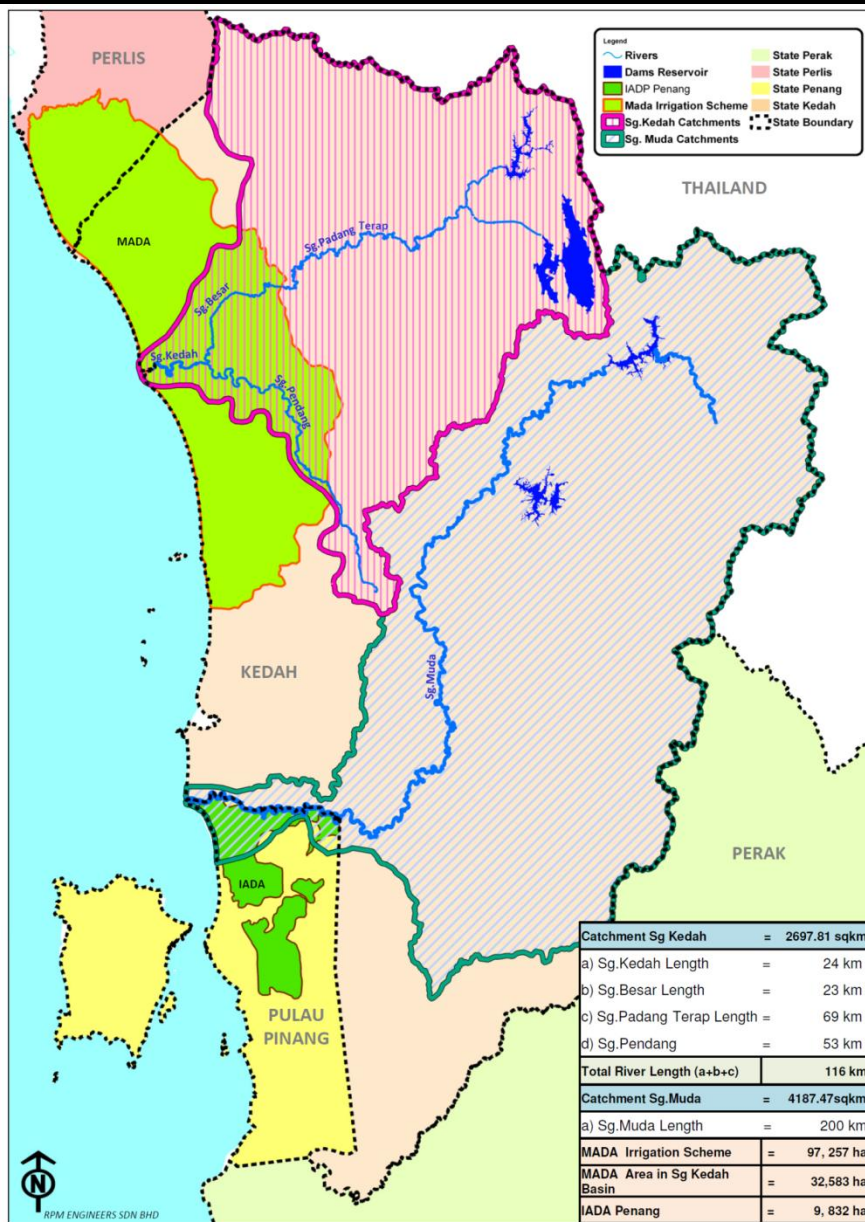
The Kedah and Muda River Basins

Kedah River Basin

- Wholly in Kedah State
- Nearly 3000 sq. km.
- 100 km length
- 30% of MADA Granary in this basin

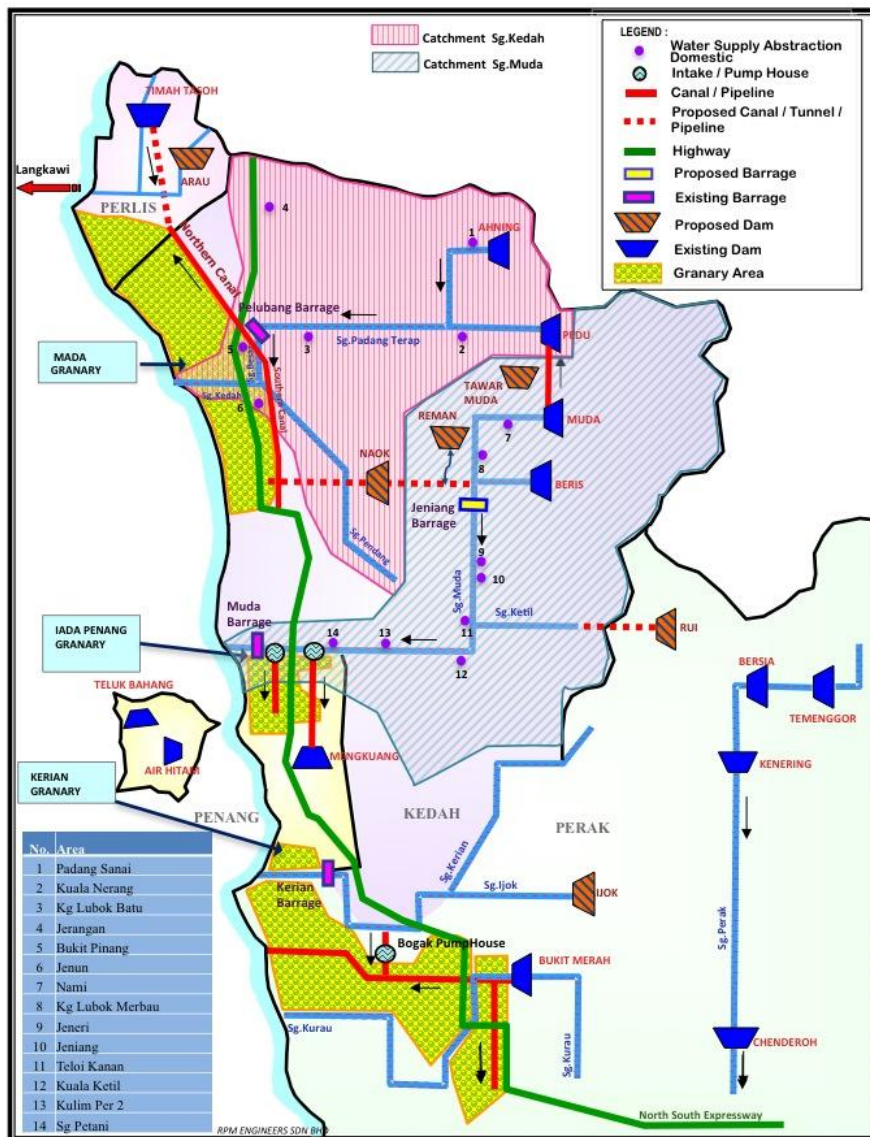
Muda River Basin

- Kedah and Penang States
- 4,200 sq. km.
- 200 km length
- MADA Granary not in this basin but part of IADA Pulau Pinang is.



The Kedah and Muda River Basins are part of an intensive Northern Region Water Resources Network

- Water Resources Development necessary to support development – The Regional Climate has distinct dry season
- Involves primarily 3 States (Perlis, Kedah, Penang)
- Supports 2 Granaries – MADA & IADA Penang



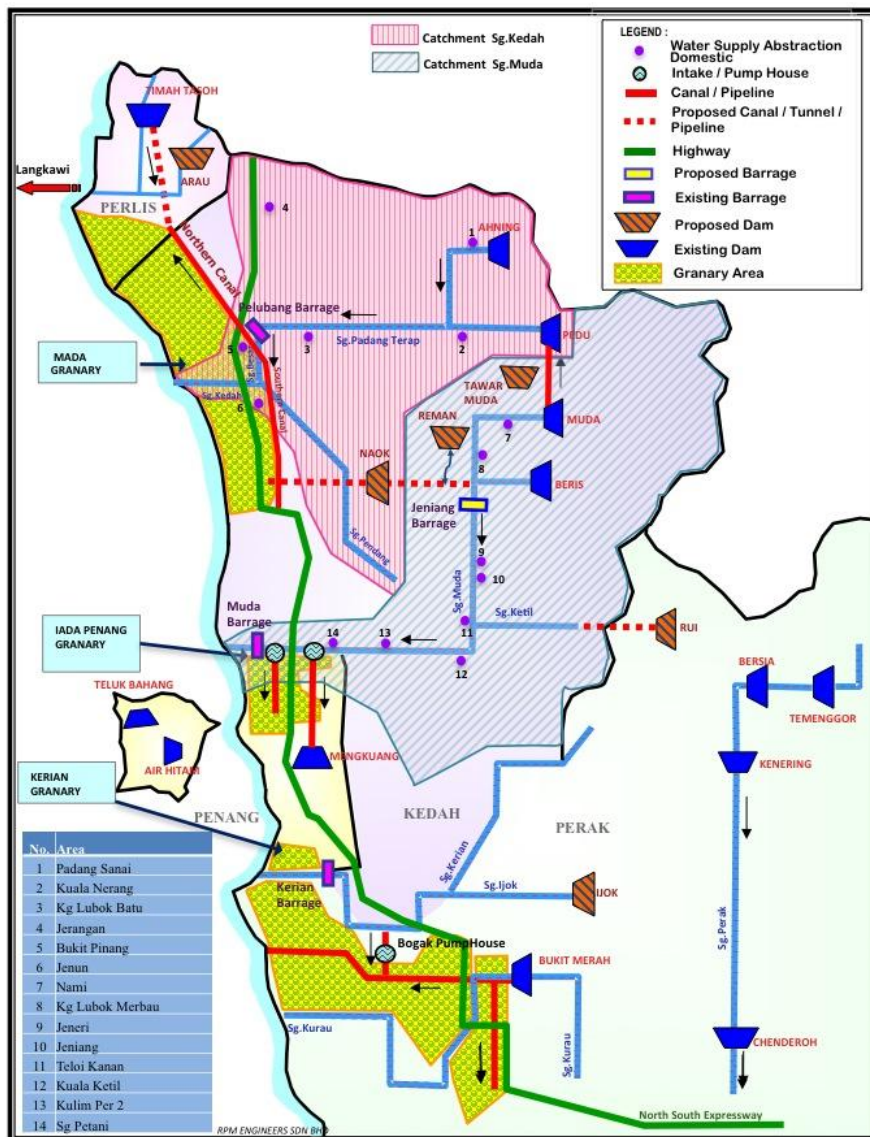
Water Resources Network in the Northern Region of Peninsular Malaysia

Case Study

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The Kedah and Muda River Water Resource Network

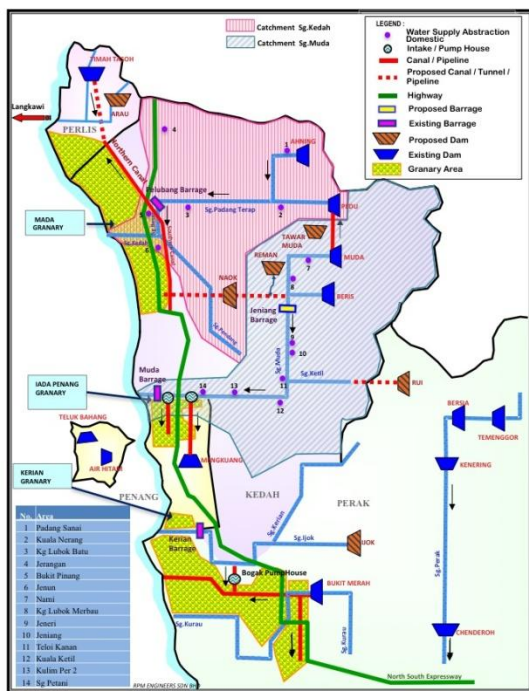
- Inter-basin water transfer scheme
- Inter-State (Pulau Pinang and Perlis)
- Agriculture started first then Water Supply
- More development planned (JTS, Mengkuang Dam Raise)
- Sectorial Approach to Water Resource Management (Present)



Water Resources Network in the Northern Region of Peninsular Malaysia

Case Study

SUSTAINABLE WATER RESOURCE USE IN SG KEDAH & SG MUDA



Water Resources Network in the Northern Region of Peninsular Malaysia

Water Resource Sustainability

- Agriculture Sector enjoyed comfortable water resource availability for 50 years – No competition
- Now Water Supply Sector competing strongly
- Recent Study:
 - 1:50yrs; 7-day low flow 1,365 MLD
 - Less 1,160 for Water Supply
 - Less 3,841 for Irrigation
 - Deficit 3,636 MLD!

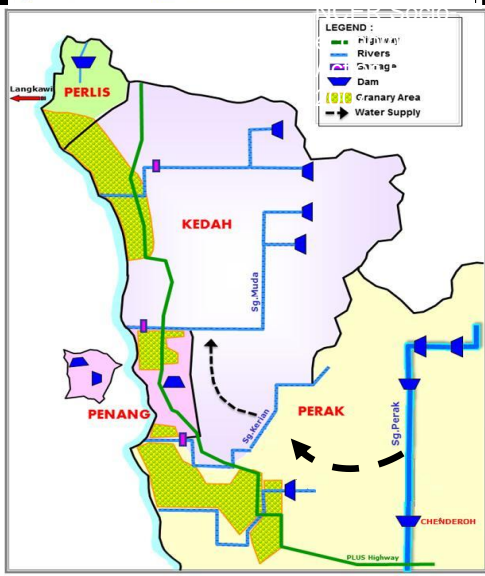
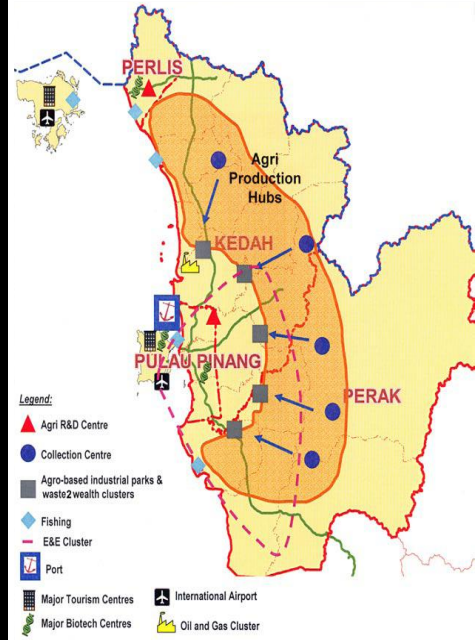
Water Resource now not sustainable!

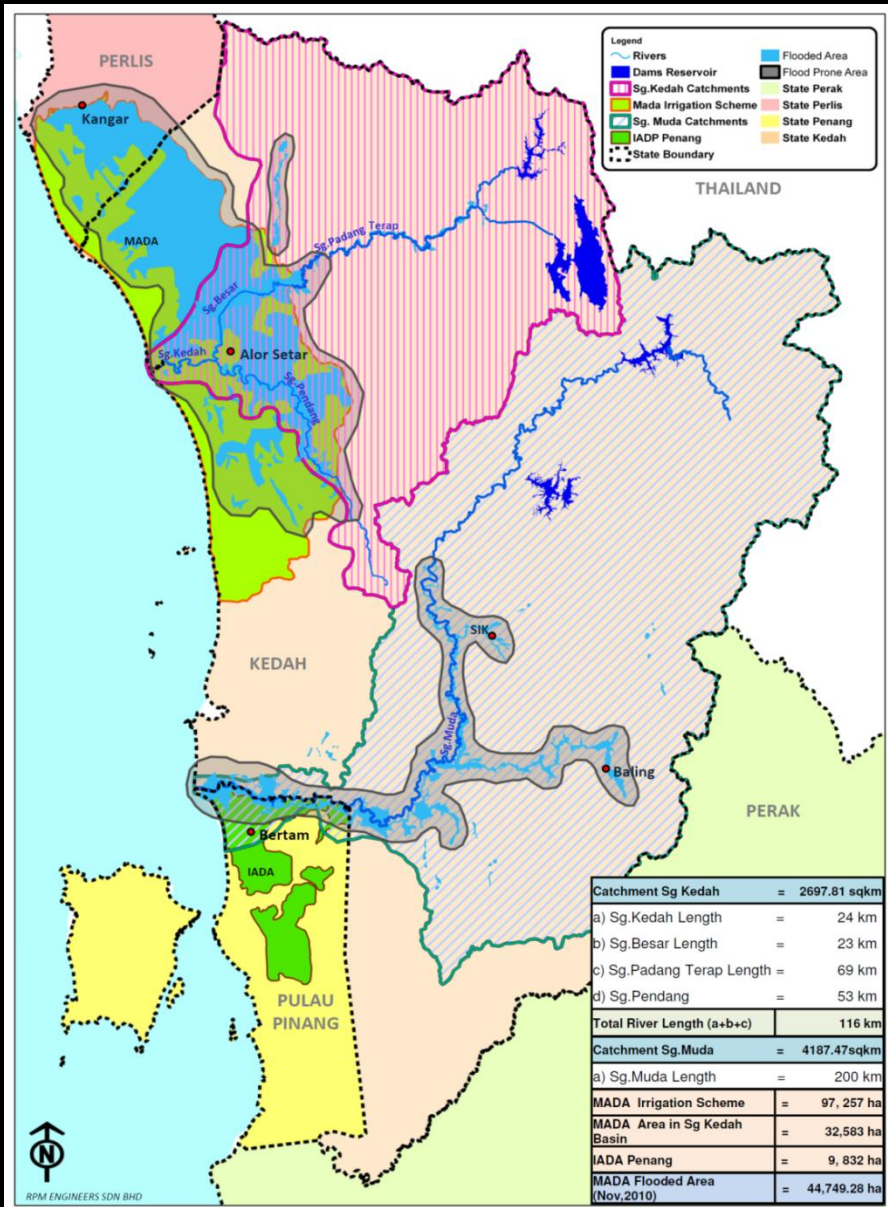
Water Resource now not sustainable!

- It can get worse:
 - Mengkuang Dam Raise Project on-line 2014
 - Jeniang Transfer Scheme on-line 2015
 - Northern Corridor Development Plans
 - More intensive and extensive irrigation development

The Muda River is no more the “River of Life”

- Immediate proposal?
 - Water Transfer Scheme from Perak River to Pulau Pinang for Water Supply





Floods becoming an issue

- November 2010, more than 40,000 ha of MADA area flooded
- Appears to be a more frequent event
- Government plans for more flood mitigation projects

Dialogues on Sustainable Water Resource Use in Sungai Kedah and Sungai Muda River Basins

Dialogue

SUSTAINABLE WATER RESOURCE USE IN SG KEDAH & SG MUDA

Summary of Dialogues and Workshops

- | | |
|---------------------------------|--------------------|
| 1. National Workshop No. 1 | – 10 January 2010 |
| 2. Stakeholders' Dialogue No. 1 | – 19 October 2010 |
| 3. Expert Dialogue | – 28 July 2011 |
| 4. National Workshop No. 2 | – 2 November 2011 |
| 5. Final National workshop | – 16 February 2012 |

Recommendations

1. To establish a committee on water management for the Kedah and Muda Basins
2. The Committee to tackle priority issues (flooding, development & partnership) as suggested by the participants.
3. Establishment of a National Water Resource Act to govern water resources in this country in a more integrated manner (National Water Resources Policy just launched in March 2012)
4. To increase multi-functionality of paddy fields by introducing new activities/programs

Recommendations

5. To increase value-chain management knowledge and skills amongst paddy farmers, such as marketing plan.
6. To review Irrigation and Drainage Laws
7. To sustain the current Granary Policy
8. To implement IWRM programs on the country's water resources.
9. To aggressively pursue green technologies in agriculture, especially in paddy farming

Water Investment Framework for Kedah and Muda River Basins Malaysia

Summary of Workshops and Dialogue

1. Local Dialogue No. 1 – 24 January 2011
2. Expert Dialogue – 28 July 2011
3. National Workshop – 2 November 2011
4. Final National Workshop – 16 February 2012

Draft Framework Results Sorted According to Priority

National Objectives :

No.*	National Objectives
1	Achieving High Income Status
2	Food Security
3	Sustainable Water Resources Management
4	Green Mission

*In order of priority

Draft Framework Results Sorted According to Priority

Agriculture Sector Objectives:

No.	Agriculture Sector Objectives
1	"Agriculture is Business"
2	Minimum 70% Rice Self-Sufficiency Level
3	Sustainable Agriculture Water Demand Management
4	Green Technology in Agriculture

*In order of priority

Draft Framework Results Sorted According to Priority

Regional Objectives :

No.*	Regional (Kedah & Muda Basins) Objectives
1	MADA Granary to Sustain Minimum 40% contribution to National Production
2	IADA P. Pinang Granary to Sustain 5% contribution to National Production
3	Sustain Quality & Quantity of Water Resource
4	Estate Management for Paddy
5	Towards 10ton/ha yield

*In order of priority

Draft Framework Results Sorted According to Priority

Basin/Local Strategies:

No.*	Strategy
1.	Competition for Water (Equity)
2.	Increase Production
3.	Increase Water Efficiency
4.	Commercialising Paddy Farming
5.	Restructuring
6.	Mitigate Flood Loss and Damage
7.	Environmental Management
8.	Water Quality
9.	Climate Change Adaptation

*In order of priority

Draft Framework Results Sorted According to Priority

Activities/Investments and Institutions for 'Competition for Water (Equity)' :

ACTIVITY/INVESTMENT*	INSTITUTION	
	PROGRAM / PROJECT	SOFT
1.1 IWRM/ IRBM		1.1.1 Study of river hydraulic and river management
1.2 Water Demand management(water supply & Agriculture)		1.2.1 Capacity building for farmers
		1.2.2 Formation of water user group
1.3 Relieve Muda River stress		1.3.1 Study for alternative sources (groundwater /Kerian)
1.4 Review Irrigation Act (1953)		1.4.1 To study/review Irrigation Act (1953)

Draft Framework Results Sorted According to Priority

Activities/Investments and Institutions for 'Increase Production':

ACTIVITY/INVESTMENT	INSTITUTION	
	PROGRAM / PROJECT	SOFT
2.1 Increase area (add irrigated non-granary schemes) & increase in cropping intensity	2.1.1 Absorb fringe area to MADA	
	2.1.2 To increase irrigated area	
2.2 High Yielding variety	2.2.1 R&D	
2.3 Best agricultural practices	2.3.1 Central Management for large scale farming	
2.4 Improved Farming technology	2.4.1 R&D	
	2.4.2 Soil Improvement Program (soil fertility, land levelling)	
	2.4.3 Farming Techniques	
2.5 Infrastructure Development	2.5.1 Intensification & upgrading of infrastructure	
2.6 Water resource development	2.6.1 Jeniang Transfer scheme, Naok Dam & Reman Dam	
	2.6.2 Increase dam storage (Mengkuang Dam)	
	2.6.3 Water Recycling	
2.7 Control land conversion (law/policy)		2.7.1 Review of Irrigation Act

**Investments &
Institutions**

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Draft Framework Results Sorted According to Priority

Activities/Investments and Institutions for 'Increase Water Efficiency':

ACTIVITY/INVESTMENT	INSTITUTION	
	PROGRAM / PROJECT	SOFT
3.1 Improve on-farm water management	3.1.1 Training for farmers	
	3.1.2 Land Levelling	
	3.1.3 Manage water in accordance to crop requirement by farmers	
3.2 Water demand management	3.2.1 Irrigation measurement system	
3.3 Recycling	3.3.1 Program for potable water (industry & domestic) - increase tariff to reduce domestic per capita consumption	
3.4 New technology (water management system)	3.4.1 Hydrological & hydraulic data acquisition	
3.5 Less water requirement paddy	3.5.1 R & D	
3.6 Maximise Rainwater harvesting	3.6.1 More ponds	
3.7 Optimise River Flows	3.7.1 More ponds (upstream of rivers & within paddy area)	

Draft Framework Results Sorted According to Priority

Activities/Investments and Institutions for 'Commercializing Paddy Farming':

ACTIVITY/INVESTMENT	INSTITUTION	
	PROGRAM / PROJECT	SOFT
4.1 Promote commercial farming	4.1.1 Estatisation for paddy	4.1.1 Develop exit plans for old farmers
		4.1.2 Value chain management
		4.1.3 Private participation

Draft Framework Results Sorted According to Priority

Activities/Investments and Institutions for 'Restructuring':

ACTIVITY/INVESTMENT	INSTITUTION	
	PROGRAM / PROJECT	SOFT
5.1 Single point granary management system		5.1.1 Review Institutional setup
		5.1.2 Private participation

Draft Framework Results Sorted According to Priority

Activities/Investments and Institutions for 'Mitigate Flood Loss and Damage':

ACTIVITY/INVESTMENT	INSTITUTION	
	PROGRAM / PROJECT	SOFT
6.1 Risk management	6.1.1 Capacity building program	
	6.1.2 Integrated flood management program	
6.2 Review planting season (study)	6.2.1 Optimised intensity	
6.3 Flood mitigation plans	6.3.1 Northern & Southern (North Kedah) flood mitigation project	
	6.3.2 Sg Muda flood mitigation project	
6.4 Land (Forest) management	6.4.1 Forest reserve for catchment area	6.4.1 Gazetting of catchment area & forest reserve
		6.4.2 Review 'loop holes' in the Forestry Acts

**Investments &
Institutions**

Draft Framework Results Sorted According to Priority

Activities/Investments and Institutions for 'Environmental Management':

ACTIVITY/INVESTMENT	INSTITUTION	
	PROGRAM / PROJECT	SOFT
7.1 Disease & pest control		7.1.1 Best management practice
7.2 Effluent discharge control (industry & domestic)	7.2.1 Expand monitoring system	
7.3 Sediment control	7.3.1 Erosion & sediment control	7.3.1 ESCP & sand mining regulations
7.4 MASMA	7.4.1 Capacity building	7.4.1 Capacity building

Draft Framework Results Sorted According to Priority

Activities/Investments and Institutions for 'Water Quality':

ACTIVITY/INVESTMENT	INSTITUTION	
	PROGRAM / PROJECT	SOFT
8.1 Drainage discharge	8.1.1 Control At Source	8.1.1 Study
8.2 Sewerage system improvement	8.2.1 Integrated water quality monitoring system	8.2.1 Integrated water quality monitoring system

Draft Framework Results

Sorted According to Priority

Activities/Investments and Institutions for 'Climate Change Adaptation':

ACTIVITY/INVESTMENT	INSTITUTION	
	PROGRAM / PROJECT	SOFT
9.1 Forecasting system	9.1.1 Develop forecasting system	
9.2 Dam capacity review		9.2.1 Study
9.3 Review planting season		9.3.1 Study
9.4 Variety development		9.4.1 Study
9.5 Dam safety review		9.5.1 Study

Concluding Statements

Dialogue

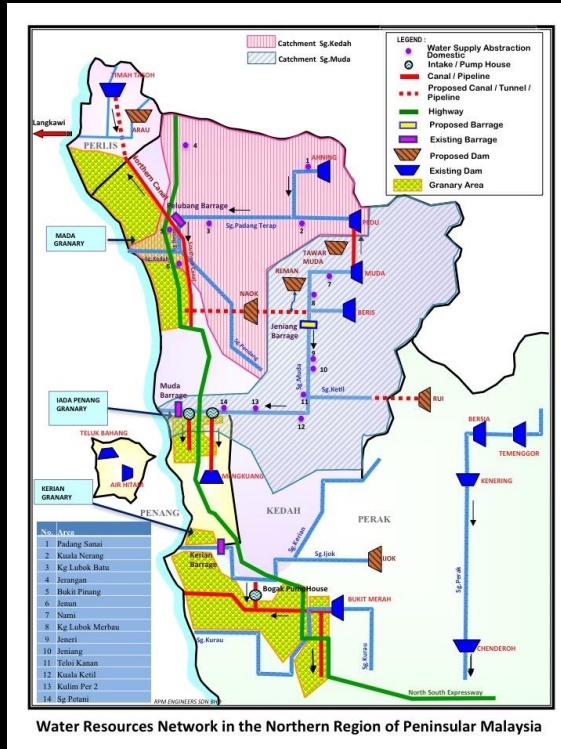
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Lessons Learnt

Dialogue

SUSTAINABLE WATER RESOURCE USE IN SG KEDAH & SG MUDA

1. Water Management & Allocation



- 1.1 The Water Management for Kedah and Muda River Basins is becoming more complex because:
- a) Inter-Sector competition for water is stiffer
 - b) The water system is inter-connected and integral for basins beyond both basins

The Kedah and Muda River Basins are inter-connected, the system is integral with basins beyond their respective boundaries and involves inter-State transboundary issues

1. Water Management & Allocation

1.2 The Local and Regional Level Managers have long recognised the need for a “Water Management Committee”. However there has been no enthusiastic effort for its formation. Perhaps the recently introduced “National Water Resources Policy” would be a driver for this. In the meantime systems operators are dependent on “professional inter-personal” relationships.

1. Water Management & Allocation

- 1.3 The main driver for improved on-farm and system level water management has been due to “double cropping”, not inter-sector competition. The need was to conserve water for and during the off-season cropping. (Not due to perennial water shortage; rainfall is relatively abundant > 2000mm/year)
- 1.4 Water Management Programs were introduced but farmers’ response to on-farm investment (during manual transplanting days) for improvement was “lukewarm” e.g. land levelling.
- 1.5 Farmers respond for “economic” reasons; not “lack of water”. When farmers converted from manual transplanting to direct seeding during outward labour migration, they invested in land levelling at their own initiative. This helps improved water management.

1. Water Management & Allocation

- 1.6 Inter-sector competition is a fast emerging issue. The Water Supply Sector appears to be in a “stronger” position than agriculture. This is because of the policy “Water for Human Needs” priority, existence of water supply laws, technology for quantification of water use, drive for more non-agriculture economic development.
- 1.7 Agriculture’s (irrigation) strength is its position in the long-established control of water resources (Pedu and Muda Dams) and the water distribution networks.

1. Water Management & Allocation

- 1.8 Agriculture (thus water resources sustainability) is “defended” by a number of legal and policy instruments and local culture namely:
- a) Irrigation Act – restricts/controls conversion of irrigation lands to other uses.
 - b) The Granary Policy – Federal Government commitment to invest in irrigation development and maintenance.
 - c) The Rice Self-Sufficiency Level (SSL) Policy – to produce at least 70% of rice needs.
 - d) The “Aging Farmers Exit Plan” – recently restructured for the MADA Granary to accelerate commercial farming to increase yields (10 tons/ha) and better resources (water) management.
 - e) The “National Water Resources Policy” – recently introduced to ensure equity and sustainability.

1. Water Management & Allocation

1.8 Agriculture (thus water resources sustainability) is “defended” by a number of legal and policy instruments, institutional strength and local culture namely:

- f) Absorbing fringe irrigation schemes (non-Granaries) into the MADA Granary scheme.
- g) Strong local culture to continue rice cultivation.
- h) The economy of scale influence provided by the Granaries (MADA and Pulau Pinang)
- i) A strong and focused institutional existence – without this the Granaries will not be easily sustainable (experts, technology, passion)
- j) Position of control of water resources facilities and distribution system.

1. Water Management & Allocation

- 1.9 The present policy is to promote IRBM that is independent of others (i.e. no inter-basin transfers). However, this Case Study has shown that inter-basin transfer is inevitable for Malaysian geographical characteristics and economic plans. Perhaps a Regional River Basin Management approach is more appropriate. (There are other areas with inter-basin transfers; this northern region appears to need another source of water from the southern adjacent basin (Kerian and Sungai Perak river basins))

1. Water Management & Allocation

- 1.9 “Water is Free” for the farmers. The present “Irrigation Rate” is not a charge on amount of water use. Also the charge is very small. Many experts believe that this will never motivate farmers/water users to save water, to aim for higher economic productivity nor support system operator’s strive for improved water management.
- 1.11 Water “used to be” the pivotal point for the scheduling of all farm activities. However the present “business structure” is that farm machinery services providers “influence” the timing for the state of readiness of the farms. There are occasions when water is supplied when farms are not ready and thus led to wastages.
- 1.10 There are no “visible” advocates and institutions for improved water quality and water environment.
- 1.11 Farmer level programs and plans for climate change adaptation is still non-existent.

1. Water Management & Allocation

- 1.12 The drive for “Green Technology” has yet to pick-up. There is a need to review pumping schemes, strengthen the gravity system.
- 1.13 The present “single purpose (irrigation)” design and use need to be reviewed for “multi-functional” use (flood management, water supply, hydro-power generation, environment management).
- 1.10 There are requests by other agriculture sectors for “multi-functional” use of paddy farms (e.g. for aquaculture).
- 1.11 The concept of “risk management” need to be strengthened amongst the farmers. At the moment, there is over dependency on the Government to invest in flood management infrastructure and also for drought situations.

2. Using the Information Gained

- 1.1 Useful to support the development of action plans under the new Water Resources Policy – equity, sustainable water resources for agriculture, strengthening of present policies, more emphasis on environment, Regional vs. Local IRBM Plans, quantifying productivity, risk management, climate change, exit plans.
- 1.2 A basis to develop models for all other Granaries in Malaysia. The Kerian Granary is also facing similar situation. Inter-sector pressures are real (water supply, tourism, aquaculture, water stresses, floods).
- 1.3 To provide guidelines and basis/justifications for policy reviews and further investments in agriculture.
- 1.4 To provide background scenarios for the development of new Granaries (Sabah and Sarawak).

3. Value of Experience Gained

- 1.1 Provides opportunity to reflect and think of the future seriously. Being in a “situation or condition” very often “clouds” administrators and operators of the change that is happening. There is often no time to “think of what is really happening” and this often result in “fire-fighting” actions rather than developing wise strategies. For example, in the 1980s there was no real anticipation of large scale abandonment of the small irrigation schemes due to economic diversity and this led to “fruitless investments in irrigation”. In the Granaries the farmers changed to direct seeding at their own initiative and this required certain management adjustments in designs and operations. The Granary Policy was the result of an in-depth study of the irrigation schemes that were challenged by the economic change.

3. Value of Experience Gained

- 1.2 Provides opportunity to update on current knowledge and issues from international experts and practitioners. Main area is on policy issues (conflicts and incompatibilities) as this has direct implications on the spread and depth of all action plans:
- i. Local administrators and operators have long recognised the need for a “Water Resources Management Committee”. However the National level support has not been very enthusiastic as this could involve potentially complex inter-State negotiations. Inter-sector and inter-State water management will continue to depend mainly on inter-personal and inter-institutional relationship.

3. Value of Experience Gained

1.2 Provides opportunity to update on current knowledge and issues from international experts and practitioners. Main area is on policy issues (conflicts and incompatibilities) as this has direct implications on the spread and depth of all action plans:

- a) Policy conflicts or incompatibility
 - ii. “Self Sufficiency Levels”, “The Granaries”, “Irrigation Act”, “Water Resources Sustainability” are more a Federal Level initiatives. States too would have their own vision and strategies for future economic development. For example, the State is dependent on forest industry for income but there is a need to conserve for water resources. Population and non-agriculture development are exerting pressures on the Granaries and water resources. These will have impacts on present policy sustainability.

3. Value of Experience Gained

- 1.2 Provides opportunity to update on current knowledge and issues from international experts and practitioners. Main area is on policy issues (conflicts and incompatibilities) as this has direct implications on the spread and depth of all action plans:
- iii. There is a general agreement for IWRM and IRBM. However there is yet to be any significant move to implement these. Water management is still very much “Sectorial”. For IRBM, the thinking is for an independent self-sufficient water for within basin development. However current development pressures are for “Regional” management.

3. Value of Experience Gained

1.2 Provides opportunity to update on current knowledge and issues from international experts and practitioners. Main area is on policy issues (conflicts and incompatibilities) as this has direct implications on the spread and depth of all action plans:

- iv. Also, there is a general concern for the water quality and water environment in the agriculture sector. However there is yet to be a “visible” effort and a “champion” to seriously promote environmental water management.
- v. The policy is for “high income generation”. Commercial farming is the agreed strategy. However the new exit plan for individual farmers is only for the MADA Granary. In the meantime, efforts will have to continue for capacity building of individual farmers (Water User Groups).

3. Value of Experience Gained

1.2 Provides opportunity to update on current knowledge and issues from international experts and practitioners. Main area is on policy issues (conflicts and incompatibilities) as this has direct implications on the spread and depth of all action plans:

- vi. The policy of “Free Water for Farmers” still prevails. To the experts, this is a major constraint on efforts for increasing water productivity and the introduction of “Green Technology”.

4. Potential Future Projects

- 1.1 Policy Sustainability and Conflicts
- 1.2 Science, Technology and Innovations particularly with respect to inter-sector and within sector water demand management. (water productivity improvements, Green Technology, climate change adaptations, water footprint, water use measurements, techniques).
- 1.3 Defining Water Resource Equity, implementation and refinement of equity rules under water stress and drought conditions.
- 1.4 Strategies to introduce and implement water charges in the agriculture sector.
- 1.5 Attaining “high-income” for paddy production.

THANK YOU