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*“Resourcing and Increasing Commitment for
the One WASH and WRM Programmes”*

Adaptation of Technology to Climate Change & GTPII

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Considerations for Climate Change adaptation and GTP II targets

- Climate change → changes in hydrological cycle
 - Increased droughts
 - More intense precipitation and flooding
 - Increased temperatures
- GTP II
 - Rapid urbanization
 - Higher service level standards
 - Socio-economic and technological changes
 - Shift from access to service improvement (MDG → SDG)



Technology options – Water supply: thinking through the spectrum of storage

- Water is stored behind dams, in forests, in soil and aquifers. Need to look at these storages together
- Water can be stored in...
 - soil (catchment management to enhance recharge, sand dams, etc)
 - Captured from runoff (haffirs, cisterns,etc)
 - Dams (from micro to large)
 - Natural aquifers (springs, shallow, alluvial, deep)
 - Surface water (rivers, lakes, streams)
- The spectrum of these technologies can be effectively used to build resilience against droughts and mitigate impacts of floods



Technology options – resilience in distribution and service delivery

- Economies of scale – schemes that can serve larger number of people
- Piped water systems with local storage (e.g. elevated reservoir)
- Multi-village/woreda schemes
- Conjunctive use, where possible
- Sustainable energy sources (solar, wind, etc)



Considerations for choosing appropriate technologies

Technical

- Water demand and use
- Availability of spare parts and materials
- Availability of local knowledge and expertise
- Present water supply and sanitation facilities;
- Design life of proposed facilities
- Raw water characteristics: source, quantity, quality, availability, and reliability
- Power requirements

Social

- Housing distribution
- Welfare & equity
- Affordability
- Migration
- Urbanization
- Cultural & religious aspects
- gender

Environmental

- Hydrology, rainfall & climate
- Soil conditions, geology and groundwater characteristics
- Water resource availability
- Sustainability

Institutional

- Roles and responsibilities for implementation; O&M
- Coordination between sectors and users
- Legislation and regulation



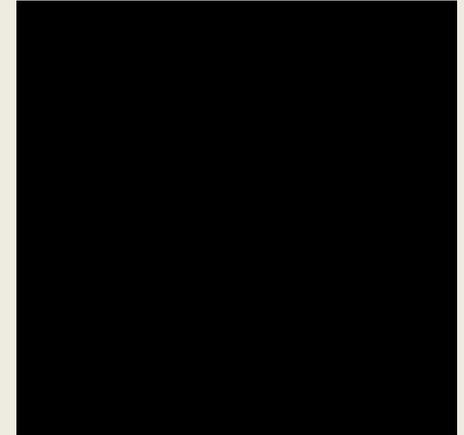
But...technology is only part of the solution...

What's Broken?



Challenges: Information

- Missing and fragmented knowledge on water resources quantity and quality
- Inadequate sector-wide data base (MIS) to capture monitoring information systematically, track non-functionality, etc
- Limited public access to data, tools to make informed decisions for planning and operation



Challenges: Institutions

- Limited technical and managerial capacity for WRM to inform design and operation of water supply infrastructure;
- Limited capacity for design and O&M for complex schemes
- Institutional coordination (information flow)
 - Formalized structure to effectively manage schemes that cross administrative borders
 - Clarity on mandates, roles & responsibilities
- Focus on sustainability - (technical, economic (e.g. water pricing), environmental & social
- Sometimes a culture of “*data-free analysis*” and “*analysis-free decision-making*”



Challenges: Investments

- Monitoring and forecasting systems
- Investment coordination
- Mechanisms to address limited progress and absorption capacity
- Limited capacity of design consultants and contractors
- Operation & maintenance



Resilience – “how to react, respond to and recover from...”

Shift from reactive to proactive measures. For example in the case of droughts...

Three Pillars of Drought Preparedness

1. Monitoring and forecasting/early warning

Foundation of a drought plan

Indices/ indicators linked to impacts and action triggers

Feeds into the development/ delivery of information and decision-support tools

2. Vulnerability/resilience and impact assessment

Identifies who and what is at risk and why

Involves monitoring/ archiving of impacts to improve drought characterization

3. Mitigation and response planning and measures

Pre-drought programs and actions to reduce risks (short and long-term)

Well-defined and negotiated operational response plan for when a drought hits

Safety net and social programs, research and extension

Source: Gutiérrez et al., 2014.



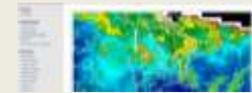
Information & Analysis

How can offer
cheaper, faster, and
easier delivery in many
domains of service?

Lessen the burden on
scarce limited
capacity?

Data services

In-situ [bottom-up] data services
Earth observation [top-down]
Surveys



Analytical services

Forecasting
Water resources assessments
Information to better orient design and
management of infrastructure



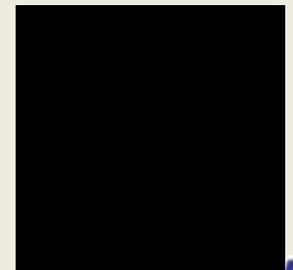
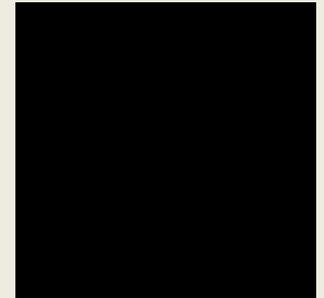
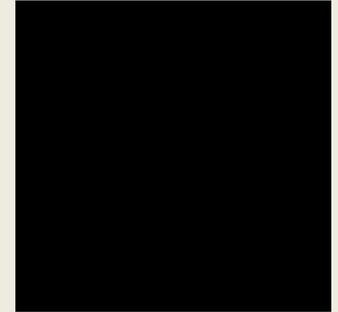
Last-mile client services

Visualization and Knowledge platforms
Early warning systems
Technical guidelines, standard bidding
documents, etc



Institutions & Policy

- Strengthening institutions – support to woreda/ zone/ regional/ federal level technical capacities
- Strengthening policies – mandates, economic instruments (e.g. water tariffs)
- Streamlining use of ICT to facilitate communication, monitoring, documentation, etc



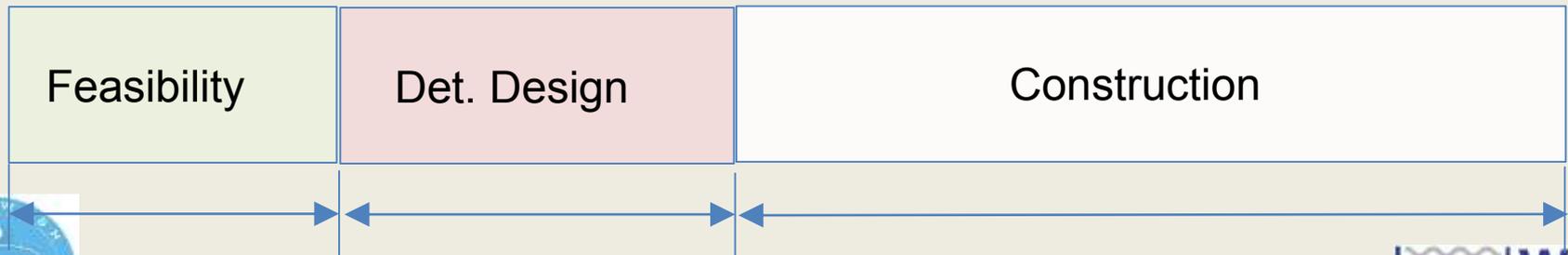
Investments & Operations

Knowable
Risk



Engagement Time

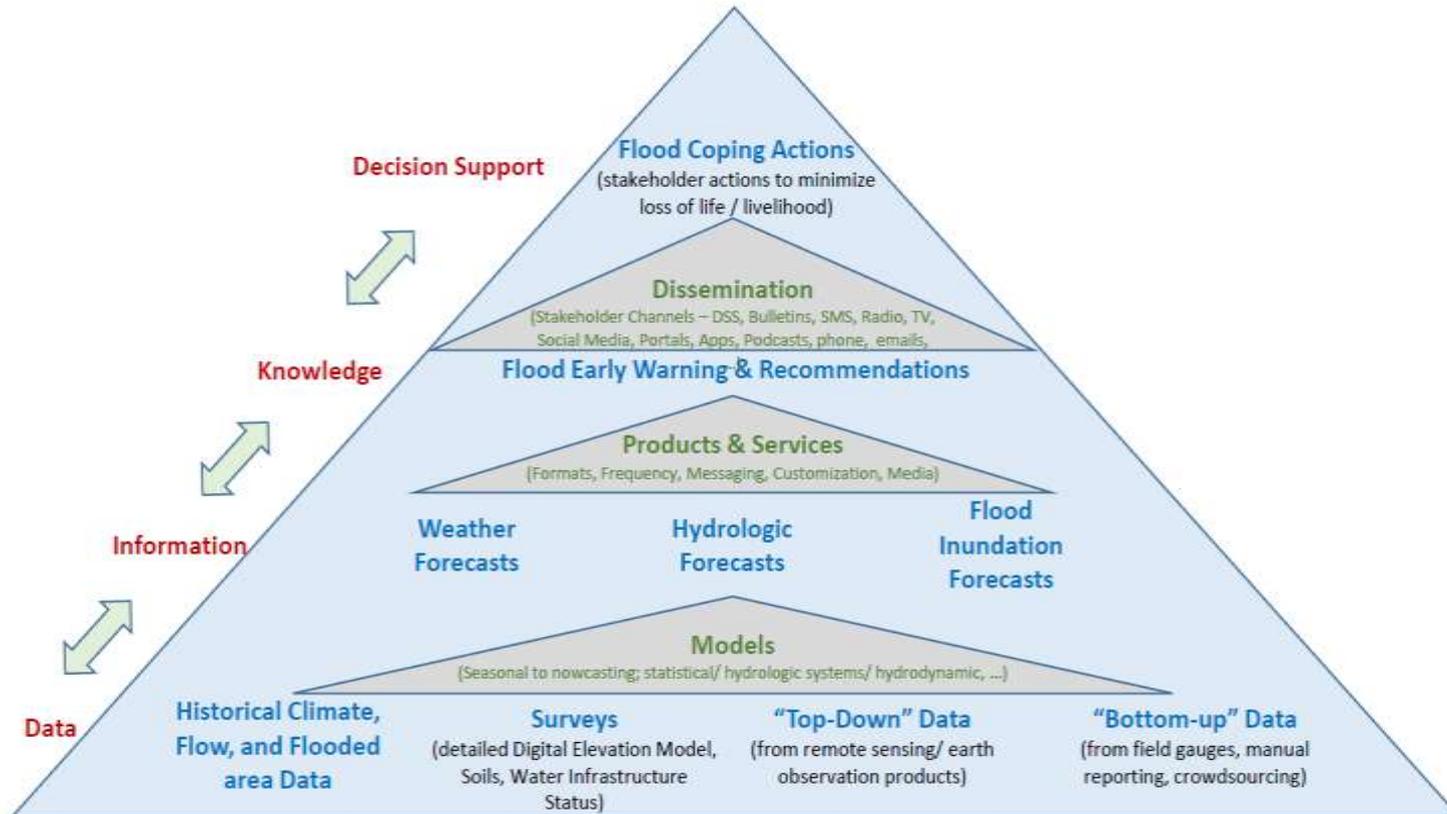
- Preparation of climate-smart investments
- Strategic packaging of design, implementation and perhaps operation to reduce delays
- Coordinated operations (water supply infrastructure)



MSF 9



“by failing to prepare, we are preparing to fail”



Thank You

