MASSCOTE

Multiple Uses of Water in Large Irrigation Systems

Conceptual approach and Cost Benefit Analysis for Operation and Management

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MASSCOTE

MASSCOTE Approach: Auditing Irrigation Management

- Assessing performance of irrigation systems
- Introducing the concept of Service Oriented Management [SOM]
- Planning for modernization

MUS is the norm SUS are marginal

Goals:

1. Operation and Governance of MUS systems
2. MUS/Policy levels (IWRM)

PLAN FOR MODERNIZATION
MONITORING & EVALUATION

(1) RAP

(2) CAPACITY & SENSITIVITY

(3) PERTURBATIONS

(4) WATER ACCOUNTING

(5) COST of OPERATION

(6) USERS & SERVICE TO USERS

(7) MANAGEMENT UNITS

(8) DEMAND for OPERATION

(9) OPERATION IMPROVEMENTS/UNITS

(10) INTEGRATING SOM OPTIONS

VISION for the agriculture and water systems

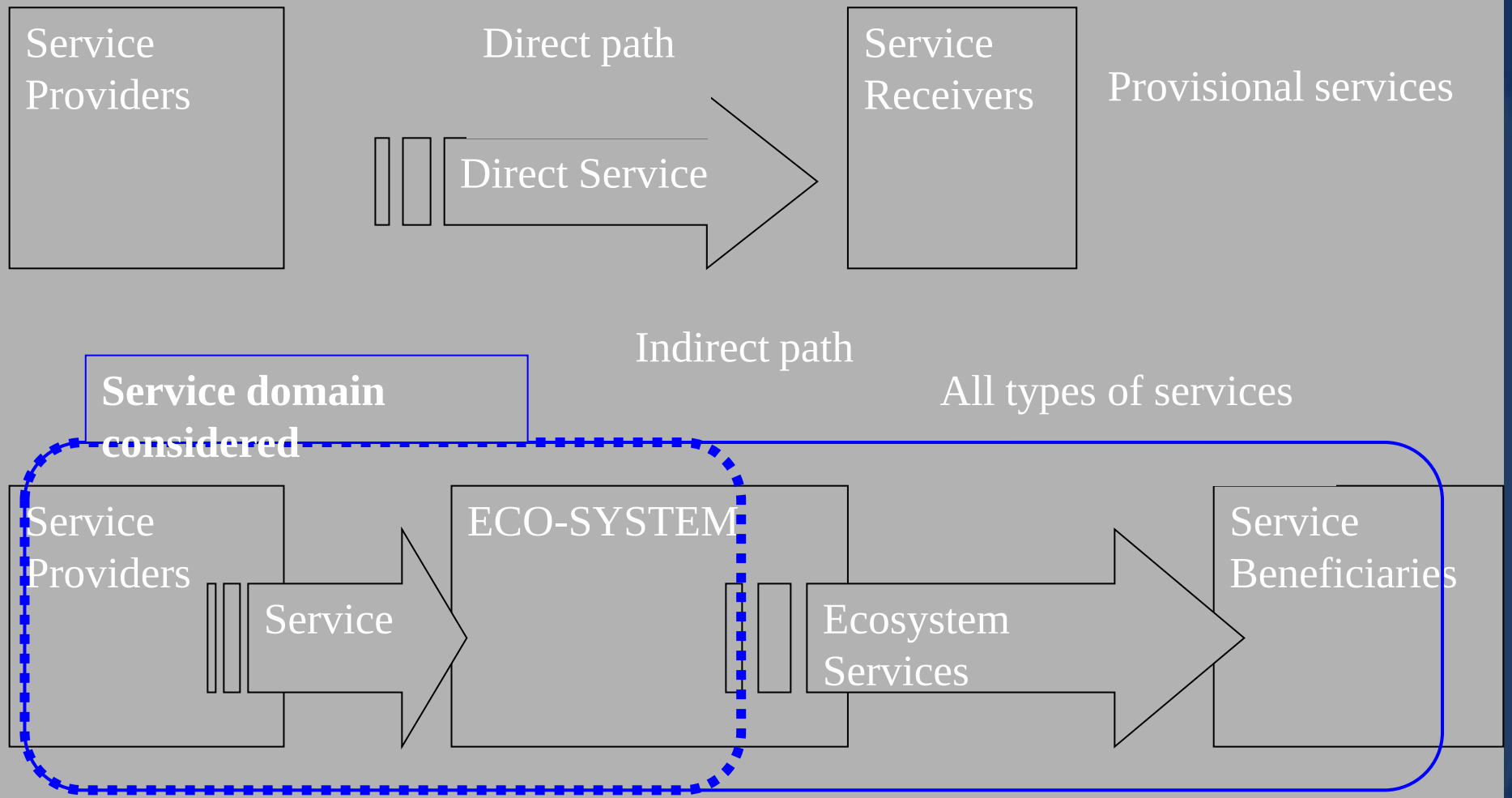
Conceptualization of MUS in large irrigation systems

Irrigated agriculture supply water to the natural ecosystems:
irrigation practice provides/supports ecosystems services

Productive-plus = ecosystem services provider

Provisioning of services	Supporting Services
Domestic water Food and fiber (irrigation) Water for cattle Transportation Hydropower Environmental flows Fuel (natural vegetation) Biochemicals and natural medicines Raw materials for construction	Groundwater recharge Support to fishing Support to natural ecosystems and wildlife (biodiversity) Soil formation Soil conservation **MEA Grid**
Regulating Services	**Cultural services**
Sanitation and wastewater treatment Flood protection Cooling effect on habitats Erosion control	Social functions linked to the infrastructure and management Recreation and Tourism Cultural heritage values and landscape (ex. terrace system)

MUS ? in large irrigation systems



- **Command area considered from a bio-physical perspective as an agro-ecosystem providing critical ecosystem services to people**
- **A dynamic organic relationship between provider and users of services.**
- **<u>In short a business service model intervening on a large ecosystem serving multiple uses</u>**

Defining services in practice ? Domestic

from WHO and UNICEF (Howard and Bartram, 2003) assessment in which they estimated that *"one-sixth of humanity (1.1 billion people) lacked access to any form of improved water supply within 1 kilometre of their home".*

Type of improved and unimproved water supply according to the JMP.

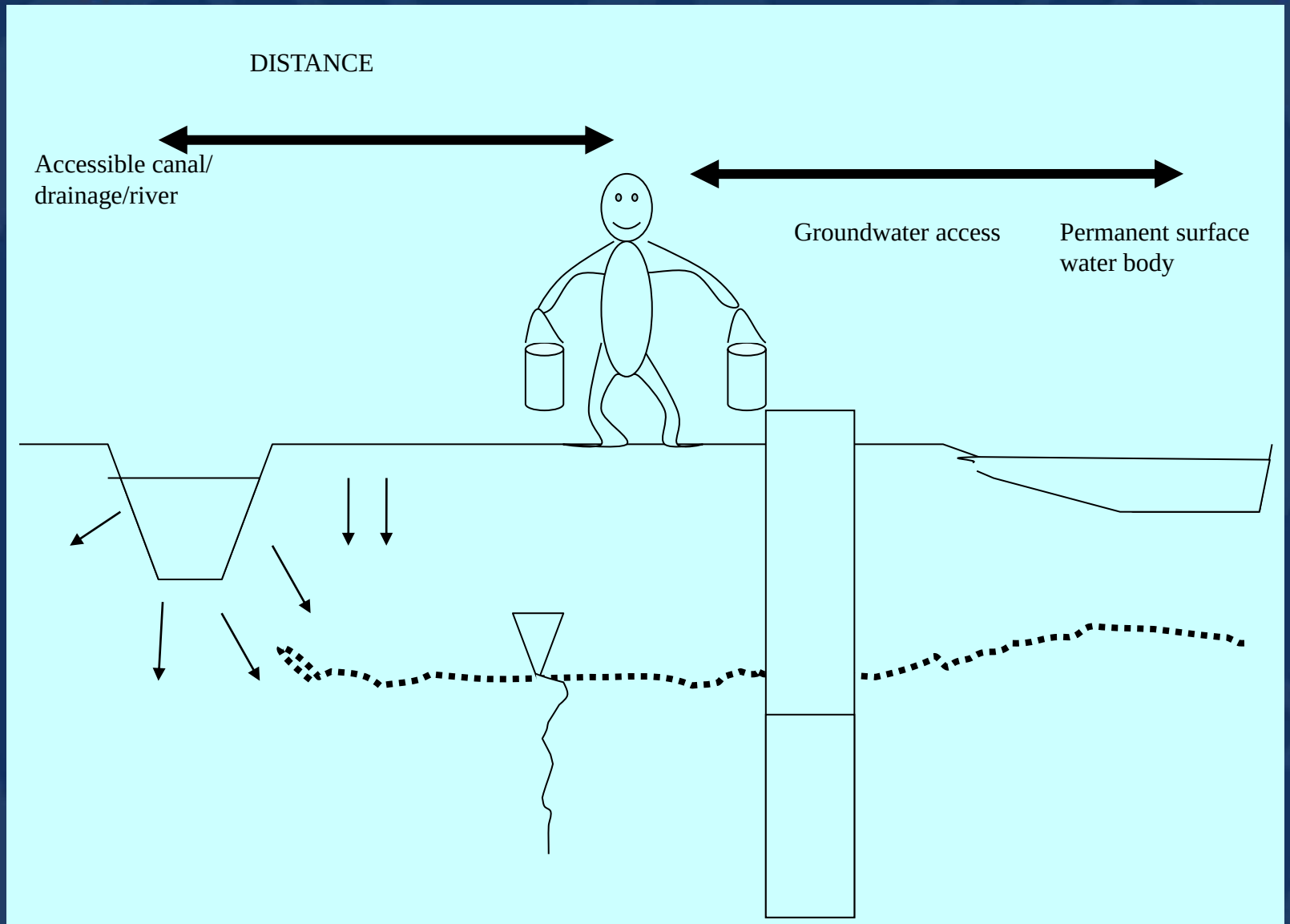
Improved Water supply	Unimproved water supply
Piped into dwelling, plot or yard Public tap/standpipe Tube well/borehole Protected dug well Protected spring Rainwater collection	Unprotected dug well Unprotected spring Cart with small tank/drum Tanker truck Surface water (river, dam, lake, pond, stream, canal, irrigation canal) Bottled water

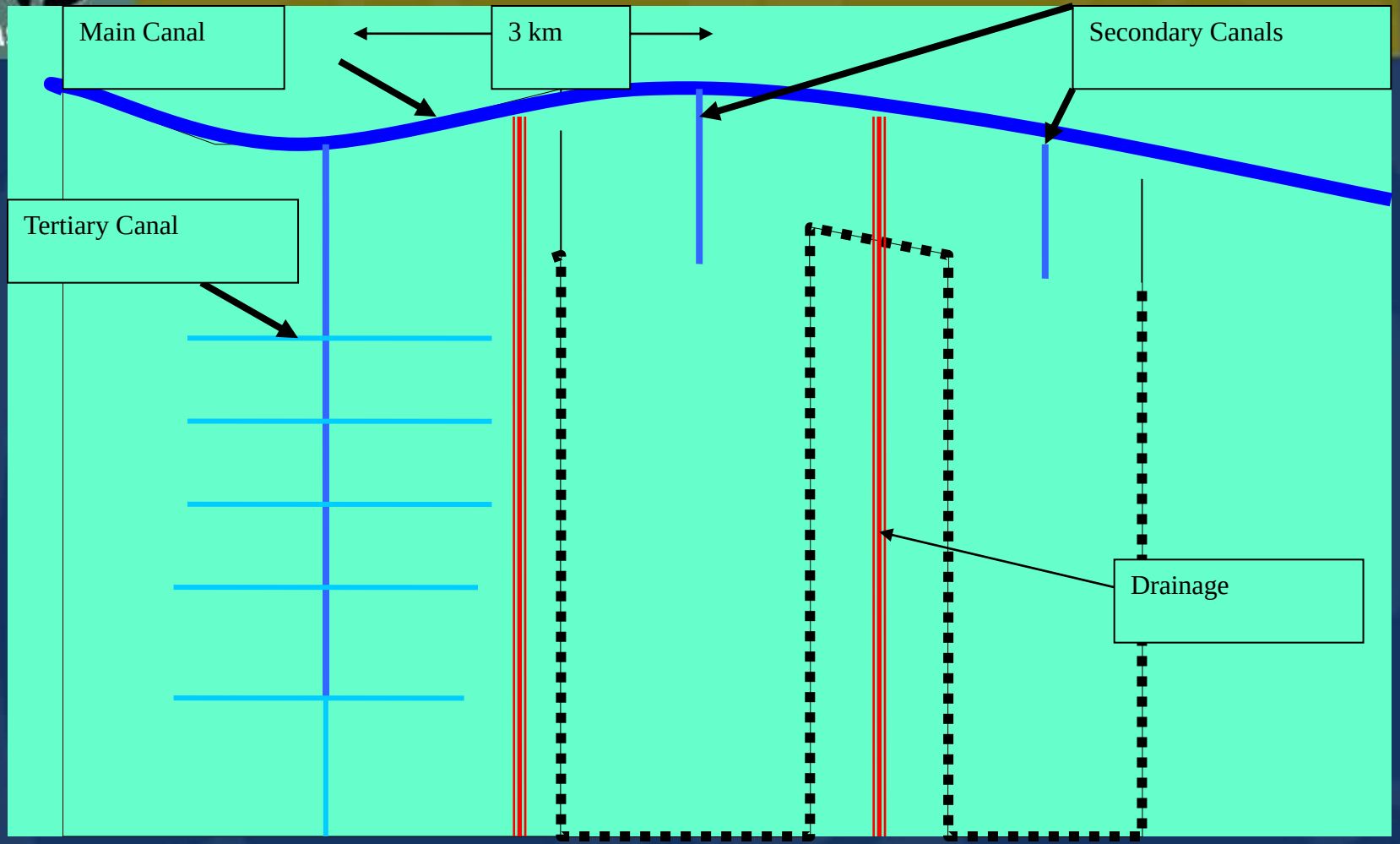
Services / Operation

- Water Deliveries
- Support to raw water surface
- Groundwater recharge
- Control of water

Service? Raw water ? physical Access? Distance to water?

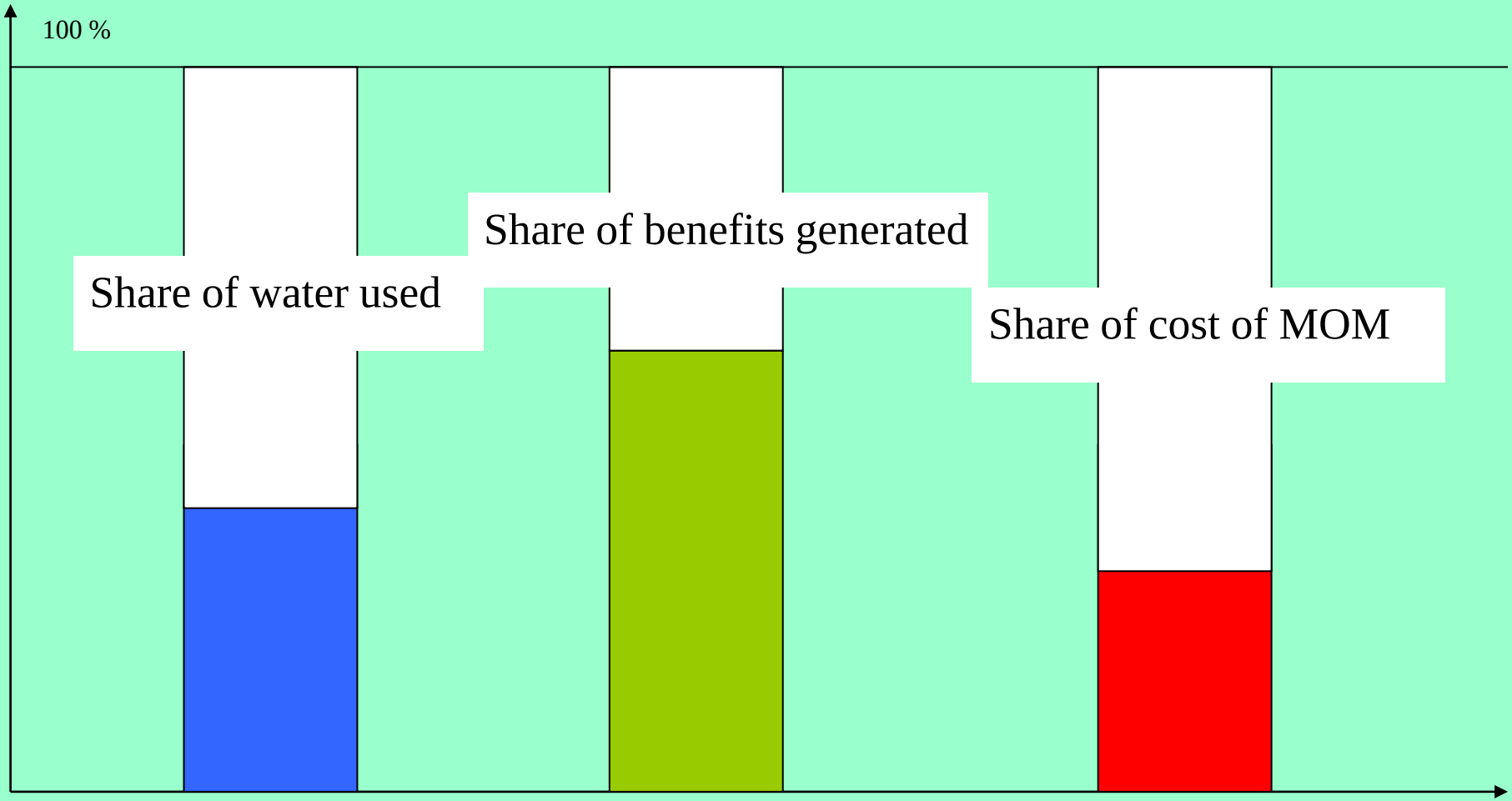
Access


DISTANCE
Accessible canal/
drainage/river
Groundwater access
Permanent surface
water body



Example of zoning around the canal infrastructure for Shahapur Canal – Right blue Main and secondary canals – Left red with tertiary canals considered – Drainage network.

WBC shares per service: Water, Benefit & Cost

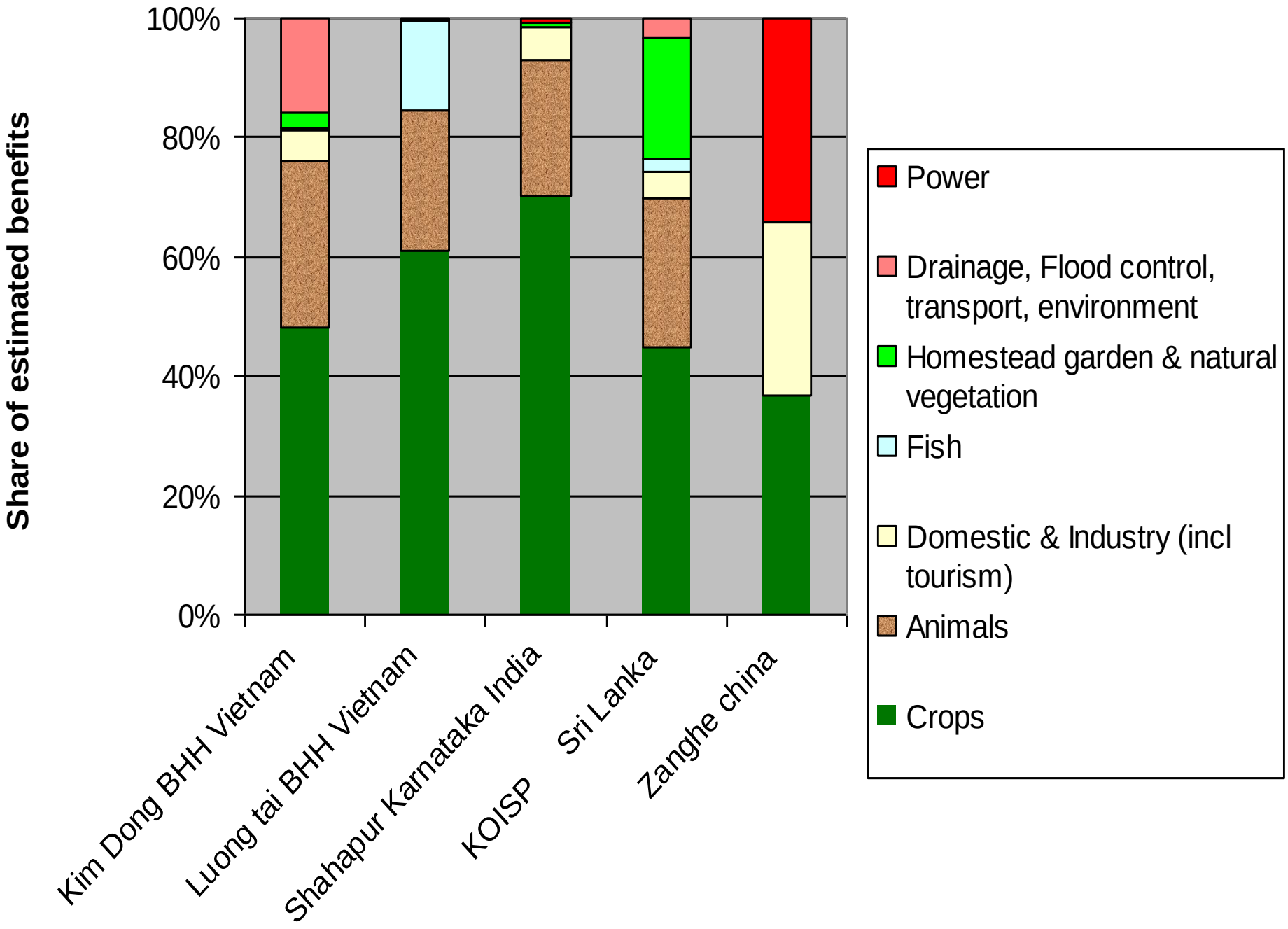


Share of benefits

- Definition of benefits of water service ?
- Usually benefits = Monetary (gross production) for agriculture ! or any productive activity as electricity, fishery, etc...
- Domestic ?? Households served for domestic,
- Environment ???
- Jobs for small business.

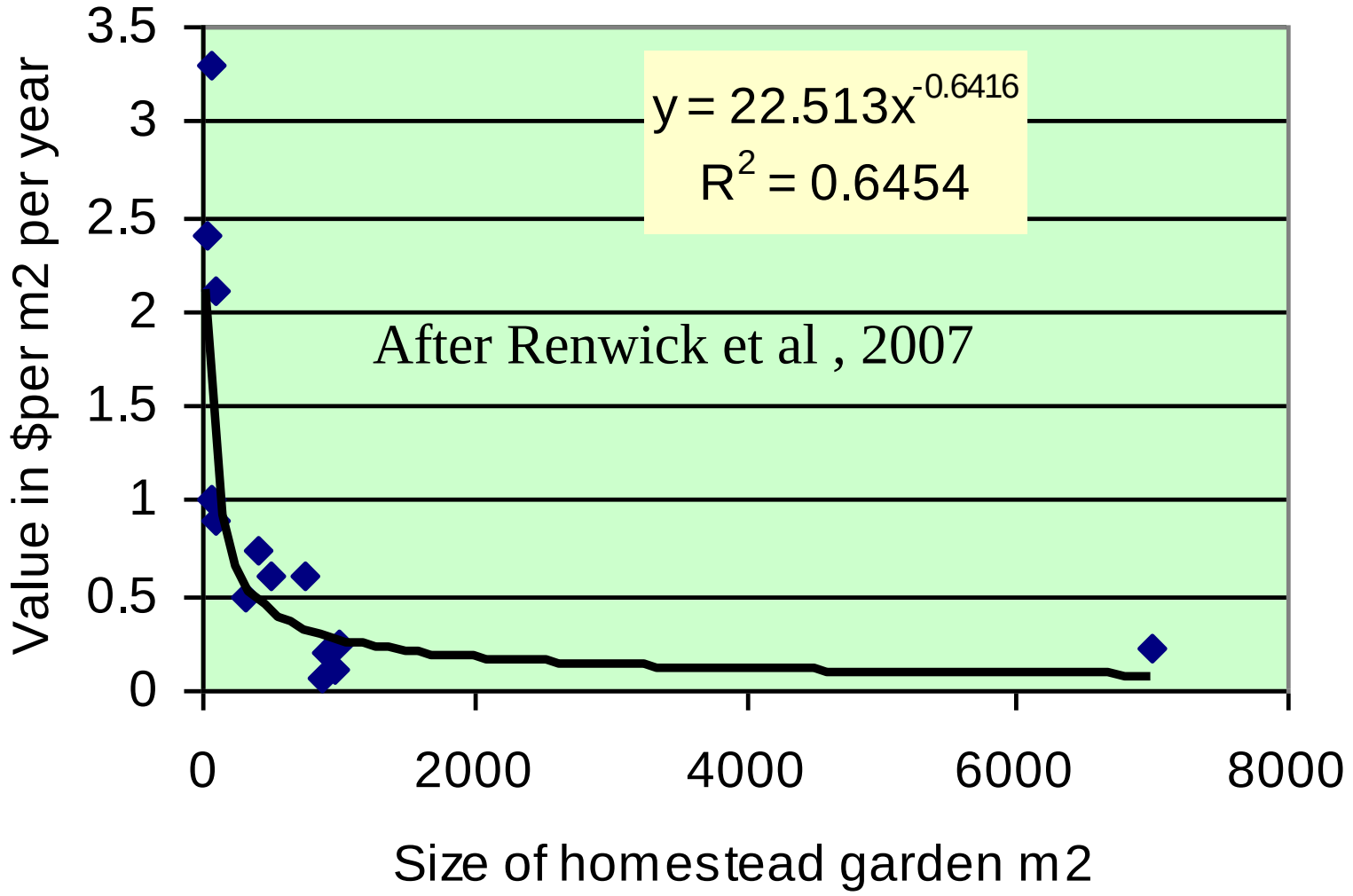
Critical Issues ?

- **References: building up a database !**
- **Methodology: MASSMUS rapid appraisal for mapping benefits**
- **Testing the Valuing methods for in depth MUS studies ?**


Share of estimated benefits
100%
80%
60%
40%
20%
0%
Kim Dong BHH Vietnam
Luong tai BHH Vietnam
Shahapur Karnataka India
KOISP
Sri Lanka
Zanghe china
Power
Drainage, Flood control, transport, environment
Homestead garden & natural vegetation
Fish
Domestic & Industry (incl tourism)
Animals
Crops

REFERENCES ?

VALUE ($) = 22.5 A^0.36 [A= size in m2]



Share of COST of MOM

Specific costs to produce each service.

- **Services: Water Deliveries - Support to raw water surface – Groundwater recharge – Control of water**
- **Investment – Operation – Maintenance**

Comparative advantage of MUS

- **Water multi-use**: **"More DGs per drop".** BUT re-use of water drops is no exclusivity of MUS therefore the specificity of MUS needs to be well documented.
- **Cost-efficiency:** **"MUS better than Σ SUS"** numerous services to a greater number of users with the same infrastructure more cost-effective than achieving the same with single use systems.
- **Provision of extra services:** ecosystems services provided by MUS systems for which little or no alternatives exist
- **Externalities:** **"MUS = positive externalities"** **YES BUT** we should not forget the negative ones !!

Practical changes and research needed

- **Local and policy levels :** importance of MUS in serving people especially the more vulnerable, ultimately addressing more MDGs. Local studies reinforced by a set of worldwide case studies on the importance of MUS on irrigation systems and on the ways to operate a MUS system.
- Development of **robust and simple methods to produce references**
- **a PILOT large MUS Irrigation system** to investigate all issues related to MUS by a consortium of interested partners.

Summary

- **Irrigation: Provide or support Ecosystems services**
- **WBC analysis (=CBA)**
- **RAP: Rapid MUS Water Benefit Cost Assessment**
- **MASSMUS 2nd phase appropriate Valuing methods ➔ MUS governance & Operations**

- **More MDGs per Drop - MUS better than Σ SUS**
- **Extra services & Externalities**

- **Local & policy awareness**
- **References**
- **MUS Pilot**