

**Assessing Determinants of PPP Project Performance: Applying  
AHP to Urban Drinking Water Sector in India**

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# Story-line

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## ▶ Urban Services and Implementation Formats

- ▶ India will have more than a billion living in cities, in less than a decade; Providing quality urban services is a challenge, especially with strained finances; Many cities exploring PPP formats

## ▶ Factors affecting performance – Literature Review

- ▶ Continuous engagement of partners, equitable regulatory frameworks, joint development of monitoring protocols, mutual trust and integrity
- ▶ Constraints - Complexity, lack of long term planning and institutionalized competition rules

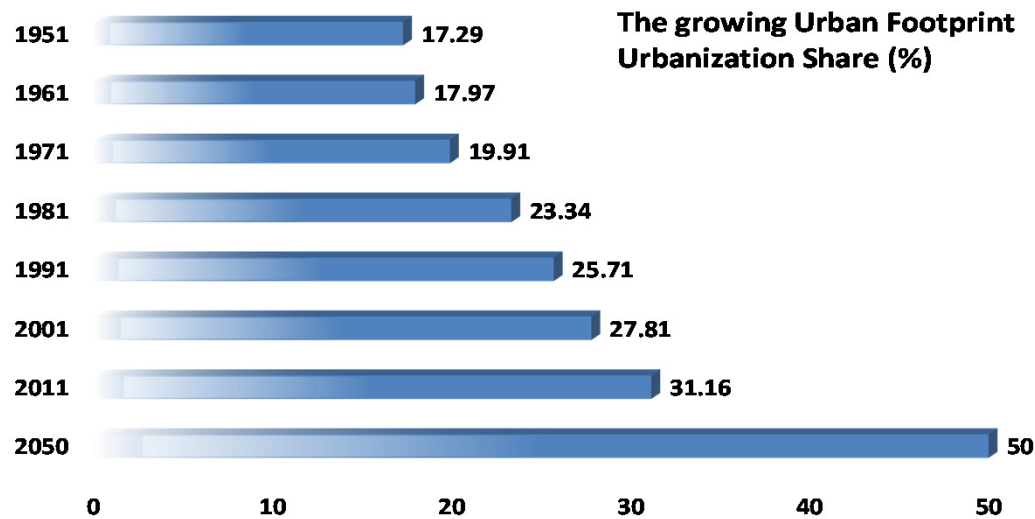
## ▶ Indian Experience

- ▶ Urban drinking water sector – barometer for a livable city
- ▶ AHP used for ranking parameters and estimating weights that affect performance

## ▶ Findings

- ▶ Stakeholder consent, project structure, baseline info and tariffs are top four parameters
- ▶ Differences among stakeholders group perceptions – government, developers, consultants and financial institutions

# Urban India - Projections

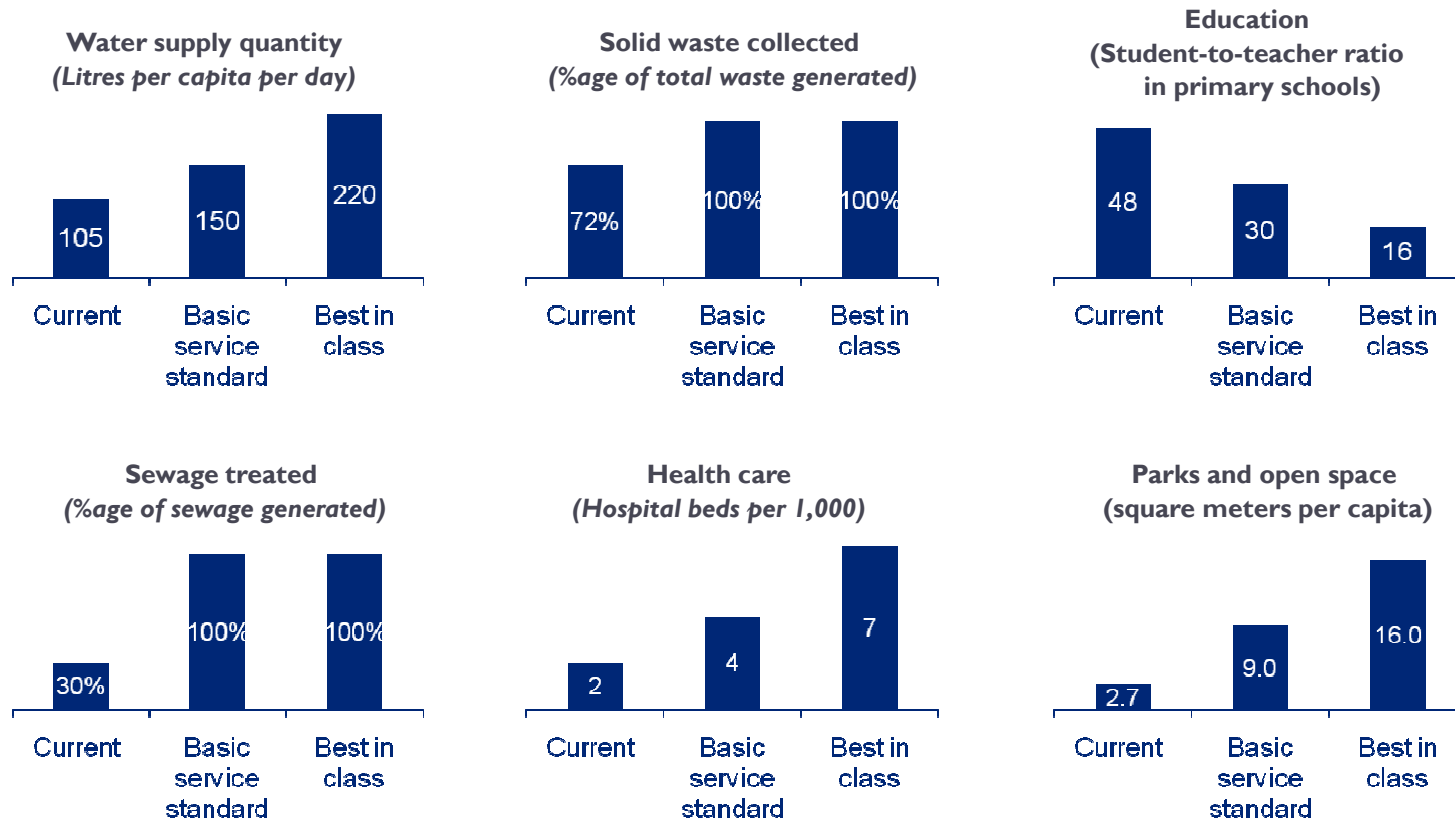


Source: Census of India, India's Urban Awakening – McKinsey Global Institute

- ▶ 5 times – the number by which GDP will have multiplied by 2030
- ▶ 590 million people in cities - ~ twice the population of USA
- ▶ \$ 2.2 trillion capital investment needed
  - ▶ \$ 1.2 trillion in capital investment
  - ▶ **26% of capital investment from debt and PPP**
- ▶ 700 - 900 million sqft of commercial residential space needs to be built ~ a Chicago every year
- ▶ 20 times than the past decade of the capacity of roads, metros and subways need to be created

# Infrastructure scenario: India snapshot

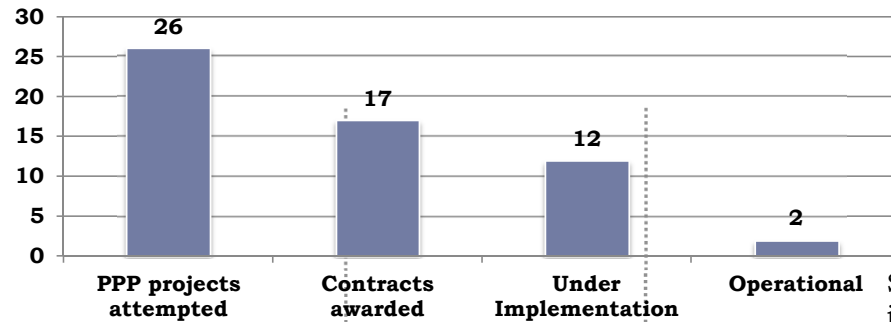
*existing infrastructure under tremendous pressure*



Source: India's urban awakening, April 2010, McKinsey Global Institute

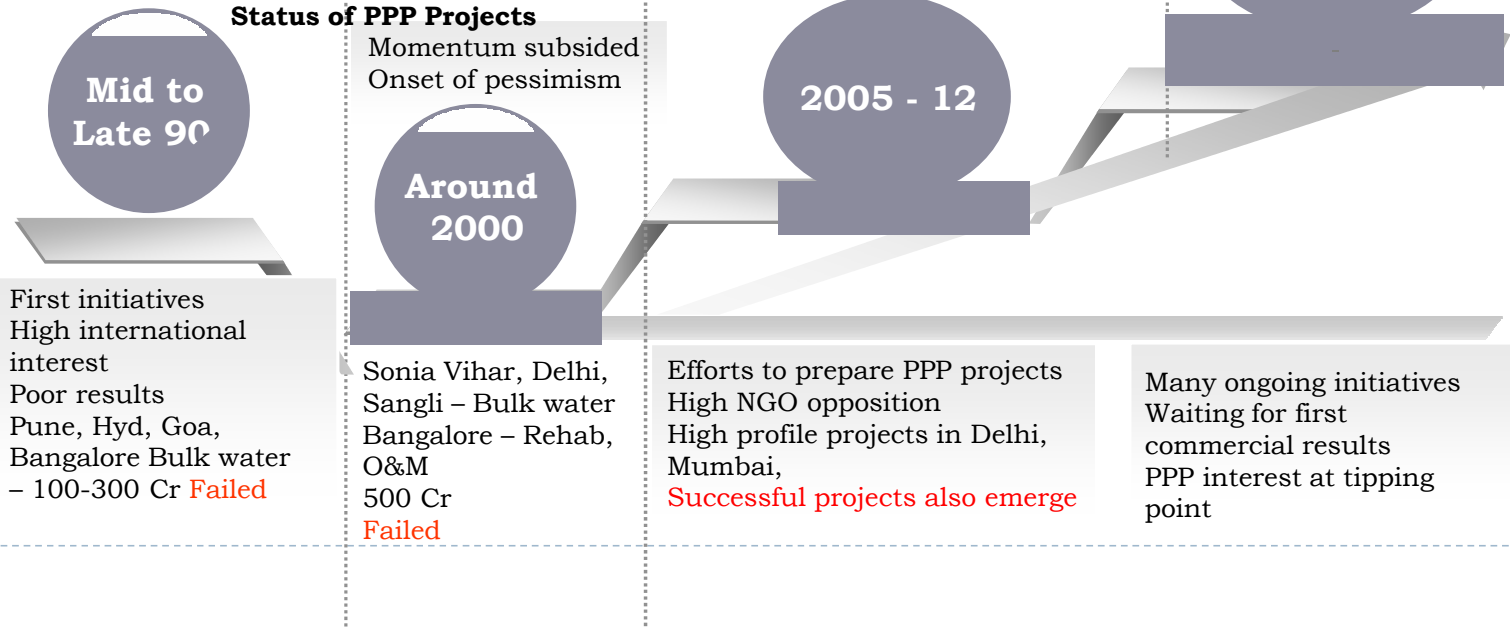
Poor quality of physical infrastructure affecting Indian cities

# Urban Drinking Water PPP Trends



Source: WSP, Expert interactions

## Status of PPP Projects



# Research Questions

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- ▶ Which parameters affect performance of PPP projects? What is their relative importance?
- ▶ How do these parameters change in Indian context?
- ▶ What are the critical factors that affect Urban Drinking Water Sector Projects in India?
  - ▶ What is their relative importance?

# Methodology

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- ▶ Review national and international literature that analyses critical success factors influencing success of PPP projects, and in particular urban drinking water sector
  - ▶ Map evaluation of various success and failure parameters suggested by the literature to develop converging lines of inquiry
- ▶ Preliminary interactions with sector experts for identifying factors in Indian context
- ▶ Questionnaire for applying Analytic Hierarchy Process (AHP)
- ▶ Conduct structured interviews (25) with stakeholders - across various groups (government, developers, financial institutions and consultants)
- ▶ Analyse findings to arrive at ranking and relative weights

# Literature Review

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## **Project Success**

- Fulfilment of budget, schedule and quality objectives indicate project success (Chua *et al.*, 1999)
- Project success is determined by achieving objectives of stakeholders (Mallak *et al.* 1991), Sanvido *et al.* (1992), Bourne and Walker, 2004; Jepsen and Eskerod, 2008)
- Stakeholder management is critical and project players will influence outcomes ((Cleland and Ireland, 2007) & Olander (2007))
- Success in development of an infrastructure project requires great integration of effort and careful management of the stakeholders' interests (Yeo, 1995)

## **Critical success factors for PPPs:**

- Continuous involvement of government either as regulator or partner (Spackman, 2002)
- Public sector should continue to set standards and monitor product safety, efficacy and quality (Scharle 2002; Jamali 2004)
- Transparent and sound regulatory framework (Pongsiri, 2002)
- Recognition by partners of what can be achieved together (Samii *et al.* 2002)
- Equal commitment from partners confirmed through allocation of time and resources (Samii *et al.*, 2002)
- Individual goals as an output of a subset of the overall programme objectives (Samii *et al.* 2002)
- Regular communication (Samii *et al.*, 2002)
- Sharing of knowledge across organizational boundaries to alleviate problems of information asymmetry and ensure convergence in learning skills and speed (Samii *et al.*, 2002)
- Joint development of a set of working practices and procedures to level out differences in working styles/culture (Samii *et al.*, 2002)



## Literature Review...2

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**Jamali (2004) lists various guidelines and principles to ensure that PPPs are not failures:**

- Precise articulation of the purposes of the partnership
- Clear delineation of targets and goals
- Transparent mapping of all costs, revenues and profitability
- Clarity of plans, risks and roles of partners
- Realistic targets, measurable output performance and transparency.
- Reporting and record keeping mechanism
- Strong central structure at the level of central administration, using private sector expertise to promote and guide policy implementation
- Provisions for contract re-negotiation and for adjusting contractual terms
- Appropriately designed legal framework
- Due considerations for environment, safety and health responsibilities
- Control over and close monitoring of monopolistic situations.

# Analytic Hierarchy Process

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- ▶ AHP, developed by Saaty (1980), has wide acceptability and could be used in the fields such as planning, selecting a best alternative, resource allocations, resolving conflict, optimization and many other fields (O S Vaidya, S. Kumar, EJOR, 2006).
- ▶ AHP is used to combine individual performance indicators to a key performance indicator by giving them individual weights.
- ▶ Method is based on solution of eigen value problem and ratios derives weight from paired comparison.
  - ▶ Step 1 – Define objective
  - ▶ Step 2 – Select elements of criteria, sub criteria, alternatives, etc.
  - ▶ Step 3 – Make pair wise comparison of various element
  - ▶ Step 4 – Calculate weighting and consistency ratio
  - ▶ Step 5 – Evaluate alternatives according to weighting
  - ▶ Step 6 – Provide rank to various alternatives

# Survey Design

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## ▶ Interviews

- ▶ Experts across various stakeholder categories – Government, Multi Lateral Agencies & Financial Institutions, Developers and Consultants (25)
- ▶ Official documents, newspaper reports were also examined to gain input for structure of questions

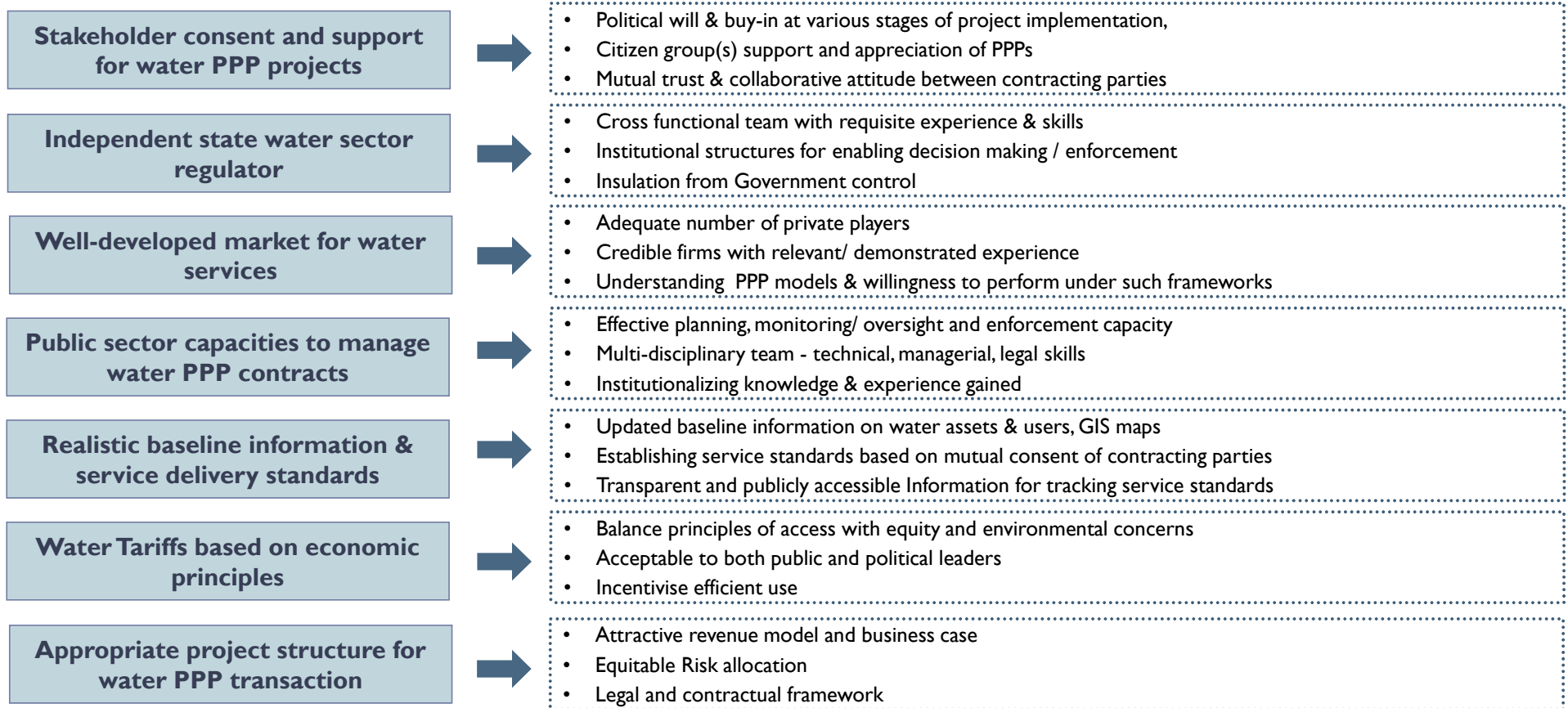
## ▶ Questions

- ▶ Pairwise comparison of factors for dominance, followed by relative importance on scale from 1 - 9

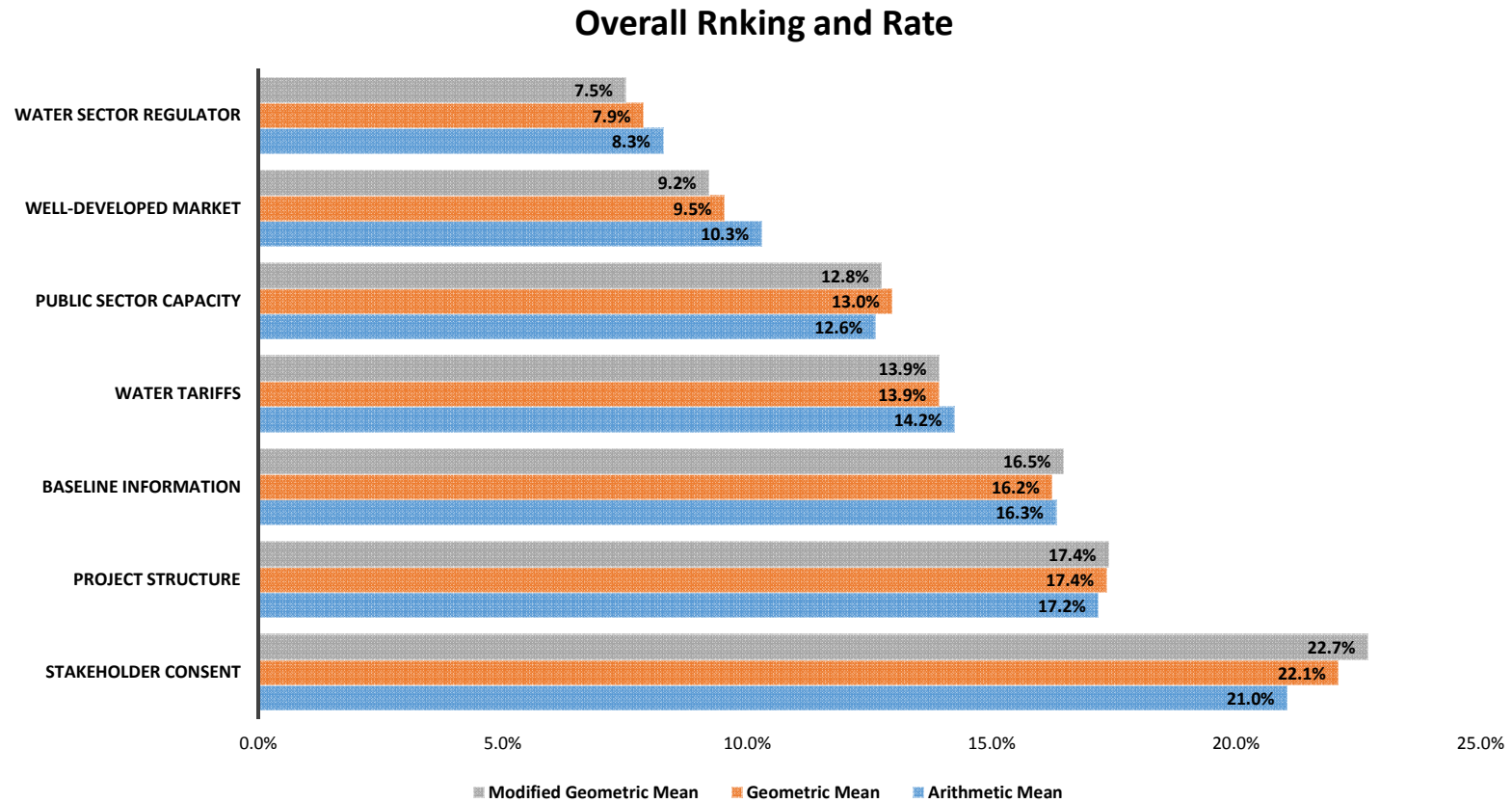
## ▶ Time period

- ▶ January 2016 – April 2016

# AHP Criteria/ Parameters



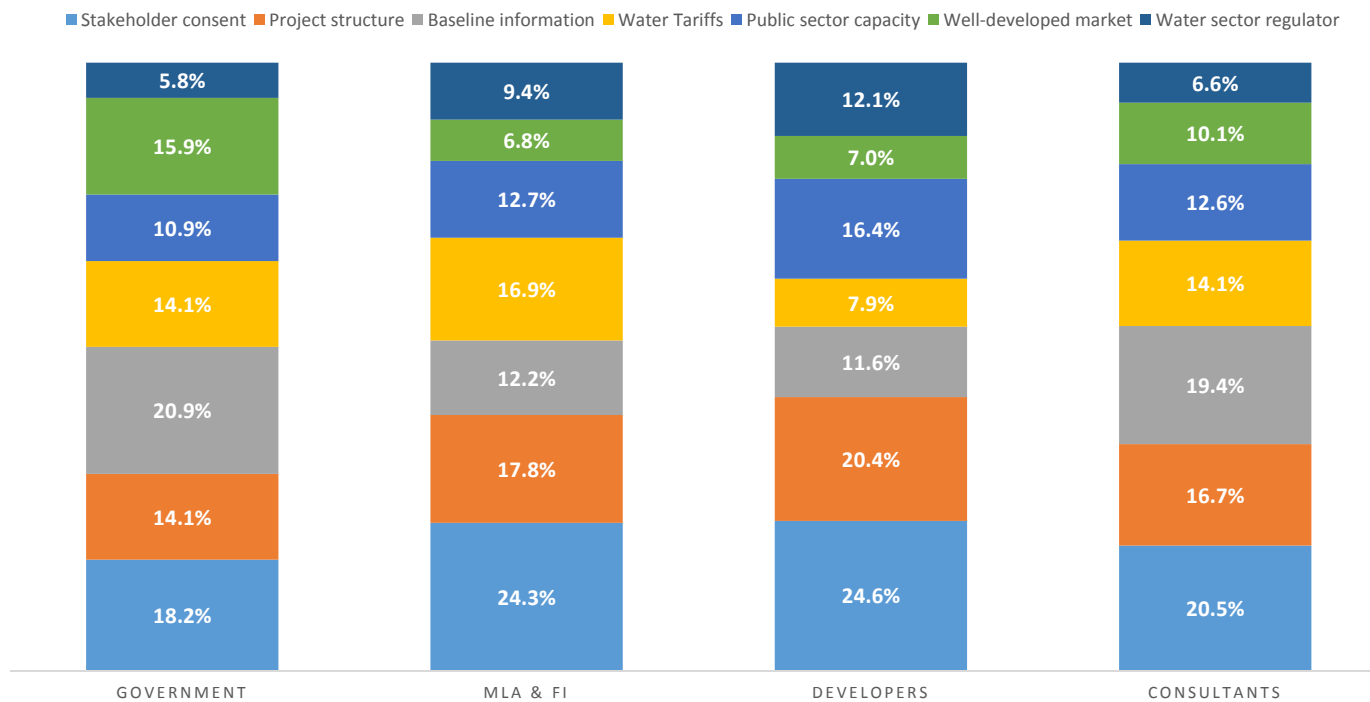
# Ranking and Weights - overall



All the three methods - Arithmetic Mean, Geometric mean and Modified Geometric Mean give the same result.

# Differences amongst various stakeholders

Differences among Various Stakeholders



Water regulator and well developed market are the least important factors.

# Findings

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- ▶ Stakeholder consent, project structure, baseline info and tariffs are top four parameters
- ▶ There are differences between various groups, reflecting their nature
- ▶ Government stakeholders feels baseline information is most important, followed by Stakeholder consent, well developed market, project structure and tariffs
- ▶ All other stakeholders indicated that stakeholder consent is the most important factor.
- ▶ Financial Institutions and Developers consider that project structure is next most important, while Consultants think baseline is second most important factor.
- ▶ Financial Institutions consider water tariffs as third most important, developers consider public sector capacity and consultants as project structure as third important factor.

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Thank You