



National water use efficiency support program India

Rajesh Yadav Senior project Officer ADB

National Water Mission
Delhi, 25 February 2019

ADB

National Water Use Efficiency Improvement Support Program - Scoping Study

- NWUEISP study completed in August 2014 to support the implementation of the NWM and the 12th FYP
- NWUEISP study takes stock of water use efficiency issues in MMI in India and proposes a framework for assessing MMI performance, identify main weaknesses leading to low efficiency and propose modernization plan.
- ADB presented NWUEISP for MMI schemes in DEA in October 2014 and to Secretary Ministry of Water Resources in November 2014.
- Subsequent presentations on NWUEISP framework were also made to NWM from time to time.

National Water Use Efficiency Improvement Support Program - Scoping Study

ADB

Project Numbers: SC 100903 IND and SC 100905 IND
November 2014

India: Support for the Implementation of the National Water Mission by State Governments in India: Scoping Study for a National Water Use Efficiency Improvement Support Program

Final Report
Volume 1: Main Report

(Financed by the ADB)

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This consultant's report does not necessarily reflect the views of ADB or the concerned, and ADB cannot be held responsible for its contents.

Asian Development Bank

ADB

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Final Report
Volume 2: Annexures

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India: Support for the Implementation of the National Water Mission by State Governments in India: Scoping Study for a National Water Use Efficiency Improvement Support Program

Final Report
Volume 3: Program Concept Paper
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Japan
Fund for
Poverty
Reduction



Technical Assistance Consultant Report

Regional Technical Assistance TA-7967-REG
Project No. 45072

Innovations for More Food with Less Water- Task 1

FINAL REPORT- May 2015

INTERNATIONAL WATER MANAGEMENT INSTITUTE

COLOMBO



National Water Use Efficiency Improvement Support Program - Scoping Study

RDTA – 7967 pilot tested the NWUEISP framework on 2 MMI in India – Dharoi in Gujarat and Sanjay Sarovar in Madhya Pradesh. Completed in June 2015.



Japan
Fund for
Poverty
Reduction



Technical Assistance Consultant's Report

Project Number: 45072-001
September 2014

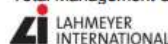
Regional Technical Assistance TA7967-REG
Innovations for More Food with Less Water Task 2



Draft Final Report – India

Prepared by

Lahmeyer International in association with Lahmeyer International India,
BETS Consulting Services, Centre for Environment and Development, and
Total Management Services



Asian Development Bank

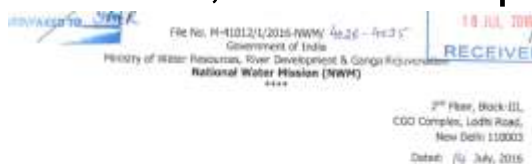


National Water Use Efficiency Improvement Support Program - Scoping Study

- ADB proposed Project Preparatory TA loan to enable the State Governments / UTs to develop project proposals and help States to implement the NWUEISP for improvement of Water use efficiency for MMI projects.
- NWM in May 2016 constituted a Project Technical Coordination Unit (PTCU) for achieving greater Irrigation Water Use efficiency and Water Productivity.
- NWM requested State Governments to identify pilot MMI projects having low WUE and to formulate project proposals in line with the framework.

National Water Use Efficiency Improvement Support Program - Scoping Study

- NWM in July 2016 shared list of States, and Projects which can be considered as part of the National program.
- Presentation was again made to Secretary, Ministry of Water Resources on 6 July 2017 and another on 19 January 2018 wherein Mission Director, NWM also participated.



Subj: Five Projects for scoping study under National Water Use Efficiency Implementation Support Programme (NWUEISP) for Major-Medium Irrigation Schemes.

Ref: ADB/TA-9051-Medhya Pradesh Irrigation Efficiency Improvement Programme - Desktop Review Mission.

Medium,

The Ministry of Water Resources, River Development and Ganga Rejuvenation, in association with the Asian Development Bank (ADB) has undertaken a scoping study under National Water Use Efficiency Implementation Support Programme (NWUEISP) for Major-Medium Irrigation Projects having low water use efficiency. ADB has completed this scoping study and has proposed Project Preparatory Technical Assistance (PPTA) to develop Public-Private Partnership (PPP) or Sector Loan to enable the State Govts/SUTs to implement the NWUEISP for improvement of water use efficiency of such PMP Projects.

NWM had requested the State Govts to identify pilot PMP projects having low water use efficiency and to formulate proposals in accordance with the recommendations of the ADBs scoping study. The Government of Madhya Pradesh, Rajasthan and Manipur have identified following projects:

State / Projects	Remarks
A. Rajasthan	
1. Bhakra Canal Project (CCA: 2,82,670 ha)	(Project Details are enclosed)
2. Mahi Bajaj Sagar Project (CCA: 90,000 ha)	
3. Calwa Dam Irrigation Project (CCA: 13,291 ha)	
4. Chispa Medium Irrigation Project (CCA: 5,735 ha)	
5. Gandhinagar Irrigation Project (CCA: 7,599 ha)	
B. Manipur	
1. Imphal Sanitary Project	
2. Loktak Lift Irrigation Project	
3. Singu Multipurpose Project	
4. Sekmai Barrage Project	
C. Madhya Pradesh	
1. Sanjay Sankar Irrigation Project	
2. Mohansara Major Multipurpose Project	
3. Kandiakra Irrigation Project	

In addition to above, NWM has identified 4 NWM Projects for improving Water Use Efficiency in association with the State Governments:

1. Telangana - Andhra Project (CCA: 27513 ha.)
2. Madhya Pradesh - Khokhona Project (CCA: 3912 ha.)
3. Rajasthan - Chemical Project (CCA: 2,29,000 ha.)
4. Rajasthan - Indira Gandhi Nahar Project Stage II, LR Scheme (CCA: 3,20,000 ha.)
5. Punjab - Renovation of Kolar distributaries, Akalgarh Block, District Canal System (CCA: 28,738 ha.)
6. Haryana-Renovation of the Huar Major Distributary Sub-system of the DIC system (CCA: 21,270 ha.)

National Water Mission, MoWR, RD & GR has constituted a Project Technical Coordination Unit (PTCU) under National Water Use Efficiency Implementation Support Programme (NWUEISP) vide O.P. No. W-41012/3/2014/NWM/2003-2013 dated 26-05-2016 (Copy enclosed), to use the framework and tools developed by the ADB under the completed scoping studies (Copy enclosed).

The ADB may consider the above mentioned PMP Projects for taking up for National Water Use Efficiency Implementation Support Programme (NWUEISP) in consultation with the respective State Govts.

Encl: As above

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Copy for information to:

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2. Under Secy (A-11), Deptt. of Economic Affairs, Ministry of Finance, 210-E, North Block, New Delhi-110001.
3. Principal Secretary, Department of Irrigation, Government of Haryana, Room No. 41, 1/A Floor, Civil Secretariat Building, Chandigarh - 160 017.
4. Principal Secretary, Department of Water Resources, Government of Madhya Pradesh, Secretariat, Bhopal, Madhya Pradesh- 462002.
5. Principal Secretary Department of Water Resources, Government of Maharashtra, Secretariat, Mumbai, Maharashtra.
6. Principal Secretary, Deptt. of Irrigation & Flood Control, Govt. of Manipur, Irrigation Secretariat, North Block, West Wing, Imphal, Manipur-795 001.
7. Principal Secretary, Irrigation & Power, Govt. of Punjab, Secretariat, Chandigarh.
8. Principal Secretary, Department of Water Resources, Government of Rajasthan, Secretariat, Jaipur-302005, Rajasthan.
9. Principal Secretary, Government of Telangana, Secretariat, Hyderabad-500 002.



OFFICE MEMORANDUM

Subject: Constitution of Project Technical Coordination Unit under National Water Use Efficiency Implementation Support Programme (NWUEISP).

A Project Technical Coordination Unit (PTCU) is hereby constituted under the National Water Use Efficiency Implementation Support Programme (NWUEISP) to use the framework & tools developed by the ADB under the completed scoping studies (Copy enclosed) to use the framework and tools developed by the ADB under the completed scoping studies (Copy enclosed).

- | | |
|---|------------------|
| 1. Chairperson & Member (Secretary, MoWR) | Chairman |
| 2. Representative of PWC | Member |
| 3. Representative of CWC | Member |
| 4. IRRS, MoWR | Member |
| 5. General Advisor | Member |
| 6. Representative of DCR/DA | Member |
| 7. Representative of ADB | Member |
| 8. Advisor (Tech, NWM) | Member Secretary |

- The Terms of Reference of PTCU will be as follows:
- (i) To coordinate with the State Govts the activities of PTCU & the proposed program approval & execution by State Govts.
 - (ii) To identify interested State Govts and provide technical guidance & capacity building in water use efficiency implementation ADBs under the framework proposed under NWUEISP & CCA, PWC.
 - (iii) To provide consultation (where required) to support the National States in developing implementation program & prepare feasibility studies.
 - (iv) To assist the States in identifying sources of finance for implementation of at least one PMP project in each State.

The PTCU would be supported by Project Design and Capacity Building Consultant (PDCBC) funded by ADB through a TA (see end of document for the Contract ID).

The PTCU may engage external resources depending on specific needs.

The issues will be approved by concerned authority.



National Water Use Efficiency Improvement Support Program - Scoping Study

- Rajasthan, Manipur, Madhya Pradesh have shown interest to proceed further with the modernization proposal.
- NWM identified six another proposals with 5 states which includes Telangana, Maharashtra, Rajasthan and Punjab.
- Presentation was again made to Secretary, Ministry of Water Resources on 6 July 2017 and another on 19 January 2018 wherein Mission Director, NWM also participated.
- The process however has not moved further, except MP moving ahead with the proposed projects including Sanjay Sarovar Modernization Plan.
- The next Part of the presentation is on Project Rationale and outcome of scoping study.

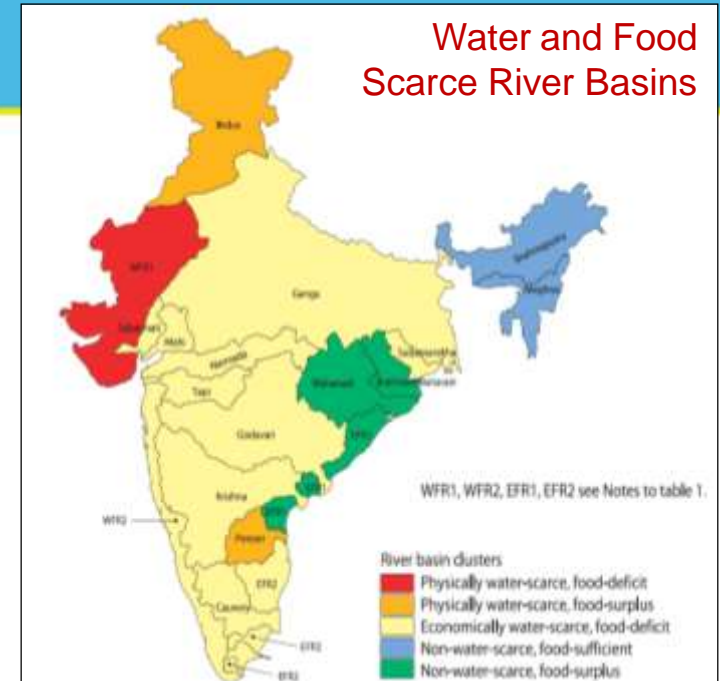
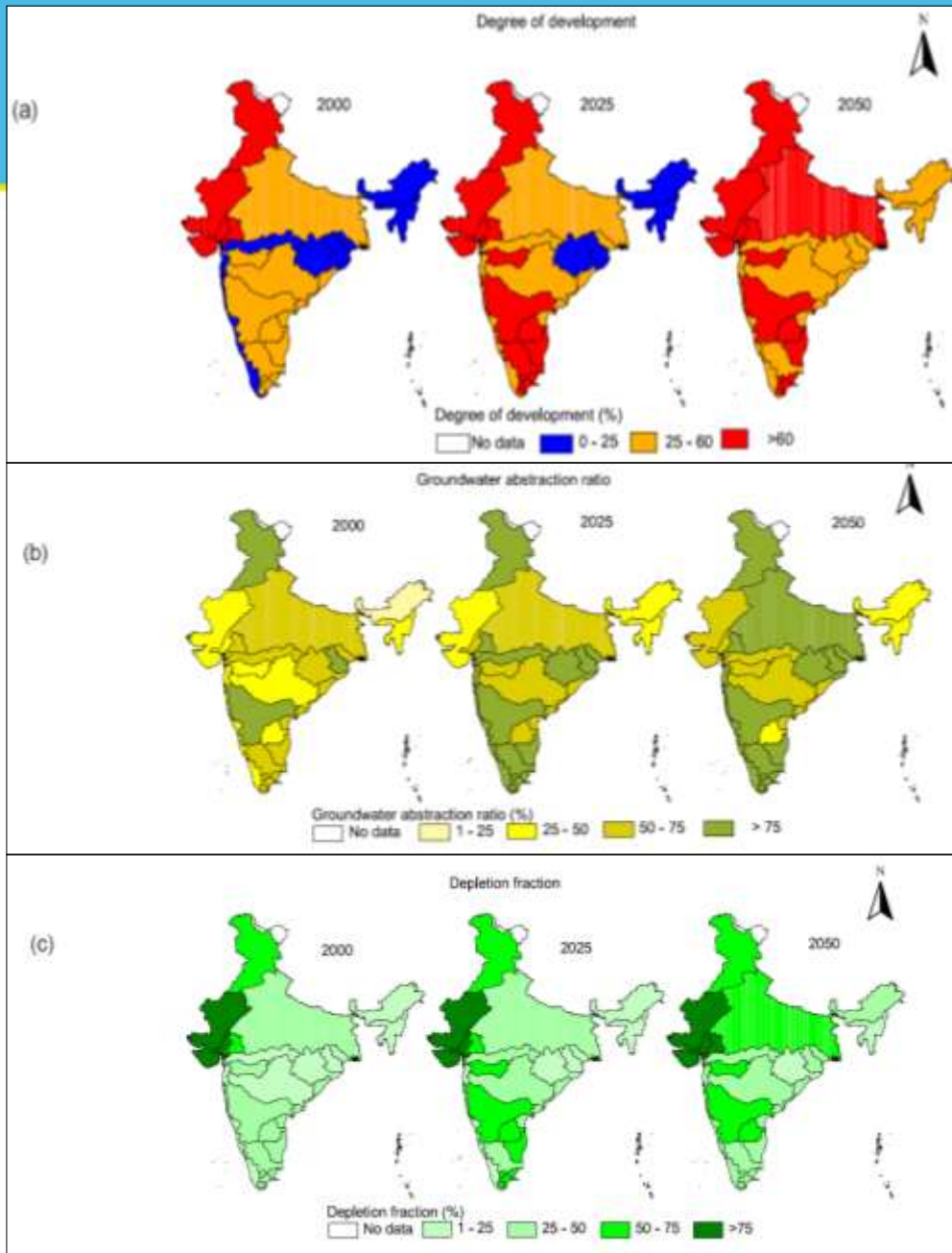
NWUEISP

Rationale

Rationale : India Water Accounting

- MOWR estimates total utilizable water resources of 1,123 BCM with a current water demand of 710 BCM rising to 1,093 BCM by 2030 (54% increase in the next 15-20 years).
- Less optimistic estimates predict that with the current pattern of demand about half the demand will not be met by 2030 (2030 WRG, 2009)

Growing regional water scarcity by 2050



Options to reduce scarcity:

- Increase crop productivity per drop
- Increase ground water recharge
- Increase economic value of water
- Inter-basin transfer

Level of Water Scarcity

No ^a .	River basin	Total renewable water resource (TRWR) km ³	Potentially utilizable water resource (PUWR) ^b				Water resources available per capita	
			Surface water km ³	Ground water ^c km ³	Total km ³	Percentage from groundwater %	TRWR m ³	PUWR m ³
	All basins	1,887	690	343	1,033	33%	2,025	1,108
	17 basins ^d	1,253	666	308	975	32%	1,411	1,098
Westerly flowing rivers	1 Indus	73.3	46	14.3	60.3	24%	1,501	1,235
	2 Mahi	11	3.1	3.5	6.6	53%	1,649	990
	3 Narmada	45.6	35	9.4	43.9	21%	2,542	2,448
	4 Sabarmati	3.8	1.9	2.9	4.8	60%	631	797
	5 Tapi	14.9	14.5	6.7	21.2	32%	831	1,183
	6 WFR1	15.1	15	9.1	24.1	38%	257	409
	7 WFR2	200.9	36.2	15.6	51.8	30%	3,871	998
Easterly flowing rivers	8 Brahmani and Baitarni	28.5	18.3	3.4	21.7	16%	1,703	1,296
	9 Cauvery	21.4	19	8.8	27.8	32%	656	852
	10 EFR1	22.5	13.1	12.8	25.9	49%	1,169	1,346
	11 EFR2	16.5	16.7	12.7	29.4	43%	423	753
	12 Ganga	525	250	136.5	386.5	35%	1,418	1,044
	13 Godavari	110.5	76	33.5	109.8	31%	1,441	1,431
	14 Krishna	78.1	58	19.9	77.9	26%	1,133	1,130
	15 Mahanadi	66.9	50	13.6	63.6	21%	2,463	2,341
	16 Pennar	6.3	6.3	4.0	10.9	37%	440	762
	17 Subarnarekha	12.4	6.8	1.7	8.5	20%	829	568
18	Brahmaputra	585.6	24.3	25.7	48	54%	17,661	1,448
19	Meghna	48.4	1.7	8.5	10.2	83%	4,830	1,018

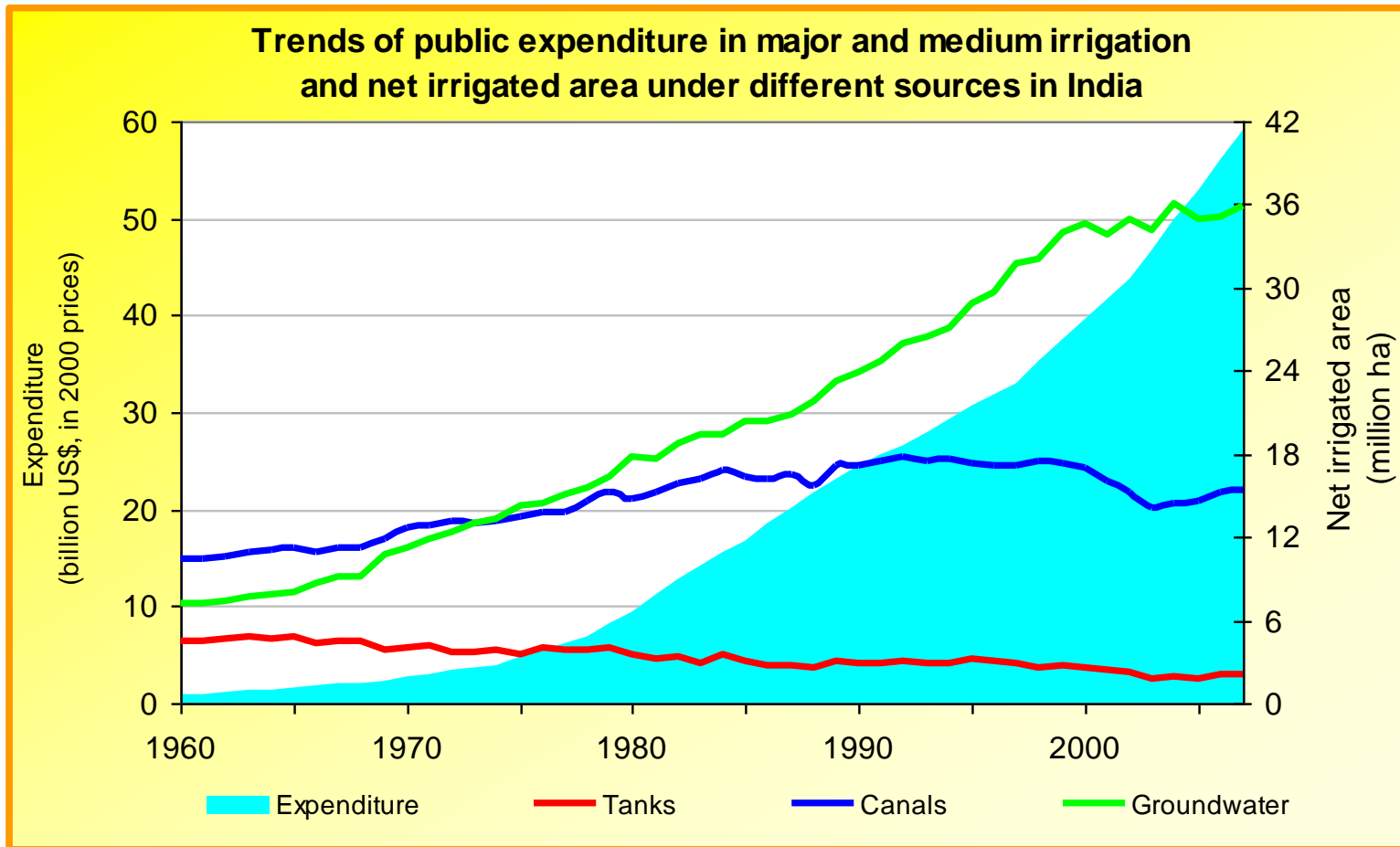
Notes:

- Refer to map given in Figure 5.
- Source: CWC (2002).
- The volume of potentially utilizable groundwater resources is the volume of groundwater replenished from normal natural discharge
- All the basins except the Brahmaputra and Meghna.

Improving Water Use Efficiency

- Agriculture estimated 80% all water withdrawal
- Irrigation Water Use Efficiency estimated at 38% (very low).
- Major and Medium Irrigation schemes represent 80% of Government created irrigated potential.
- Focus on MMI. What to do?

Public Irrigation Investments



Need for a Paradigm Shift

- *IDs should: “move away from a narrow engineering-construction-centric approach to a more multi-disciplinary, participatory management approach for MMI schemes, with a focus on command area development and a sustained effort at improving water use efficiency” (para. 5.5,12th FYP)*



NWUEISP scoping study

Key Findings and Recommendations

Public Irrigation Systems: Desired Future?

Fig 3a Canal Commands: Business-as Usual

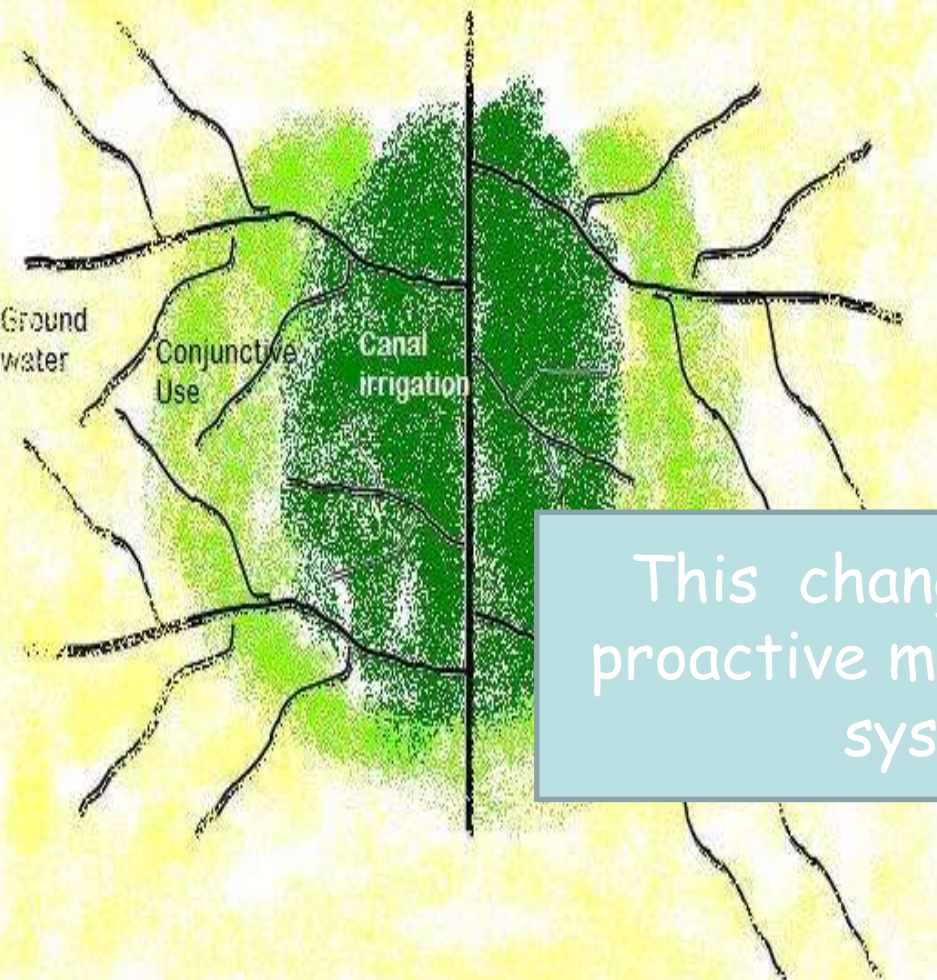
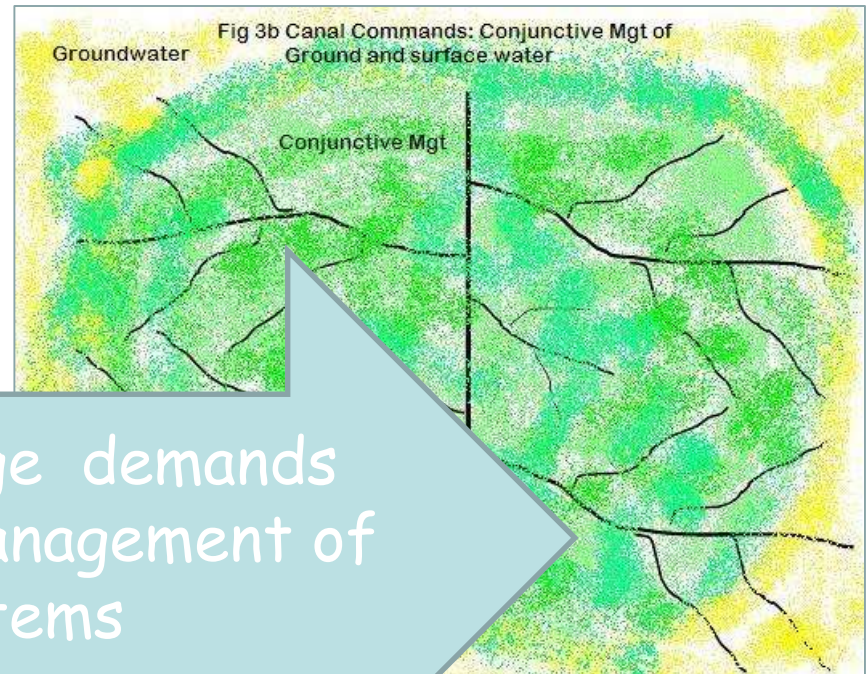
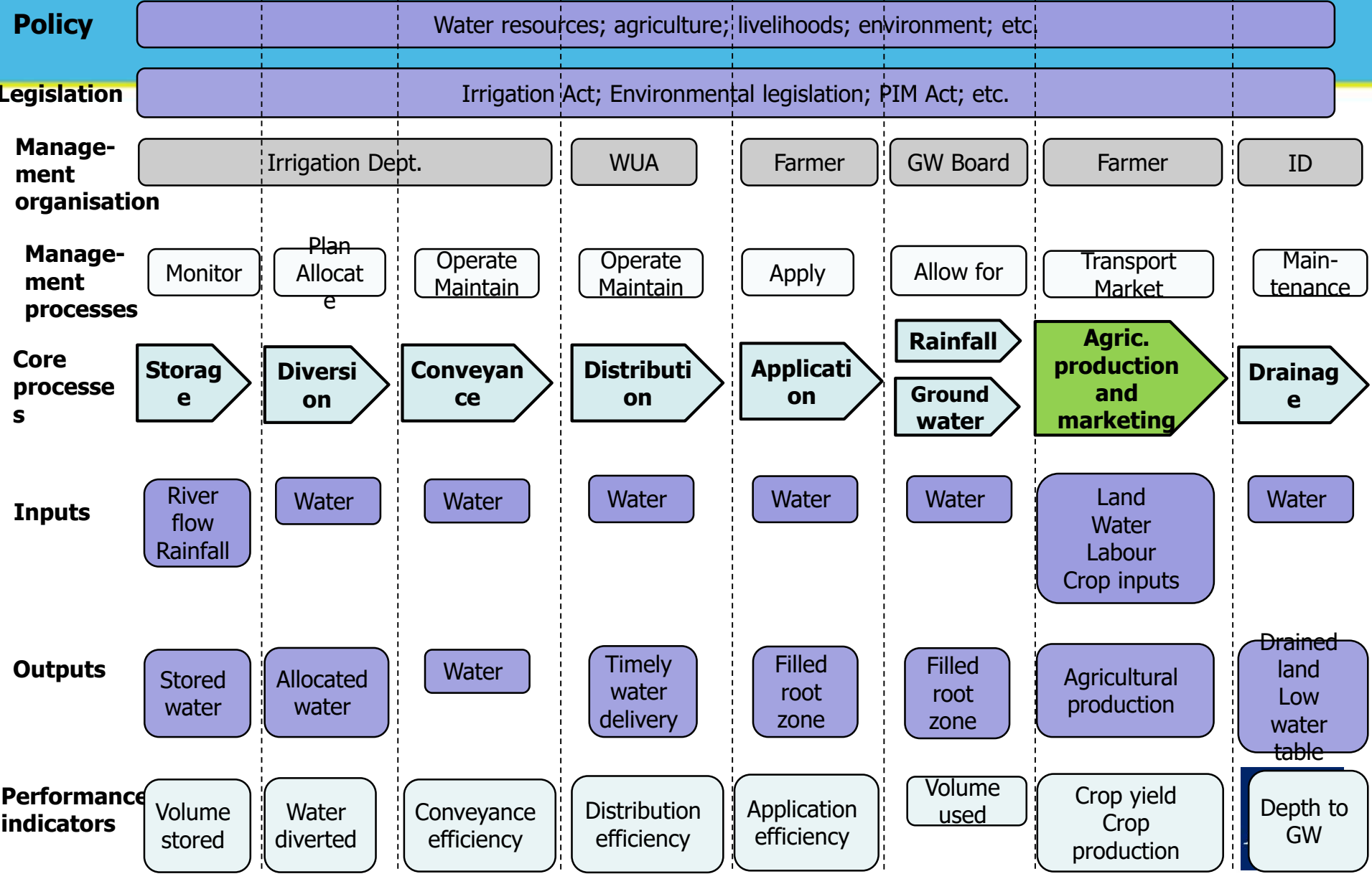


Fig 3b Canal Commands: Conjunctive Mgt of Ground and surface water



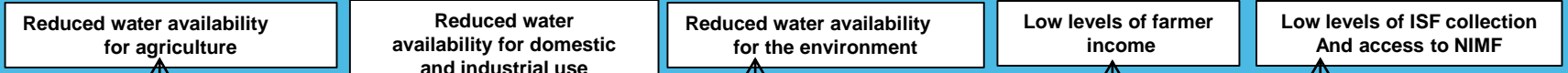
This change demands
proactive management of
systems

Identify core processes in MMI schemes



Identified Problem Tree

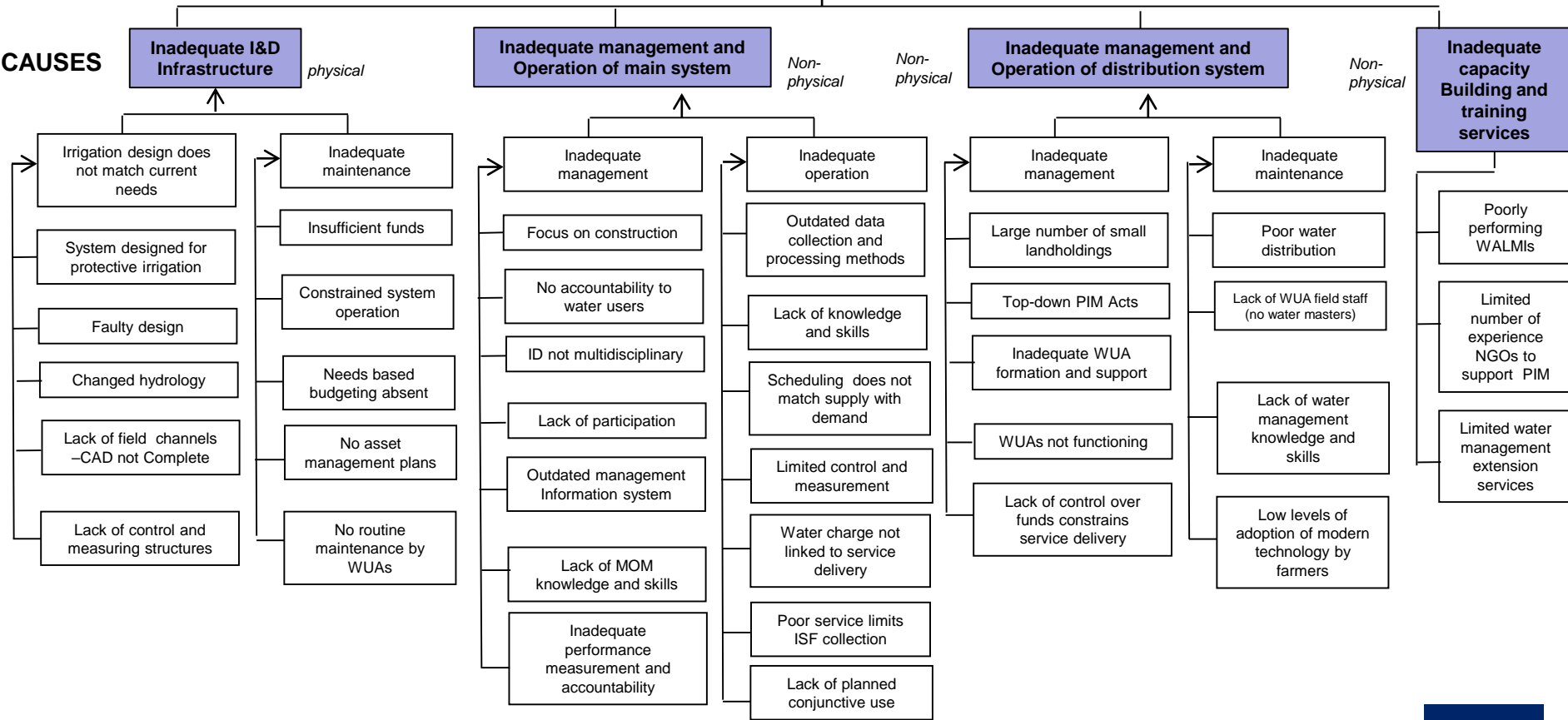
EFFECTS



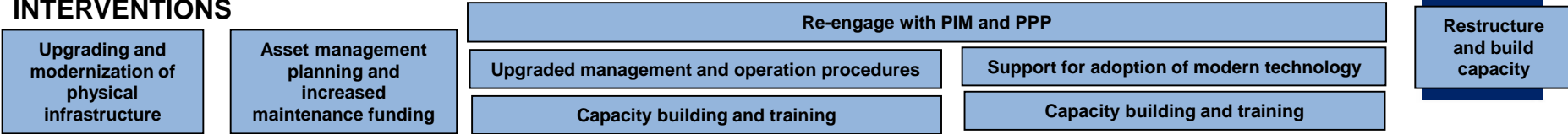
CORE PROBLEM



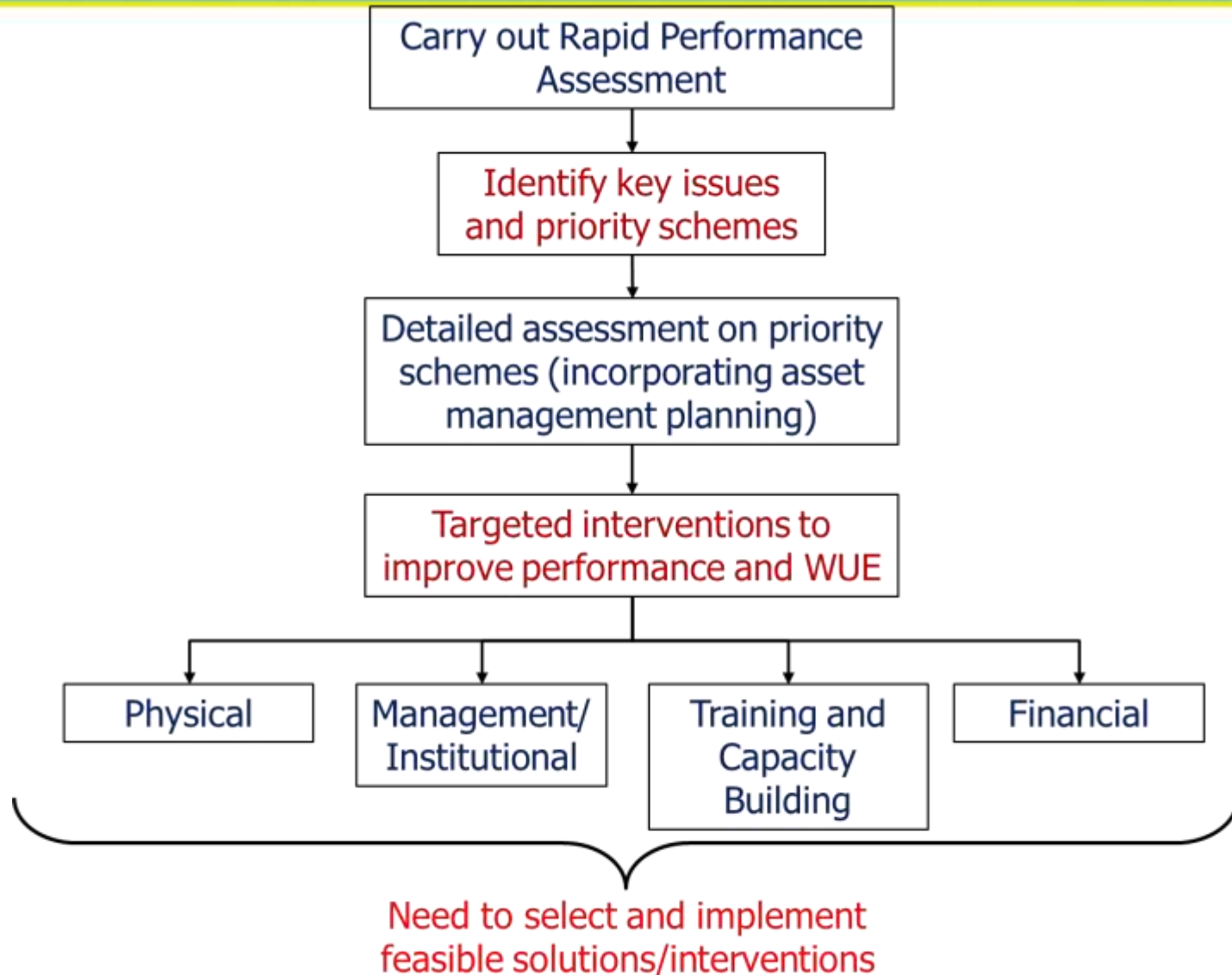
CAUSES



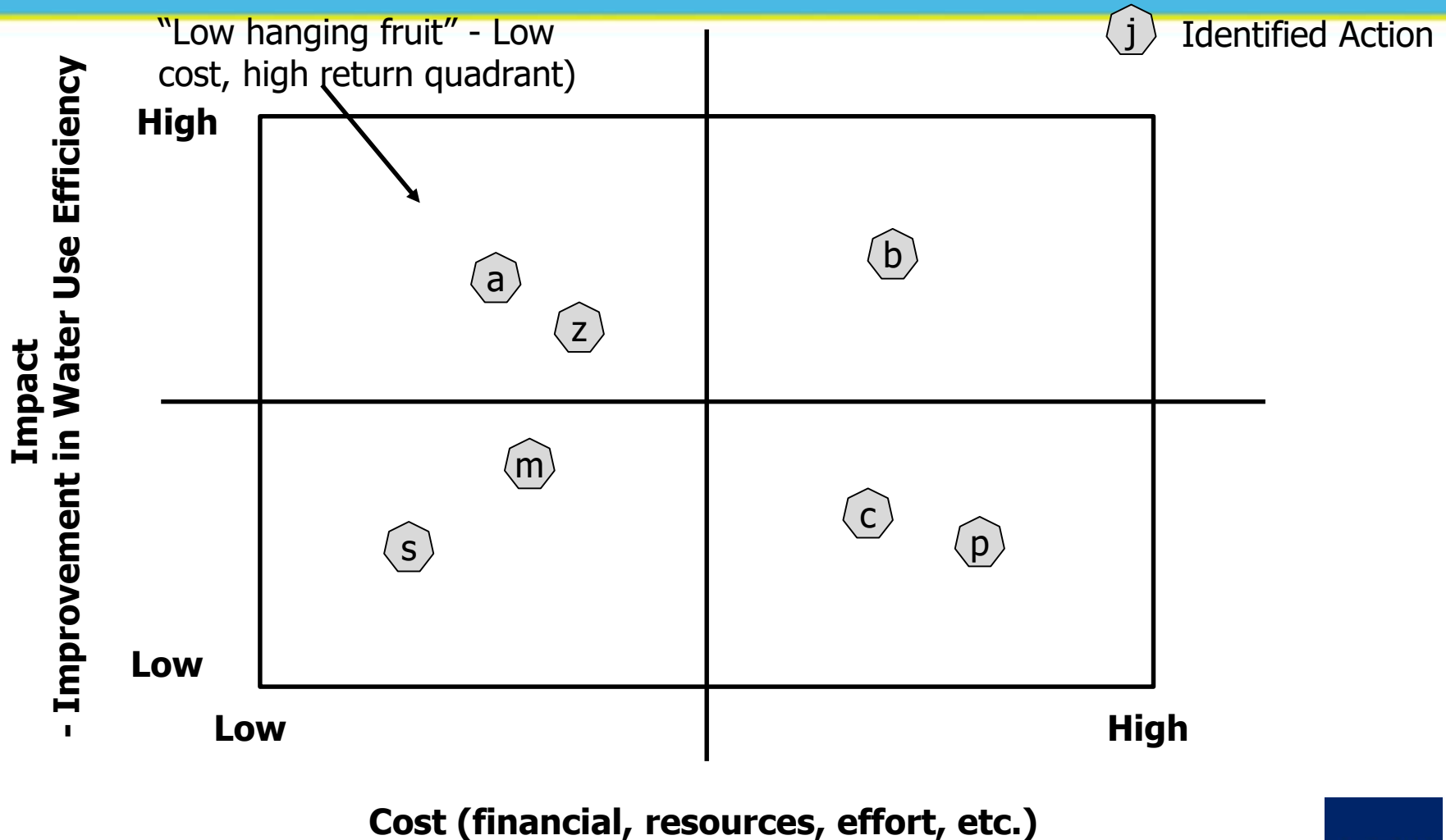
INTERVENTIONS



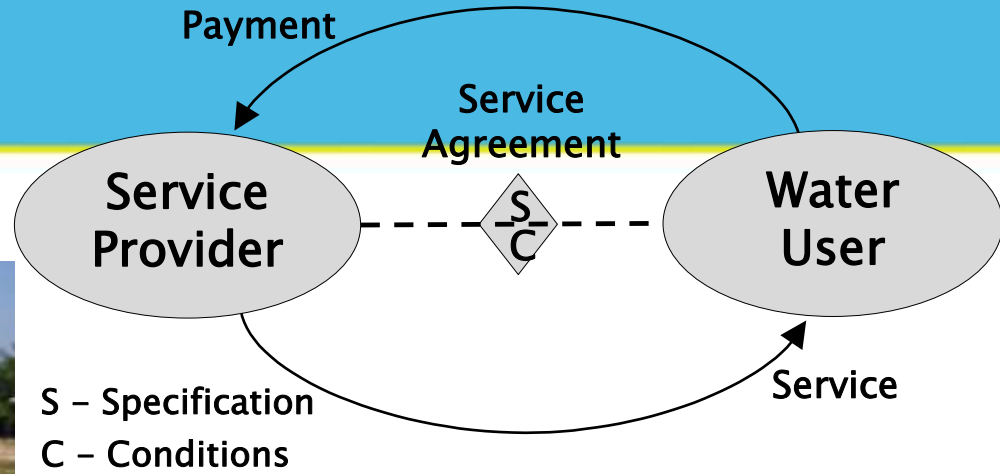
Approach for a Solution



Identifying cost-effective measures for improving WUE



Central Concept - Improving service delivery



VOLUMETRIC MEASUREMENT (M&R) BR 2

NAME OF IC = KHATODA 204-245 HA.

	1	2	3	4	5	6	TOTAL
NO. OF HOURS CANAL RUNNING	350	285	255	427	430	536	3383
AREA IRRIGATED IN HECTARES	65	254	265	138	138	134	883
TOTAL WATER USED IN MCFEET	0-18	26-70-8	20-0-0	18-200-34-71	0-55	00-00-00	
TOTAL WATER USED IN LAKH LITERS	134-35	5834-57	1704-434	4000-44	442-38	2018-47	20230-000
PER HA WATER USED	2066-66	22971	27-23	29-14	32-14	15-04	20230-000
DELTA IN CM	05-1	23-71	27-23	29-14	32-14	15-04	20230-000
AVERAGE CAPACITY WITHIN CANAL RUN	2-5	1-5	1-5	1-5	1-5	1-5	1-5
WATER CHARGES @ 150/- PER HA.	12672	33168	40182	26430	20122	20122	100000
RATE PER 10000 LITERS	0-55	0-57	0-39	0-48	0-44	0-48	0-47

Central concept – Improving service delivery

Service delivery encompasses the following:

- ID staff or third party (PPP) are responsible for service delivery and scheme performance
- Focus on productive irrigated agriculture
- Improved scheduling to match supply and demand
- Linking service delivery to fee collection
- Using modern technology – Remote sensing for crop area and ET; GIS; MIS; SMS linked to web pages, etc.
- Improved control and measurement (linked to scheduling)
- Adequate maintenance budget (linked to service delivery)
- Partnership with water users (through WUAs)
- Plan and manage for conjunctive use
- Supported by effective education and training

Analytical Tools Developed for Rapid Appraisal and Planning - 1

Benchmarking	Benchmarking based on FAO RAP approach
Focus Group Discussions (FGDs)	Quick non-quantitative assessment of current farming systems, constraints and indicative responses to possible initiatives
Participatory Rural Approach (PRA)	More detailed structured and detailed surveys including some quantitative assessment of constraints, issues and responses to possible initiatives
Sample area profiling	Semi-detailed studies in a sample areas including infrastructure, agriculture and social and institution as in conjunction with FGDs
Medium and detailed level remote sensing	Quick analysis of land-use from freely available medium resolution imageries over 5 schemes Pilot analysis over a selected area using high detail analysis to assess crop productivity

Analytical Tools Developed for Rapid Appraisal and Planning - 2

Sub-basin water balance	Scheme water balance of both surface and sub-surface systems
Institutional and technical analysis	Compiling and integrating the outputs of RAP and PRA including costs
Improved water management	Prefeasibility plans to assess options and present proposals to improve water management and agriculture
Preliminary plans for water management	Preliminary plans for scheme modernization and increase efficiencies; Report

NWUEISP Summary - 1

- Require a “paradigm shift” in the way irrigation schemes are managed
- Upgrade and modernize control and measurement in canal systems, with associated step-changes in O&M procedures
- IDs need to adopt a service delivery approach using modern technology (remote sensing, GIS, etc.)
- Focus on service delivery and performance management, including rapid appraisal and benchmarking
- Re-engage with PIM – provide support and leadership, strengthen WALMIs and NGOs

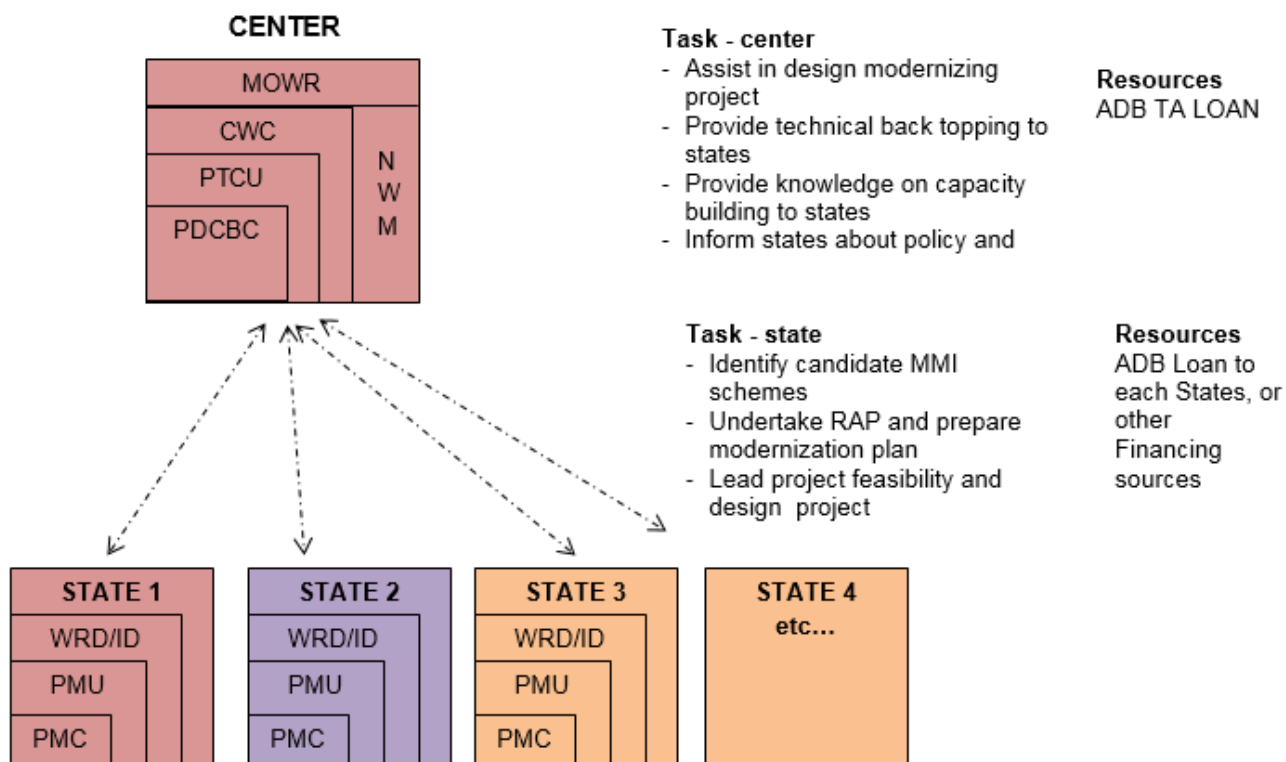
NWUEISP Summary - 2

- Develop approaches and procedures for conjunctive use of surface and ground water
- Quantify MOM costs using asset management planning and provide adequate funds, either from users or government. Properly maintained I&D systems should become the norm, not the exception.
- Strengthen CAD&WM and agricultural support programmes
- Piloting of modern approaches to MOM – it's time to move forward in changing the basic approach, processes and expectations.
- Involve the private sector in innovative ways – introduction of modern technology, management contracts, etc.

NWUEISP – Conceptual Approach

- **Support both physical and non-physical modernization innovations:**
 - Physical: Upgrade/modernize to improve the ability to convey, control and measure irrigation water
 - Non-physical: Management strengthened to improve the planning, delivery and monitoring irrigation water; institutions strengthened to better support efficient irrigation management, implement PIM – explore PPP
 - Develop models of modernized MMI schemes in several candidate states. Work with states which are ready to reform and use these successes to show case best practices to less eager/capable states.
- **MOWR/CWC are enabled to better service candidate states with their infrastructure and reform programs – incl. provision on consulting services for RAP, capacity building, etc. MOWR/CWC catalyst role to encourage/demonstrate other states reform.**

NWUEISP Implementation Framework



Legend

CWC = Central Water Commission; M&E = monitoring and evaluation; MOWR = Ministry of Water Resources; PDCBC = project design and capacity building consultant; PMC = project management consultant; PMU = project management unit; PTCU = program technical coordination unit; RAP = rapid appraisal process; WRD/ID = Water Resources Department/Irrigation Department.

NWUEISP – TA loan

- **Scope:**
- **Capacity building on irrigation modernization**
 - performance assessment : RAP, Remote sensing, PRA, water accounting, etc.
 - Finding solutions : innovations in IT, conveyance, control structure, flow measurement; PPPs for irrigation, performance based MOM, etc

NWUEISP – TA loan

- **Scope:**
- **Support states MMIs modernization project design**
 - modernization plans
 - feasibility studies
 - detailed designs
 - tender documents

NWUEISP – TA loan

- Resources :
 - International and national consultants
 - International and national academia and applied research organizations - partnerships
 - Study tours
- Tentative Budget
 - \$20 to 30 million USD

NWUESIP : Next Steps

- Confirm with DEA feasibility of the proposed approach and willingness to proceed with project preparation
- Consult states, assess interest to join the scheme
- Appoint a focal person to work on project preparation and be the contact for ADB officer
- Prepare a preliminary project proposal (PPR) for the TA loan using DEA format - This can be done with support from ADB if required
- Submit the PPR to DEA for screening committee clearance
- Inform ADB when/if clearance is obtained and request ADB to field fact finding mission.

Thank You

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