STRATEGIES TO ENHANCE SUSTAINABILITY OF PUBLIC PRIVATE PARTNERSHIP PROCUREMENT PROCESS FOR INFRASTRUCTURE DEVELOPMENT

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ABSTRACT

Public Private Partnerships (PPPs) have been used as one of the preferred modes for infrastructure development since the last two decades in India. The PPP programme in India, though, has stabilized significantly with lessons learnt from the experience of implementing PPP projects, but the PPPs in India still suffers from certain shortfalls which could be related to the failure to meet many aspects of sustainable development (SD) principles. One of the ways to overcome these shortfalls could to modify the procurement process so as to fulfil the principles of SD even through PPP route. The main aim of this paper is to develop a conceptual framework highlighting the strategies for integrating sustainability principles in procurement process of PPP projects.

Content analysis on existing literatures, research reports, and case studies on PPP projects has been adopted to first identify the shortfalls in PPP process and, secondly, examine the possible strategies from best practices being adopted in PPP projects executed all over the world. The preliminary framework on how to integrate the principles of sustainability is then conceptualized explaining how the formulated strategies can be integrated into PPP process. Finally, focused interviews with the key stakeholders of PPP projects have been undertaken to assess the feasibility of the preliminary framework.

The preliminary findings from the study indicate the opportunities to promote SD even through PPP route if procurement process is enhanced with respect to the following aspects by relooking the PPP process from the perspective of SD concepts and principles: stakeholder's participation, environment impact assessment, value for money analysis, user's charges and risk allocation policies, transaction and bidding cost, and bid evaluation criteria. The proposed framework will be a useful tool for the government to restructure the PPP procurement process in India to fulfil the SD goals, which are being currently pursued by the government rigorously.

Keywords: *Infrastructure Development; Procurement Process; Public Private Partnerships; Sustainability; Sustainable Development.*

1. INTRODUCTION

The Indian Government has adopted Public Private Partnership (PPP) route for development of infrastructure projects since the economic liberalization initiated in 90s. PPPs have become of the innovative routes for the governments to rehabilitate aging infrastructure and develop new facilities to bridge the demand-supply gap. PPP shave become an explicit procedure to achieve benefits such as optimal risk transfer, increased efficiency, access to advanced technology, and bring in innovation (Cheung, 2009). On the other hand, it has been observed that PPPs may result in construction of over-engineered and inefficient infrastructure, creating long-term indebtedness of municipalities, providing unequal access to service due to high user tariffs, postponement of investments in less profitable projects parts, and contract renegotiation in favour of private providers (Koppenjan and Enserink, 2009).

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The PPP programme in India has stabilized significantly with lessons of experience of implementing infrastructure projects, but the PPPs in India still suffers from certain shortfalls which could be related to the failure to meet many aspects of sustainable development (SD) principles (PWC, 2005). Samuel and Oshani (2011) haves suggested that sustainability practices are present within PPP experience, but SD principles are largely absent from the theory and frameworks. Incorporating of SD principles in the procurement of infrastructure projects through PPP mode could lead to development of better infrastructure, bring more benefits to the better society and improve the quality of environment (Samuel and Oshani, 2012). One of the ways to overcome these shortfalls could be to modify the procurement process so as to fulfil the principles of SD even through PPP route. The main aim of this paper is to develop a conceptual framework highlighting the strategies for integrating sustainability principles in procurement process of PPP projects in India.

1.1. RESEARCH METHODOLOGY

The study used a mixed research methods to answer the various research questions relating to sustainable development promotion when infrastructure is developed through PPP route. A critical review of literature, research reports, and case studies on PPP projects were undertaken to answer the research question "*what are the areas of sustainable infrastructure development goals which are not fulfilled when infrastructure is procured through PPP route?*" For the critical review, content analysis methodology approach was used wherein the principles of sustainable development guided the critical analysis of PPP procurement process to identify the shortfalls from SD perspective. These identified shortfalls then guided formulation of preliminary framework of strategies on how to integrate SD principles in PPP process. This applicability of the preliminary framework was then evaluated through focused interviews as part of the research strategy to gain insights on the research question "*how to integrate sustainable development principles in PPP procurement process?*" The focused interviews with the key stakeholders developing PPP projects in Guwahati region of India have been undertaken to assess the feasibility of the preliminary framework.

2. PUBLIC PRIVATE PARTNERSHIPS AND SUSTAINABLE DEVELOPMENT

2.1. PUBLIC PRIVATE PARTNERSHIP PROCUREMENT PROCESS IN INDIA

PPP projects evolved through various phases while undergoing development from project concept to constructed facility. With respect to the PPP programme in India, the procurement process comprises of the four stages with respective deliverables. Table 1 depicts the outline of Indian PPP procurement process (PPP Cell, 2014).

Table 1: Phases of PPP Process in India

Phases	Deliverables
Identification	Strategic planning, Project pre-feasibility, PPP suitable check
Development	Full feasibility, PPP preparation and Clearance, Value for money (VfM) test
Procurement	Prequalification, Bid preparation, Bid evaluation, Contact finalization
Management	Construction / Operation, Contract management and Monitoring

2.2. PRINCIPLES OF SUSTAINABLE DEVELOPMENT

The principles of sustainability refer to abstract rules or guidelines that one can apply in order to achieve sustainable development. Various sets of principles of SD have been proposed in the past decades. Amongst the principles, the eight principles of sustainability formulated by Gibson *et al.* (2005) have been one of the commonly used principles for sustainability assessment. These principles have been used in various studies on infrastructure development as core criteria for sustainability assessment for urban development proposal (Morrison-Saunders and Hodgson, 2009); water governance regimes (Wiek and

Larson, 2012; Kuzdas *et al.*, 2014); and critical river basin infrastructures (Shah and Gibson, 2013). The eight sustainability principles postulated by Gibson are briefly explained in Table 2.

3. ANALYSIS OF PPP PROCUREMENT PROCESS – SD PRINCIPLES PERSPECTIVE

The process of procuring infrastructure projects through PPP route is examined to ascertain whether PPP mode of infrastructure development is leading to SD. The above mentioned eight principles of SD have been applied to all the phases of PPP project lifecycle, i.e. identification, development, procurement, and management. The processes and practices for PPP project procurement are critically reviewed to assess the extent to which it is promoting SD. A comprehensive literature review through content analysis of secondary data sources such as articles, reports, guides and online databases related to criticisms on PPPs for infrastructure development has been undertaken to identify the shortfalls.

Table 2: Principles of Sustainable Development

Principles	Description
Socio-ecological system integrity	Build human-ecological relations to establish and maintain the long-term integrity of socio-biophysical systems and protect the irreplaceable life support functions upon which human as well as ecological well-being depends.
Livelihood sufficiency and opportunity	Ensure that everyone and every community has enough for a decent life and that everyone has opportunities to seek improvements in ways that do not compromise future generations' possibilities for sufficiency and opportunity.
Intra-generational equity	Ensure that sufficiency and effective choices for all are pursued in ways that reduce dangerous gaps in sufficiency and opportunity (including health, security, social recognition, political influence) between the rich and the poor.
Intergenerational equity	Favour present options and actions that are most likely to preserve or enhance the opportunities and capabilities of future generations to live sustainably.
Resource maintenance and efficiency	Provide a larger base for ensuring sustainable livelihoods for all while reducing threats to the long-term integrity of socio-ecological systems by reducing extractive damage, avoiding waste, and cutting overall material consumption and energy use per unit of benefit.
Socio-ecological civility and democratic governance	Build the capacity, motivation and habitual inclination of individuals, communities and other collective decision-making bodies to apply sustainability requirements through more open and better informed deliberations, greater attention to fostering reciprocal awareness and collective responsibility, and more integrated use of administrative, market, customary and personal decision-making practices.
Precaution and adaptation	Respect uncertainty, avoid even poorly understood risks of serious or irreversible damage to the foundations for sustainability; plan to learn; design for surprise; and manage for adaptation.
Immediate and long-term integration	Apply all principles of sustainability at once, seeking mutually supportive benefits and multiple gains.

Table 3 shows the findings from the content analysis. The seven shortfalls identified from the analysis hamper sustainability of PPP projects from the perspective of key sustainability principles, namely, inefficient resource utilization and failure to promote socio-ecological system integrity; intra-generational inequality and lack of livelihood sufficiency and opportunity; failure to promote socio-ecological civility and demographic governance; and inadequate precautionary and adaptation measure.

4. STRATEGIES TO ACCOMPLISH THE PRINCIPLES OF SD

Strategies for SD are about making and implementing such choices, in a realistic, effective and lasting way. OECD (2001) defined the strategies for SD: "A co-ordinated set of participatory and continuously improving processes of analysis, debate, capacity strengthening, planning and investment, which seeks to

Table 3: Shortfalls in PPP Process Fails to Accomplish SD Principles

Shortfalls	Explanation	References	Deficient SD Principles
Inadequate environment impact assessment(EIA) and social impact assessment (SIA)	Current EIA and SIA activities for feasibility study are inadequate in ensuring promotion of project outcomes that are sustainable. EIA focuses all too often on acceptable impacts instead of optimizing the project for environmental, social and community benefits.	(Arce and Gullon, 2000; Arts and Faith-Ell, 2012; UNESCAP, 2006; Lorenzo, 2008)	Inefficient resource utilization and failure to promote socio-ecological system integrity
Inadequate whole life costing (WLC) methodology for VfM analysis	WLC methodology does not considered environmental and social externalities, and cost savings in VfM estimation. Risk model used in VfM analysis is very simple and outdated; and it fails to model the complex risk/reward profile of PPP project.	(Julie and Collins, 2004; Lockie, 2003; Samuel and Oshani, 2011; Samuel and Oshani, 2012; Curnow *et al.*, 2005; Carrillo *et al.*, 2008; PWC, 2005; PWC, 2008)	Inefficient resource utilization and failure to promote socio-ecological system integrity
Inadequate bid evaluation criteria for PPP procurement	Current bid evaluation criteria are in financial terms only, the private player tends to focus on maximizing returns and recover the investment cost by making crucial changes in the project. The bidding process should embed environmental and social safeguards/dimensions in their tender evaluation, supplier selection, and monitoring and contracting functions.	(Samuel and Oshani, 2011; Samuel and Oshani, 2012; Julie and Collins, 2004; Arts and Faith-Ell, 2012; Curnow *et al.*, 2005; Cheung, 2009; PWC, 2005)	Inefficient resource utilization and failure to promote socio-ecological system integrity
High tariff charges for infrastructure services	One of the most common complaints by the general public against PPP projects are the high tariff charged for the services provided by private sector. High tariff will make certain section of the society inaccessible to the infrastructure services and will fail to provide equal opportunity for growth and increase the gaps between the rich and poor.	(Cheung, 2009; Curnow *et al.*, 2005; Samuel and Oshani, 2011; Samuel and Oshani, 2012; Li *et al.*, 2005; WEF, 2013)	Intra-generational inequality and lack of livelihood sufficiency and opportunity
High bidding and transaction cost of PPP procurement preparation	The current bidding and transaction cost of PPP procurement preparation is six time higher than that of traditional procurement practice due to the lengthy negotiations in bidding process. Also, PPP projects engage professional services, which are highly costly, for structuring project deals.	(Albert *et al.*, 2010; Carrillo *et al.*, 2008; Cheung, 2009; Curnow *et al.*, 2005; Li *et al.*, 2005; PWC, 2005; PWC, 2008; Samuel and Oshani, 2011; Samuel and Oshani, 2012)	Intra-generational inequality and lack of livelihood sufficiency and opportunity
Lack of stakeholder's participation and public opposition	Public opposition has been reported as the main reason for failure of PPP projects in several instances. The main reasons for such failure, which are primarily connected with stakeholder's lack of awareness in the concept of PPP; insufficient education about PPP; and being denied access to detailed information contained in the consortium's PPP proposals.	(Gupta, 2011; Cheung, 2009; Arce and Gullon, 2000; Samuel and Oshani, 2011; Samuel and Oshani, 2012)	Failure to promote socio-ecological civility and demographic governance
Unbalance risk allocation and mitigation profile between public and private sector	The underlying norms of risk transfer and compensation for PPPs will need to be changed so that it can effectively serve as tools for SD. Also, the necessary precautionary measures could not be planned at the conceptual stage and the corresponding risks and risk mitigation mechanisms will not be in-built in the concession agreement (CA).	(Albert *et al.*, 2010; Cheung, 2009; Curnow *et al.*, 2005; Gupta, 2011; Samuel and Oshani, 2011; Samuel and Oshani, 2012; PWC, 2008)	Inadequate precautionary and adaptation measure

integrate the short and long term economic, social and environmental objectives of society through mutually supportive approaches wherever possible and manages trade-offs where this is not possible."

Plausible strategies on how to overcome the shortfalls were identified through content analysis of secondary data sources such as articles, reports, guides and online databases on best practices of promoting sustainable infrastructure development. Table 4 summarizes the final set of strategies to overcome the shortfalls and accomplish the requirement of SD principles.

The preliminary framework on how to improve sustainability of PPP projects is shown in Table 5. The framework indicates the point of interventions of the identified strategies in PPP lifecycle and which deliverables of PPP procurement process will be affected by the interventions.

Table 4: Strategies to Promote Sustainability of PPP Projects

Strategy to Achieve Broad SD Goals	References	SD Goal
Strategic environmental assessment (SEA) - Incorporate environmental and social (E&S) considerations into policies, plans and programmes of PPP project identification through SEA.	(Arce and Gullon, 2000; Arts and Faith-Ell, 2012)	Socio-ecological system integrity
Climate change considerations (CCCs) - Include the assessment of CCCs (GHG emission from project and climate change impact on project) into EIA of PPP project identification and development.	(Samuel and Oshani, 2012; UNECE, 2008)	Socio-ecological system integrity
Environmental-friendly and smart-growth technique (EFSGT) - Install and implement EFSGT technique in design of PPPs for contribute towards biodiversity conservation e.g. Green design through LEED, CEEQUAL, and BREEAM (rating tools).	(DOIT, 2010; USDOT, 2007)	Socio-ecological system integrity
Green accounting (GA) - Include E&S costs, and benefits (i.e. GA) in WLC estimation for VfM analysis through promoting to use renewable energy sources and cost effective technologies.	(Samuel and Oshani, 2012)	Resource maintenance and efficiency
Climate change parameters (CCPs) and long term environmental and social (E&S) impact - Include CCPs, and long term E&S impact in risk model of VfM estimation.	(Samuel and Oshani, 2012; UNECE, 2008)	Resource maintenance and efficiency
Life cycle assessment (LCA) - Adopt a LCA approaches using a materials calculator to quantify and compare materials lifecycle impacts and also recognizes use of materials that have environmental labels.	(UNECE, 2008)	Resource maintenance and efficiency
Green procurement (GP) - Promote GP through enhancement of procurement policy to invite that bid which uses innovative technologies to reduce pollution, climate change mitigation, and recycle of waste.	(UNECE, 2008)	Resource maintenance and efficiency
Environmental and social (E&S) criteria - Include the E&S criteria in bid evaluation through promoting private partners which complying the requirement of an 'Equator Principles' to assess E&S impact on project.	(Samuel and Oshani, 2011; UNECE, 2008)	Socio-ecological system integrity
Additional bidding criteria for energy efficient systems (EESs) - Include additional bidding criteria to promote utilization of EESs systems and various management techniques such as lean construction to minimize construction and operation and maintenance related wastes.	(USDOT, 2007; UNECE, 2008)	Resource maintenance and efficiency
Awareness through value analysis - Arrange comprehensive communication program to educate the public users about the necessity of improved services, as the new service saves their time and cost.	(DEA, 2010)	Intra-generational equality
Modified viability gap funding (VGF) mechanism - Enhance current government payments support system like VGF in India, which is currently limited to 40% of the total project cost.	(UNECE, 2008)	Intra-generational equality
Institute differentiated rates (IDRs) mechanism - Implement IDRs, specifically, adjust charges according to time, location and usage.	(UNECE, 2008)	Intra-generational equality
Relational contracting (RC) - Introduce the concepts of trust and reputation of RC in order to minimize procurement transaction costs through integrating principles of RC in PPP contract.	(Parker and Hartley, 2003)	Livelihood sufficiency and opportunity
Probity arrangements (confirmed integrity and honesty) - Interacting effectively with bidders during the tender process, consistent with appropriate probity arrangements through probity advisors.	(UNECE, 2008; WEF, 2013)	Livelihood sufficiency and

Strategy to Achieve Broad SD Goals	References	SD Goal
		opportunity
Flexibility to private sector for preparation of entire master plan for the project so that it promotes innovative and competitive bids.	(Mahalingam, 2010)	Livelihood sufficiency and opportunity
Special purpose company (SPC) - Establish a SPC, jointly owned by government, users and private developers as an institutional mechanism for development of projects.	(UNECE, 2008)	Socio-ecological civility and demographic governance
Building Information Modelling (BIM) - Adoption of BIM system for better communication tool for stakeholder's participation in decision making and provide greater clarity for all stakeholders across the project lifecycle.	(USDOT, 2007; WEF, 2013)	Socio-ecological civility and demographic governance
Partnering with urban local bodies (ULB) or NGOs - Encouraging community involvement through partnering with ULB /NGOs can play a key role in convincing the community on the benefits of PPP project	(Gupta, 2011; DEA, 2010)	Socio-ecological civility and demographic governance
Renegotiation mechanism (RM) - Include RM in model concession agreement (MCA) to address socio-political or economic changes which could be handled through inflexible contract model.	(Mahalingam, 2010)	Precautionary and adoption
Flexibility in MCA for climate change and disaster - Current MCA should have flexibility to address future unforeseen or unpredictable issues related to climate change, any disaster and risks	(UNECE, 2008)	Precautionary and adoption

Table 5: Preliminary Framework on Strategies for Deliverables of PPP Process

Code	Strategies enhance the sustainability	Deliverables	PPP Phase
STG-1	Strategic environmental assessment	EIA and SIA	Identification
STG-2	Climate change considerations into EIA		
STG-3	Environmental-friendly and smart-growth technique		
STG-4	Green accounting	VfM analysis	Development
STG-5	Climate change parameters and long term E&S impact		
STG-6	Life cycle assessment		
STG-7	Green procurement	Bid preparation and evaluation	Procurement
STG-8	Environmental and social criteria		
STG-9	Additional bidding criteria for energy efficient systems		
STG-10	Awareness through value analysis	User charges	Development
STG-11	Modified viability gap funding mechanism		
STG-12	Institute differentiated rates mechanism		
STG-13	Relational contracting	Bidding and transaction cost	Procurement
STG-14	Probity arrangements (confirmed integrity and honesty)		
STG-15	Flexibility to private sector for preparation of entire master plan		
STG-16	Special purpose company	Stakeholders participation	Development
STG-17	Building information modelling		
STG-18	Partnering with urban local bodies or NGOs		
STG-19	Renegotiation mechanism	Risk allocation	Procurement
STG-20	Flexibility in MCA for climate change and disaster		

5. FEASIBILITY OF FRAMEWORK – THROUGH FOCUSED INTERVIEWS

The feasibility of this preliminary framework formulated in previous stage has been evaluated through focused interviews. The focused interviews comprise of three sub-stages, namely respondent selection, interview protocol, and analysis of interview transcriptions.

5.1. RESPONDENT SELECTION

The targeted respondents are the practitioners involved in development and implementation of PPP projects. For the present study, the experts currently working in and around Guwahati region of India participated in the focused interviews. These experts can be categorized under three groups namely transaction advisors (TAs), officials from government/public sectors (GSs), and project managers from private sectors (PSs).

Sample size in qualitative research projects is determined using the concept of saturation (Miles and Huberman, 1994; Patton, 2002). Saturation occurs when new interviews do not provide additional data over previously conducted interviews and can be limited between 5 and 50 interviews, depending on the interview content and research focus (Patton, 2002). The six respondents have taken from two experts of each category mentioned above. Table 6 shows the details of respondents for each category. The experts are selected based on the criteria: Educational qualification; Position in the organisational hierarchy of the firm, and Number of years of experience relating to PPP procurement process for infrastructure projects in India. These criteria were based on the recommendations suggested by Hallowell and Gambatese (2010) for selecting experts. It could be observed that five out of six respondents having post-graduate degree (i.e. higher qualification). Five respondents are holding top level managerial position in their organisations (two directors, one senior manager, one project engineer, and one project manager) while the remaining one respondent is a middle level management executive (i.e. PPP expert). The experiences of the all respondents have been more than five years while some of them have up to ten years of experience in PPP project development.

Table 6: Demographic Information of Respondents

Code	Sector	Educational Qualification	Position in the Organisation	Experience in Years
TA-1	Consultant	Post Graduate Degree	Director	16-20 Years
TA-2	Consultant	Doctorate	Director	More than 20 Years
GS-1	Government	Post Graduate Degree	PPP Expert	6-10 Years
GS-2	Government	Post Graduate Diploma	Project Engineer	6-10 Years
PS-1	Private	Post Graduate Degree	Manager, Project Panning	6-10 Years
PS-2	Private	Post Graduate Degree	Senior Manager, Contracts	16-20ears

5.2. INTERVIEW PROTOCOL

The focused interview protocol has been designed to gain insights on respondent's understandings of the shortfalls in PPP process and feasible strategies that could be opted to overcome the shortfalls so as to facilitate fulfilment of SD goals. As part of the interview protocol, prior contact has been established with the respondents and the interview template that has been prepared to ensure that line of enquiry focuses on the strategies to overcome the shortfalls is also shared with them prior to the interview. The interview template comprises of three major sections. The first section has been designed to gather information about the qualification, and experience of the respondents in PPP project development. The respondents' opinion of appropriateness for various sustainability principles in PPP projects has been the focus of the second section. Lastly, in the final section, the opinion on suitability of the various strategies to overcome the shortfalls is sought from the respondents

5.3. ANALYSIS OF INTERVIEW TRANSCRIPTIONS

The interviews has been transcribed and analysed with the qualitative research program NVivo10 (QSR, 2014), a software program used in qualitative research to help store, organize, and analyse data (Lincoln

and Guba, 1985). The transcriptions of word file and handwritten notes by each respondent have been uploaded into the program. Themes in the data have been coded through open coding under various tree nodes (shortfalls in PPP) and associated free nodes (strategies enhancing sustainability) of NVivo. Further analyse has been conducted to assess the level of agreement elicited by the respondents on feasibility of using the strategies to enhance the sustainability of deliverables in PPP process. The micro-interlocutor analysis - a new method of analysis for focused interview findings have been used wherein the consensus of the respondents is displayed in the form of a matrix (Onwuegbuzie *et al.*, 2009). Table 7 shows the matrix output showing how many respondents have provided substantive statement indicating feasibility of the concerned strategy or example suggesting a dissenting view. The acronyms written below Table 7 are used to define respondent's view on each strategy. It could be observed from the micro-interlocutor analysis that all respondents have expressed views highlighting feasibility of adoption of all the strategies (mentioned with acronym, A/SA), except the four instances wherein the respondents have disagreed (denoted with acronym, D/SD). The aggregated consensus of all the respondents' viewpoints for each strategy is displayed in the last column of matrix.

Table 7: Matrix for Assessing Level of Consensus in Respondents on Feasibility of Strategies

Strategies with Code	Interview Respondents						Aggregate Remark
	TA-1	TA-2	GS-1	GS-2	PS-1	PS-2	
STG-1	A	SA	NR	A	SA	A	A
STG-2	SA	SA	A	A	SA	SA	SA
STG-3	SA	SA	A	A	A	A	A
STG-4	A	A	A	A	SA	SA	A
STG-5	SA	D	SA	A	SA	A	SA
STG-6	A	A	A	A	A	A	A
STG-7	A	A	A	A	SA	A	A
STG-8	A	SA	SA	A	SA	A	SA
STG-9	A	SA	SA	A	SA	A	SA
STG-10	A	A	A	A	SA	A	A
STG-11	A	A	A	SA	SA	A	A
STG-12	A	A	SA	SA	SA	A	SA
STG-13	SD	SA	NR	A	SA	A	SA
STG-14	A	A	SA	SA	SA	A	SA
STG-15	SA	SA	SA	SA	A	A	SA
STG-16	SA	SA	SA	A	SA	A	SA
STG-17	A	A	A	SD	SA	A	A
STG-18	A	A	A	A	SA	A	A
STG-19	A	A	SA	A	SA	A	A
STG-20	A	A	SD	A	A	A	A

(Acronyms: A = Indicates agreement; D = Indicates dissent; SA = Provides significant statement or example suggesting agreement; SD = Provides significant statement or example suggesting dissent; NR = did not indicate agreement or dissent, i.e., non-response)

6. CONCLUSIONS

PPP has become a preferred mode for accelerated infrastructure development for the cash strapped governments in both developed and developing countries. PPP, though, brings in additionally of resources but PPPs are being criticised for unsatisfactory performance and these criticisms relate to the failure to promote sustainable development goals. Analysis of PPP procurement process from sustainability development principles perspective yields the key shortfalls, such as inadequate EIA and SIA, inadequate WLC methodology for VfM analysis, inadequate bid evaluation criteria for PPP procurement, high tariff charges for infrastructure services, high bidding and transaction cost, lack of stakeholder's participation and public opposition, and unbalance risk allocation and mitigation profile between public and private sector.

The strategies to overcome these shortfalls in order to promote satisfactory fulfilment of SD goals have been formulated into a preliminary framework. The key strategies are to replace EIA with SEA; include

E&S dimensions and green accounting in VfM analysis; introduce SPC, BIM and partnering with ULBs and NGOs in stakeholder participation for sustainable feasibility study, introduce RC mechanism and flexibility in preparation of master plan with probity arrangement. The feasibility of the preliminary framework has been tested through focused interview with stakeholders involved in PPP development in and around Guwahati region of India.

The framework gives an insight on various strategies to integrate SD principles in various deliverables of PPP procurement process and these strategies could become a useful tool for government on how to restructure PPP procurement process in India. However, the preliminary framework that has been derived from content analysis and preliminary interviews with local experts from Guwahati region need to be subjected to further study in order to increase the usefulness and enhance the applicability for practitioners.

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