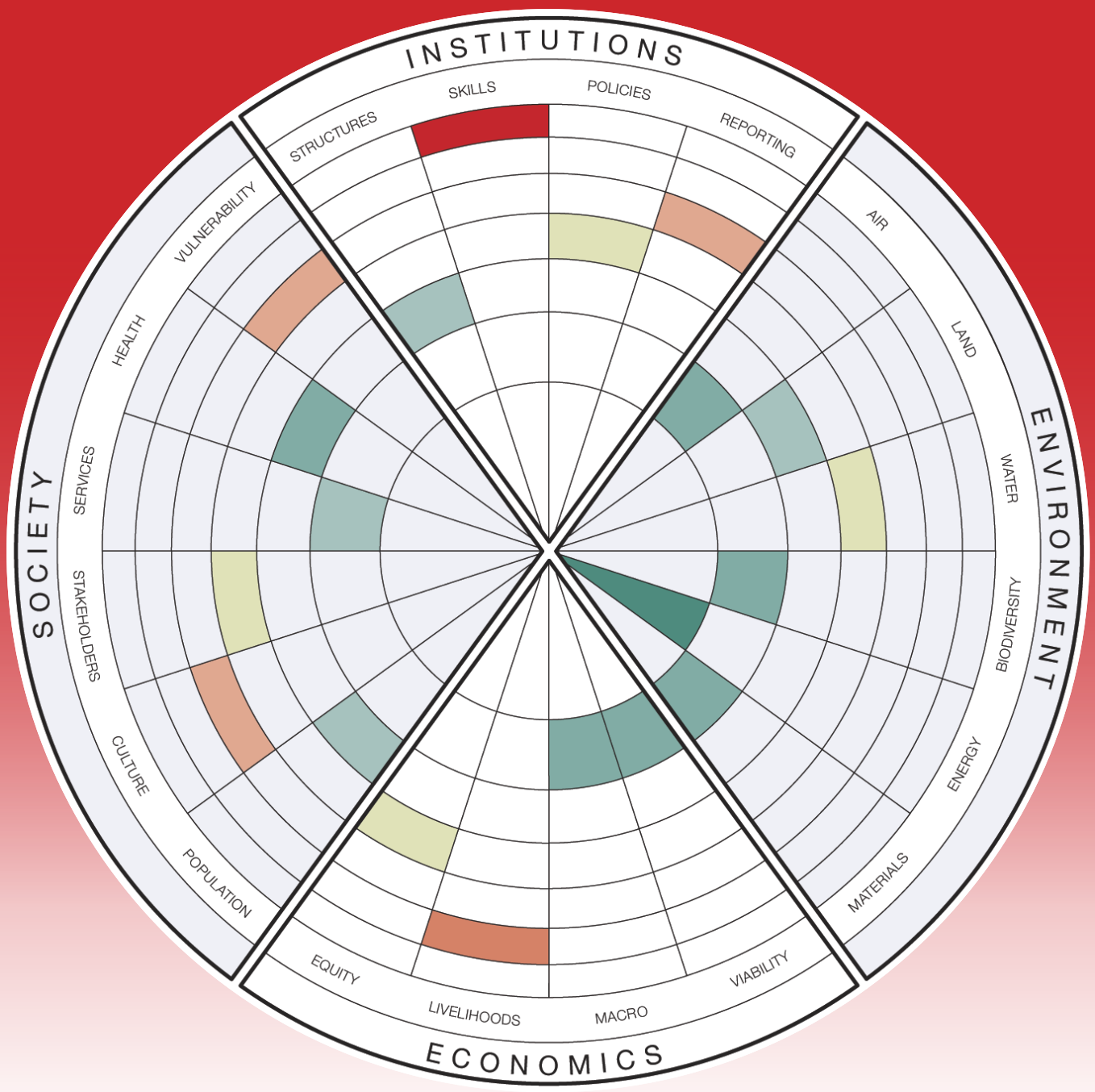
ASPIRE

A Sustainability Poverty and Infrastructure Routine for Evaluation

Research and Development



ENGINEERS AGAINST POVERTY

ARUP

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EXECUTIVE SUMMARY

Sustainable infrastructure services are central to reducing poverty and promoting sustainable development. However, in the past, infrastructure developments have often failed to deliver the expected societal benefits, especially to the poor. They have also fuelled corruption and resulted in negative social and environmental impacts on local communities and ecosystems. Globally, investment flows in infrastructure are growing rapidly, driven by economic growth as well as poverty reduction and climate change objectives. This presents a unique opportunity to promote the development of infrastructure that is both sustainable and pro-poor, and avoids the risks and limitations of past practice.

However, developing sustainable 'pro-poor' infrastructure in practice requires tools that support the integration of poverty reduction and sustainability objectives throughout the entire infrastructure project life cycle. These tools need to be easy to apply and readily understandable by all project stakeholders. ASPIRE has been produced to meet these challenging specifications.

ASPIRE is a software based tool for assessing the sustainability of infrastructure projects which recognises poverty reduction as an overarching objective. It provides a holistic appraisal framework encompassing the four key dimensions of environment, society, economics and institutions. ASPIRE was the result of an intensive two year research, consultation and testing programme, funded by the Institution of Civil Engineers (ICE) R&D Enabling Fund, Arup Design and Technical Fund and EAP programme resources. To develop ASPIRE, the following key activities were undertaken:

- Comparative analysis of leading assessment frameworks to identify key strengths and weaknesses of each assessment framework and then review how ASPIRE can draw on the strengths and address the weaknesses.
- Development of the conceptual framework for ASPIRE and identification of a comprehensive indicator set to define sustainable pro-poor infrastructure.
- Analysis of how ASPIRE could integrate into the key stages of the project life cycle.
- Development of an initial version of ASPIRE that was then tested on a broad range of actual projects.

Through this process, Arup and EAP have developed a unique tool that has been demonstrated in practice to add value to a wide range of stakeholders with an interest in developing sustainable pro-poor infrastructure.

This report provides an overview of the research and development process for ASPIRE. Current and potential users of ASPIRE who want to gain additional insight through understanding its development process will find this report informative. It will also be relevant to researchers in this area who are interested in the lessons from our experience and how they might apply or compare with other tools or other sectors, as well as to policymakers who are interested in the 'state of the art' in terms of understanding project impact to inform policy decisions. This report does not, however, contain detailed information on how to conduct ASPIRE assessment or use the software. For information on how to use ASPIRE, please refer to the ASPIRE User Manual.

1. INTRODUCTION

This document provides a concise summary of the development of ASPIRE – a new software-based sustainability assessment tool for infrastructure projects which includes poverty reduction as an overarching agenda. ASPIRE was developed through a unique partnership between Arup and Engineers Against Poverty (EAP), with support from the Institution of Civil Engineers Research and Development Enabling Fund, Arup's internal Design & Technical Fund and EAP programme resources.

The final version of ASPIRE is available at http://www.oasys-software.com/aspire

The following chapters describe the key stages in the development of ASPIRE to meet these specifications. The core of this process was the modification of an existing proven sustainability assessment tool – SPeAR®. To develop ASPIRE, the following key activities were undertaken:

- Research and literature review to understand the relationship between poverty, infrastructure and sustainable development *(Chapter 2)*.
- Comparative analysis of SPeAR® with other leading assessment frameworks to identify strengths and limitations of the base model and to identify areas for refinement *(Chapter 3)*.
- Development of the conceptual framework for ASPIRE and identification of a comprehensive indicator set to define sustainable pro-poor infrastructure *(Chapter 4)*.
- Analysis of how ASPIRE could integrate into the key stages of the project life cycle *(Chapter 5)*.
- Developments of an initial version of ASPIRE and detailed testing on a broad range of actual projects *(Chapter 6)*.

2. RESEARCH AND LITERATURE REVIEW

An extensive literature review was undertaken to better understand the relationship between sustainable development and poverty reduction, the role of infrastructure in addressing these objectives and the barriers to achieving positive developmental outcomes. Key points arising from the review are summarised here as background to Arup and EAP's decision to develop ASPIRE.

2.1 Sustainability

Sustainable development has been internationally agreed as the fundamental guiding principle for development at the global, national and local level. The most widely-accepted definition of sustainable development was that proposed by the Brundtland Report: "development that meets the needs of the present without compromising the ability of future generations to meet their own needs"[1].

In some respects, the emphasis of Brundtland's definition is on the principle of intergenerational equity; the needs and rights of future generations. However, implicit in the concept of 'meeting the needs of the present' is the principle of intragenerational equity (i.e. equity within the current generation). The importance of this principle was reaffirmed in an international context at the World Summit on Sustainable Development in 2002 which described poverty eradication as both an overarching objective and essential requirement of sustainable development[2]. Sustainable development therefore requires prioritising the needs of the world's poorest who currently do not have even their basic needs met.

2.2 Poverty

Extensive research on poverty was carried out by Arup as part of their Drivers for Change programme. The results of this research have been published in a designed series of cards. For further information about the Drivers of Change research go to www.driversofchange.com.

This highlighted severe deficiencies in basic infrastructure services both in rural communities and for rapidly expanding poor urban populations in developing countries. Globally, more than 884 million people do not have safe drinking water or access to roads, 2.5 billion have no sanitation facilities[3], 2.3 billion lack reliable sources of energy and 4 billion are without modern communication services[4]. Poverty involves lack of access to basic services and material deprivation as measured by income, also lack of adequate food, clothing and shelter, as well as low achievements in education and health. It also includes peoples' vulnerability to adverse events (e.g. illness, violence, economic shocks, bad weather, and natural disasters) and a lack of power and voice to influence institutions and key decisions that affect their own lives[5].

2.3 Infrastructure

Infrastructure directly contributes to development and alleviating poverty by improving the access of poor people to services such as clean water and sanitation, health and education and by protecting them against humanitarian disasters[6]. In particular, well-designed infrastructure projects can bring significant positive benefits for women and girls by improving access to markets, schools, and health services or improving women's safety[7]. In addition, infrastructure enhances the opportunities for more people to participate in economic activity through supporting macroeconomic development, providing employment and 'removing bottlenecks in the economy which hurt poor people by impeding asset accumulation, lowering asset values, imposing high transaction costs and creating market failures'[8]. This is also illustrated by the analysis of the role of infrastructure in achieving the Millennium Development Goals which is summarised in Tables 1-3.

Infrastructure can be seen as playing a critical role in brokering the relationship between society's needs and the limited carrying capacity of the planet which is essential to sustainable development. However, historically, infrastructure provision has been inefficient and resource-intensive both in construction and operation. Consequently, the built environment accounts for up to half of global raw materials consumption and up to half of national energy consumption[9].

In the future, as we adapt to climate change and transition to a low carbon economy, infrastructure projects will increasingly have to demonstrate that they are energy efficient and

employ renewable resources. Equally, infrastructure in the form of drainage, flood defences, and irrigation systems form part of the arsenal for combating climate change and reducing risk due to sea-level rise, flooding and changes to rainfall. Significant flows of resources for climate-related infrastructure investment in developing countries is anticipated which address both mitigation and adaptation. Coordinated effectively and used appropriately, these resources will not only achieve their climate-related objectives but also represent an enormous opportunity to promote sustainable development and poverty reduction.

Unfortunately, approaches adopted for planning and delivery of infrastructure for development have often failed to produce their intended benefits, even on well-intentioned donor funded programmes. Instead, infrastructure development has a long record of producing unacceptable environmental impacts and has failed to adequately address the needs of the poor. See Table 4.

2.4 Conclusion

Lack of infrastructure is a priority in tackling poverty since access to water, energy, healthcare, education and markets enables communities to move beyond survival to self sufficiency. Equally, effective services, facilities and transport links underpin equitable economic growth. However, infrastructure projects tend to be delivered with the emphasis on technical performance within the project boundary rather than recognising their long term contribution to the sustainable development of the communities they serve or are located in. The increasing requirement to carry out environmental and social impact

BOX 1

Sustainable Pro-poor Infrastructure: Key Outcomes

- Provides access for the poor to affordable services that meet their basic human needs, reduce their vulnerability to natural disasters and allow them to participate in economic activity;
- Enhances employment generation in construction, operation and maintenance;
- Supports substantive freedoms[11] for individuals and communities to participate in decision making that affects their wellbeing and livelihoods;
- Minimises the consumption of natural resources and the impact on biodiversity and natural systems;
- Is financially, operationally and institutionally viable in the long term; and
- Is designed and operated through holistic consideration of social, environmental and economic benefits and costs.

1 United Nations (1987) *Our Common Future - Report of the World Commission on Environment and Development*. United Nations, New York, 1987.

2 United Nations (2002) *Report of the World Summit on Sustainable Development, Johannesburg, South Africa, 26 August- 4 September 2002*. United Nations, New York, 2002.

3 WHO & UNICEF (2008) *Progress in Drinking-water and Sanitation: special focus on sanitation.*

4 Organisation for Economic Co-operation and Development (OECD) (2006) *Promoting Pro-Poor Growth – Infrastructure.* Paris: OECD.

5 Department for International Development (DFID) International Development White Paper. DFID, London, 2006.

6 Jahan, S. and McCleery, R. (2005) *Making Infrastructure Work for the Poor: Synthesis Report of Four Country Studies Bangladesh, Senegal, Thailand and Zambia.* United Nations Development Programme, New York.

7 OECD (2006).

8 OECD (2006) pg. 18.

9 United Nations Environment Programme (UNEP) and The International Council for Research and Innovation in Building and Construction (CIB) (prepared by Du Plessis, C.) *Agenda 21 for Sustainable Construction in Developing Countries. CSIR Building and Construction Technology,* Pretoria, 2001.

10 Mileti, D.S. (1999) *Disasters by Design: A Reassessment of Natural Hazards in the United States.* Joseph Henry Press. Washington D.C.

11 Sen, A. (1999) *Development as Freedom.* Oxford University Press, Oxford.

assessments is predicated by a philosophy of 'do no harm' and the need to mitigate the potential negative impacts of infrastructure projects, as opposed to recognising the opportunity to enhance the environment, strengthen society, and act as a catalyst for economic growth.

A different approach is required to ensure infrastructure developments are sustainable and contribute to reducing poverty. This requires consideration of both the product (water supply, road, etc) and the process by which it is conceived, implemented and operated, based on criteria which determine project success in terms of outcomes rather than outputs. Positive outcomes include promoting economic vitality, supporting human health and well-being, minimising environmental impact, enhancing institutional capacity, and reducing vulnerability[10]. See also Box 1. In practice, developing sustainable 'pro-poor' infrastructure requires tools that support the integration of these core characteristics into the project process throughout the entire infrastructure project life cycle, and help those funding, commissioning, designing and implementing infrastructure projects to consider a wider range of issues and stakeholder concerns. Such tools need to be easy to apply and readily understandable by all project stakeholders. These requirements formed an initial brief for the subsequent development of ASPIRE.

MDG Goals	Targets
Goal 1: Eradicate extreme poverty and hunger	Target 1: Halve, between 1990 and 2015, the proportion of people whose income is less than $1 a day Target 2: Achieve full and productive employment and decent work for all, including women and young people Target 3: Halve, between 1990 and 2015, the proportion of people who suffer from hunger
Goal 2: Achieve universal primary education	Target 4: Ensure that, by 2015, children everywhere, boys and girls alike, will be able to complete a full course of primary schooling
Goal 3: Promote gender equality and empower women	Target 5: Eliminate gender disparity in primary and secondary education, preferably by 2005, and to all levels of education no later than 2015
Goal 4: Reduce child mortality	Target 6: Reduce by two-thirds, between 1990 and 2015, the under-five mortality rate
Goal 5: Improve maternal health	Target 7: Reduce by three quarters the maternal mortality ratio Target 8: Achieve universal access to reproductive health
Goal 6: Combat HIV/AIDS, malaria and other diseases	Target 9: Have halted by 2015, and begun to reverse, the spread of HIV/AIDS Target 10: Achieve, by 2010, universal access to treatment for HIV/AIDS for all those who need it Target 11: Have halted by 2015 and begun to reverse the incidence of malaria and other major diseases
Goal 7: Ensure environmental sustainability	Target 12: Integrate the principles of sustainable development into country policies and programmes and reverse the loss of environmental resources Target 13: Reduce biodiversity loss, achieving, by 2010, a significant reduction in the rate of loss Target 14: Halve, by 2015, the proportion of the population without sustainable access to safe drinking water and basic sanitation Target 15: By 2020, to have achieved a significant improvement in the lives of at least 100 million slum dwellers
Goal 8: Develop a Global Partnership for Development	Target 16: Address the special needs of least developed countries, landlocked countries and small island developing states Target 17: Develop further an open, rule-based, predictable, non-discriminatory trading and financial system Target 18: Deal comprehensively with developing countries' debt Target 19: In cooperation with pharmaceutical companies, provide access to affordable essential drugs in developing countries Target 20: In cooperation with the private sector, make available benefits of new technologies, especially information and communications

Table 1: The UN Millennium Development Goals

Table 2: Analysis of the contribution of infrastructure to services provision and MDG's

	Service	Physical Infrastructure	Examples of socio-economic inputs	MDG Targets
Advanced Infrastructure	National and international movement and Import/export of goods and people	• Ports/harbours • Airports • Highways • Railways	• Trade relations and agreements	16, 17, 19, 20
	Service industries e.g. banking	• Offices	• Skills training • External investment	16, 17, 20
	Manufacturing and processing	• Factories • Industrial units	• Skills training	17
	Acute health care	• Hospitals • Pharmaceuticals	• Medical training • Affordability • Accessibility	3, 6, 7, 8, 9,10, 11, 16, 17, 19
	Further education	• Universities • Colleges • Secondary schools	• Academic links • Curriculum development • Affordability	2, 4, 5, 7, 16, 17
Infrastructure for community well being	Community mobilisation	• Community centres • Public buildings	• Community demand • Building skills	16
	Disaster Risk Reduction	• Communal shelters • Flood defences	• Community awareness • Warning systems	12, 13, 15, 16
	Communications	• Wireless networks • Mobile networks • Telephone networks • Telecentres	• Local skills training • Private sector enterprise	1, 2, 5, 15, 16, 17, 20
	Power supply	• Power stations • Electricity distribution	• Demand management • Affordability	1, 2, 4, 12, 15, 16, 17
	Agriculture and food distribution	• Local roads • Irrigation • Local markets	• Training • Information	1, 3, 6, 7, 12, 13, 17
	Public transport and accessibility	• Pedestrian/cycle routes • Bus systems • Water transport	• Needs assessment • Affordability • Road safety	2, 4, 12, 16, 17
Basic Infrastructure for survival	Primary healthcare	• Health centres	• Health promotion • Health training	3, 6, 7, 8, 9, 10, 11, 15, 16
	Primary education	• Primary schools	• Teacher training • Affordability • Curriculum development	2, 4, 5, 9
	Access to finance/markets	• Microcredits	• Link to formal banking • Link to markets	1, 2, 5, 15, 16, 17
	Shelter	• Houses	• Building skills • Siting • Demand	1, 2, 6, 15
	Sanitation and waste management and disposal	• Latrines • Drainage systems • Sewerage systems • Solid waste transfer • Landfill sites • Recycling plants	• Hygiene promotion • Community management • Community recycling	1, 3, 4, 5, 6, 7, 11, 12, 15, 16
	Water supply	• Point sources • Treatment • Storage • Distribution systems	• Hygiene promotion • Community management • Maintenance training • Private sector enterprise	1, 2, 3, 4, 5, 6, 7, 11, 14, 15, 16

+, ++ and +++ indicate the relative level of improvement from the pre project/intervention level.

Sector	MDG 1: Reduce income poverty and hunger	MDG 2: Full primary education coverage	MDG 3: Gender equality in education	MDG 4: Reduce < 5 mortality	MDG 5: Maternal mortality reduction	MDG 6: Communicable disease	MDG 7: Environmental protection	MDG 8: Framework for development.
Transport – Local (Village to Township or Main Road)	+++ Improvements to low-volume local roads and associated networks of village tracks can significantly reduce poor farmers' transaction costs and expand their production possibilities	++ Village roads significantly affect school enrolment and attendance	++ Girls' attendance significantly increased by safer roads	+ Increases use of primary healthcare facilities and facilitates access to better water	+ Positively affects antenatal care and share of deliveries professionally attended		+ Care needed to maximise compatibility of engineering design with local environment	+ Work on local roads/transport can generate much youth employment
Transport – Trunk (Beyond the Township)	+++ Availability of competitive transport services on adequately maintained trunk network is critical to the effective participation of an area in national and international markets	+ Quality of link to regional centre significantly affects quality of teacher who can be attracted and his/her attendance	+ Helps secure better quality of teacher	++ Vaccines/drugs supply, visits by more skilled health personnel and emergency evacuations	+ Increases in-hospital deliveries and often critical when emergency obstetrics required	+ Important for drug supply and higher-level diagnostics Care needed to avoid stimulating AIDS spread	– Great care needed in fragile ecological environments to minimise risks and compensate people who suffer	+++ Essential facility to enable area to benefit from international trade
Modern energy	+++ Rural electrification often correlates with sharp increase in regional incomes and growth of non-farm activity. Reliability of modern energy supply strongly affects investment in, and competitiveness of, local enterprises	+ Availability of modern energy increases enrolment and attendance rates, and home electrification raises time devoted to study	++ Modern energy helps families release girls for school: less time collecting fuel-wood and water, and schools improved	++ Sharply reduces indoor smoke pollution and impurities in water/food consumed, the two major mortality factors	+ Reduced stress of household chores, and electricity improves medical services (hours, equipment, refrigeration)	+ Improved medical services, including from attraction of more qualified personnel	++ Reduces pressure on land resources (by moving water and reducing fuel-wood need), but care needed to avoid ill-effects of large dams	+ Small quantities of electricity essential for use of modern ICT
Telecoms/ ICT	++ ICT significantly improves the efficiency of most service-sector activities (incl. government) and can in particular reach poorer people with information of direct use for improving their economic situation	+ ICT helps expand and improve teacher training, and can make classes more interesting	+ ICT can make school more worthwhile attending by strengthening students' exam performance	+ Can promote better health practices and ensure timely availability of life-critical diagnostic info. and drugs	+ ICT enables efficient arrangements for emergency treatment	+ Reduce drug stock-outs and make efficient referrals to higher medical institutions	+ Record-keeping and retrieval services of importance for environmental protection	++ Essential to target for ICTs' supply, and for participation in international economic opportunities
Household water	++ Convenient, good water can substantially reduce morbidity and mortality, time spent fetching water, and enterprise interruptions, and improve nutrition, with significant effects on poor people's productivity	++ Good home water supply increases school attendance (especially by children with literate mothers) and increases learning capacity	+ More convenient home water supply facilitates release of girls for school and reduces absences due to sickness	+++ Good home water supply greatly reduces child mortality, especially if mother is literate	+ Water improves general maternal health and deliveries	+ Clean water important for disease treatment, and for formula milk (HIV mothers)	+++ Crucial for meeting the household water target under this goal	+ Water improvement much needed in least developed countries
Sanitation	+ Adequate sanitation sharply reduces illness and expenditure on medical treatment (itself a significant factor in poverty)	+ Good sanitation/water helps attract good teacher	++ Good school sanitation and water facilities increase girls' attendance. Infant and child mortality rates are lower among children whose mothers are more highly educated	+ Improved sanitation decreases child mortality and improves nutrition	+ Improved sanitation reduces maternal illness	+ Effective water disposal reduces malaria mosquito breeding	++ Crucial for meeting the sanitation target and combating urban environmental degradation	+ Sanitation high priority in least developed countries
Water management structures	+++ Irrigation and flood control structures can greatly increase incomes and nutrition levels of the poor if they are managed to maximise benefits to the community as a whole, and especially if they support production of labour-intensive crops		+ Less drudgery for women in obtaining water for household needs		+ More ample supplies of water for household use	– Care needed to avoid adverse health consequences of man-made changes in water regimes	++ Sound planning, design and op. of water-related structures are key in protecting environmental resources and accommodating growing populations	

Table 3 – Sectoral analysis of contribution of Infrastructure to the MDG's [12.]

Table 4 – Key findings from recent historical reviews of infrastructure development

Report	Key Issues
The World Bank (2006): Infrastructure at the Crossroads – Lessons From 20 Years of World Bank Experience[13] An internal review of lessons learned from 20 years of World bank lending to energy, transport, water and sanitation and urban development projects.	Problems identified with World Bank infrastructure investments (particularly in 1980s and 90s) included: • Overly complex project design • Optimistic or unclear economic, financial, and institutional assumptions at appraisal • Inadequate implementation monitoring frameworks and arrangements • Failure to accurately gauge political commitment • Lack of attention to sustainability
OECD – Development Assistance Committee (2006): Promoting Pro-Poor Growth: Infrastructure[14] Part of a series of reports on the promotion of pro-poor growth focused primarily on the role of donors. Developed by the DAC POVNET Task Team on Infrastructure drawing on the expertise of bilateral and multilateral donors, partner countries, private actors and civil society.	"Because of insufficient investment, inadequate planning, poor maintenance and unsustainable sector governance, most…partner countries – especially low income countries – suffer from huge gaps in infrastructure. Without major progress, it will be impossible for these countries to significantly reduce poverty and achieve the Millennium Development Goals"[15].
Department For International Development (2002): Making Connections - Infrastructure For Poverty Reduction[16] An internal DFID review conducted by a multi-stakeholder team. Focused on how infrastructure can benefit poor people and the lessons from past mistakes, especially for donors.	"Infrastructure…has a bad name among many donors because in the past investment did not always deliver the expected benefits. Investment choices were distorted by political or personal interests, without strong systems or procedures to scrutinise them. There was a bias towards large-scale capital projects, and neglect of institutional issues and maintenance. The contribution to growth was sometimes less evident than the damage to the environment and to vulnerable people displaced from homes or livelihoods"[17].
World Commission on Dams (2000): Dams and Development: A New Framework for Decision-Making[18] A multi-stakeholder commission with a mandate to review the development effectiveness of large dams and develop internationally acceptable criteria, guidelines and standards for large dams. It reviewed a large range of material including eight detailed case studies.	While some projects had delivered significant developmental benefits, evaluation of the planning and project cycle revealed a series of limitations, risks and failures in the manner in which these facilities have been planned, operated and evaluated: • Participation and transparency in planning processes frequently was neither inclusive nor open. • Options assessment has been typically limited in scope and confined primarily to technical parameters and the narrow application of economic cost-benefit analyses. • The participation of affected people and the undertaking of environmental and social impact assessment have often occurred late in the process and were limited in scope. • The paucity of monitoring and evaluation activity once the project was completed has impeded learning from experience.

12 OECD, 2006, Annex B.

13 The World Bank (2006) Infrastructure at the Crossroads – Lessons From 20 Years of World Bank Experience. The World Bank, Washington.

14 OECD (2006).

15 OECD (2006) Pg. 17.

16 DFID (2002) Making Connections: Infrastructure for Poverty Reduction. DFID, London.

17 DFID (2002) Pg. 5.

18 World Commission on Dams (2000) Dams and Development: A New Framework for Decision-Making, the Report of the World Commission on Dams. Earthscan, Virginia.

3. COMPARATIVE ANALYSIS OF EXISTING ASSESSMENT FRAMEWORKS

A comparative analysis was carried out of a number of existing tools and frameworks for assessing the performance of projects/programmes in relation to sustainability and/or poverty. SPeAR® - a sustainability assessment tool previously developed by Arup – was used as a benchmark. The purpose of the analysis was to understand whether existing tools and frameworks were:

a. applicable to infrastructure projects in developing countries;

b. addressed both sustainability and poverty reduction agendas; and

c. could be used at different stages in the project lifecycle.

The analysis also looked at indicators in terms of the extent to which they are project specific, and whether they are qualitative or quantitative. The time required undertaking assessments, the level of information needed and the type of output was also reviewed.

3.1 SPeAR®

The Sustainable Project Appraisal Routine, known as SPeAR® was originally developed in 2001 by an in-house team of specialists in Arup, initially targeted primarily for use in the UK. It is a holistic tool which brings together a large number of indicators relating to the total impact of the project system on the environment, use of natural resources, and socio-economic impact. SPeAR® contains a set of core sectors and indicators that were derived from the UK Government's set of sustainability indicators and its sustainability strategy (Securing the Future (2005)); United Nations Environment Programme (UNEP) indicators; and the Global Reporting Initiative (GRI). SPeAR® has been independently reviewed by Forum for the Future (a leading sustainability non-governmental organisation) and has been successfully applied on hundreds of projects worldwide.

Particular proven strengths are:

- An integrated, cross-sectoral perspective of sustainability which addresses and balances socio-economic as well as environmental concerns based on universally accepted indicator sets.
- The graphical output is readily comprehensible to multiple stakeholders (not just technical experts) providing a facilitation mechanism for stakeholder engagement.
- It allows monitoring of sustainability performance against agreed criteria throughout the project life cycle.
- It highlights information gaps in sustainability appraisals.
- It drives informed decision making by project and programme teams, and identifies priorities for action.
- It has been successfully used as a training tool to support organisational learning as well as promoting sustainability on projects.

3.2 Comparative Analysis

Four other leading frameworks/tools were identified as representing leading international thinking on sustainability and/or poverty assessment (see Table 5). A summary of the analysis is provided in Table 6.

Name of Framework/Tool	Primary focus	Lead Research Institution
1. Project Sustainability Assessment	Sustainability	International Federation of Consulting Engineers (FIDIC)
2. IUCN Sustainability Assessment	Sustainability	The World Conservation Union (IUCN)
3. Sustainable Livelihoods Framework	Livelihoods and Poverty	Department for International Development (DFID)
4. Ex-Ante Poverty Impact Assessment	Poverty	Organisation for Economic Co-operation for Development (OECD)
5. Sustainable Project Appraisal Routine (SPeAR®)	Sustainability	Ove Arup & Partners International Limited

Table 5: Frameworks/Tools reviewed

The dimensions of the DFID and IUCN frameworks were conceptually well-defined but this did not necessarily translate into a tool with practical application on infrastructure projects. The FIDIC, OECD and SPeAR® frameworks are more specifically project focused. Whilst each offers useful elements for appraising performance against some of the requirements of sustainable pro-poor infrastructure, none of them effectively integrate poverty reduction and sustainability criteria in one framework. This confirmed the likely need for a new tool to enable those responsible for infrastructure projects in developing countries to address these issues in an integrated manner.

The number and range of indicators and way in which they were grouped varied widely, but there was significant overlap in terms of key themes relating to environmental resources, economics and social well-being. In some cases indicators are self-selected and specific to the project which was felt provided less scope for objective comparative analysis and a risk that key issues are overlooked. A generic list of indicators was felt to be preferable. Even so, most indicators were qualitative which implies that the output is to some extent subjective and dependent on the competencies, perspective and intent of the user.

Features	1. FIDIC Project Sustainability Assessment	2. IUCN Sustainability Assessment	3. DFID Sustainable Livelihoods Framework	4. OECD Ex-Ante Poverty Impact Assessment	5. SPeAR
Primary Focus	Sustainability	Sustainability	Livelihoods, poverty and vulnerability	Poverty	Sustainability
Assessment Scope	Project	Geographical area (regional or national)	Community	Programme/project	Project /programme
Qualitative/Quantitative	Quantitative	Qualitative and Quantitative	Qualitative	Primarily Qualitative	Primarily Qualitative
Output	No visual output or presentation. Primary output is a list of indicators.	This method uses 2 visual tools: the 'barometer of sustainability' and the 'egg of wellbeing'. The output is an overlay and hence hard to visualise individually	The main visual output is the asset polygon, which presents a relative overview of people's assets under the five capitals.	The main visual output is a series of matrices. While these matrices are useful for organising the data they do not provide a clear visual output.	Simple visual output based on four quadrant representation of sustainability and traffic light colour coding.
Indicators	Indicators are project specific with a process specified for tailoring generic indicators for project-specific applications.	Indicators are only selected after specifying goals, sub-elements and objectives.	No indicators. Mainly based on the collection of qualitative information defined in consultation with communities.	Uses a series of high-level subjective indicators.	Standard indicators with scope to add/omit indicators to suit the project brief.
Time/Cost	Minor/moderate time and resources depending on data availability and depth of assessment.	Long term (2 year approx.) assessment process.	Time, cost and resource intensive.	Costs vary between 15000 to 40000 USD for typical assessment.	Minor/moderate time and resources depending on data availability and depth of assessment required.
Applicability in the Project Life Cycle	Primarily for use in the design phase of the project life cycle but could be applied during implementation.	Not designed for use in a project environment. Could inform policy development and the design of subsequent projects of programmes.	Primarily for the design of poverty related programme interventions but could be used at other stages (e.g. for evaluation).	Specifically designed for the ex ante assessment of proposed projects of programmes.	Designed for applicability throughout the project lifecycle.
Comments	Project focused appraisal tool with an emphasis on quantitative indicators.	The human and ecosystem dimension clearly defined in the framework but this clarity is lost in the visual output.	The five capitals are well defined and provide a comprehensive and broad framework.	Concept of outputs and outcomes is robust. Weakness in assessing technology and institutions.	Wide range of application and clear output.

Table 6: Summary of Comparative Analysis of other Frameworks/Tools

The outputs included diagrams and matrices. The diagrams provide a valuable overview but generally require reference to more detailed output for interpretation and substantiation. SPeAR® performed strongly compared to other tools as it provides a simple approach to data input with a clear and powerful graphical output. In addition, its primary focus is on infrastructure and is applicable at all stages of the project life cycle with a track record of successful practical application. SPeAR® has some acknowledged limitations as a tool, including the subjective nature of the assessment method and a fairly generic application.

3.3 Conclusion

The analysis concluded that the SPeAR® software platform should be adapted for ASPIRE, but that a comprehensive review and reconsideration of the conceptual framework and indicators was required based on current documentation and cross-referencing against the indicators used in other tools. Key recommendations included:

- A core framework that seeks to 'balance' environmental and ecosystem quality with human and community well-being.
- An explicit institutional dimension as part of the conceptual model in addition to the three pillars: economic, social, environmental. One of the key barriers for the implementation and delivery of sustainable infrastructure projects in the developing country context is the limitation in capacity and effectiveness of the institutional structures and processes.
- New indicator sets to cover issues particularly relevant to developing country contexts including: vulnerability, capacity building, prevention of corruption, conflict sensitivity, social inclusion and the provision of essential services.
- Guidance to users on the assessment process to include stakeholder identification/analysis and definition of the assessment boundary.
- Consideration of how the tool can be used at different stages of the project life cycle.

4. DEVELOPMENT OF ASPIRE

The development of ASPIRE was considered in four key areas: the conceptual framework, the indicators, the software interface, and the road map for carrying out an assessment.

4.1 Conceptual Framework

The conceptual framework is underpinned by the primacy of the environment and the dynamic between people and the planet (which in the IUCN framework is articulated in terms of humans and ecosystems). The essence of sustainable development is to find the critical balance between the needs of society and the natural environment both globally and locally, acknowledging that our planet has limited carrying capacity to support an increasing global population aspiring to a higher quality of living. This is particularly acute in developing countries where the basic needs of millions are unmet and there is a more direct reliance on ecosystems. This results in a tension between the creation and maintenance of societal assets and environmental impact which is implicit in the ASPIRE keystone diagram (see Figure 1).

Infrastructure plays a key role in brokering this people-planet relationship, but is only effective and sustainable long term if supported by robust institutional structures and processes and well-balanced economic development. Hence the ASPIRE conceptual framework uniquely has four dimensions: society, environment, economic and institutions. These are presented as inter-locking keystones forming a circle in recognition of their dependence on one another (see Figure 1). The inclusion of the Institutional enabler was a key finding of the comparative analysis of assessment frameworks and mirrors the four core dimensions of social, environmental, economic and institutional used by the United Nations Commission on Sustainable Development (CSD). The four dimensions of ASPIRE also reflect the DFID Sustainable Livelihoods approach assuming that the fifth dimension of physical assets is the project itself.

Within each of the four dimensions a number of key themes (either 4 or 6) have been identified under which indicators are grouped:

- **Environment** is considered in terms of enhancing and minimising impact on natural assets: air, land, water, biodiversity, materials. Energy is included as a sixth theme recognising the increasing importance of renewable energy sources and energy efficiency.
- **Society** is considered in terms of four themes representing assets required to meet needs equitably, unlock human potential and alleviate poverty through: access to services, public health, culture, stakeholder participation. Two further themes - vulnerability and population - include issues such as conflict, exposure to natural hazards, displacement.
- **Economics** encompasses four themes which contribute to economic vitality: project viability long term, macro-economic effects (such as inflation and competition), livelihood opportunity and equity of economic opportunity.
- **Institutions** includes four themes which consider the capacity and effectiveness of the

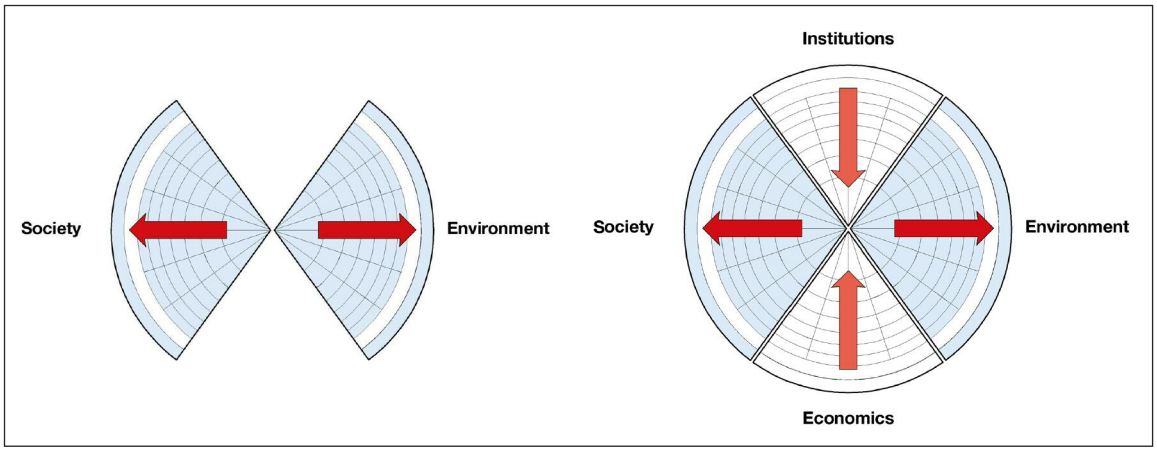

Figure 1: ASPIRE Conceptual Framework

institutional environment to support the delivery of infrastructure that contributes to sustainable development: policy, governance, skills, and reporting.

4.2 Indicators

Within this conceptual framework, it was then necessary to identify a comprehensive set of indicators to assess project performance. ASPIRE uses the same organising principle of SPeAR. The four key dimensions of sustainability - environment, society, economics and institutions – are represented as four quadrants which are divided into 20 primary theme areas as shown in Figure 2. The Society and Environment quadrant has 6 themes each and the Institutions and Economics quadrant has four themes each. Within each theme there are 4-5 sub-themes (or indicators).

Drawing on the existing SPeAR indicators, key references as summarised in Appendix A and a series workshops/discussions with sector specialists and consultants, an initial list of approximately 160 sub themes was drafted. The process was jointly managed by a team of experts from Arup and EAP, mobilising expertise covering all four sustainability dimensions. Through a further series of workshops and discussions, the initial list was streamlined to 96 sub-themes. Although this is a large number of indicators to address in an assessment, it does provide a comprehensive framework that addresses the totality of issues that need to be considered. This is particularly important at the outset of a project to ensure that opportunities are not overlooked and gaps are identified. This approach, together with the ability to omit a small number of indicators if considered irrelevant for a particular project, was felt to be a more rigorous approach than either using fewer generic indicators or selecting project specific indicators. A smaller number of Key Performance Indicators (KPIs) aligned with a

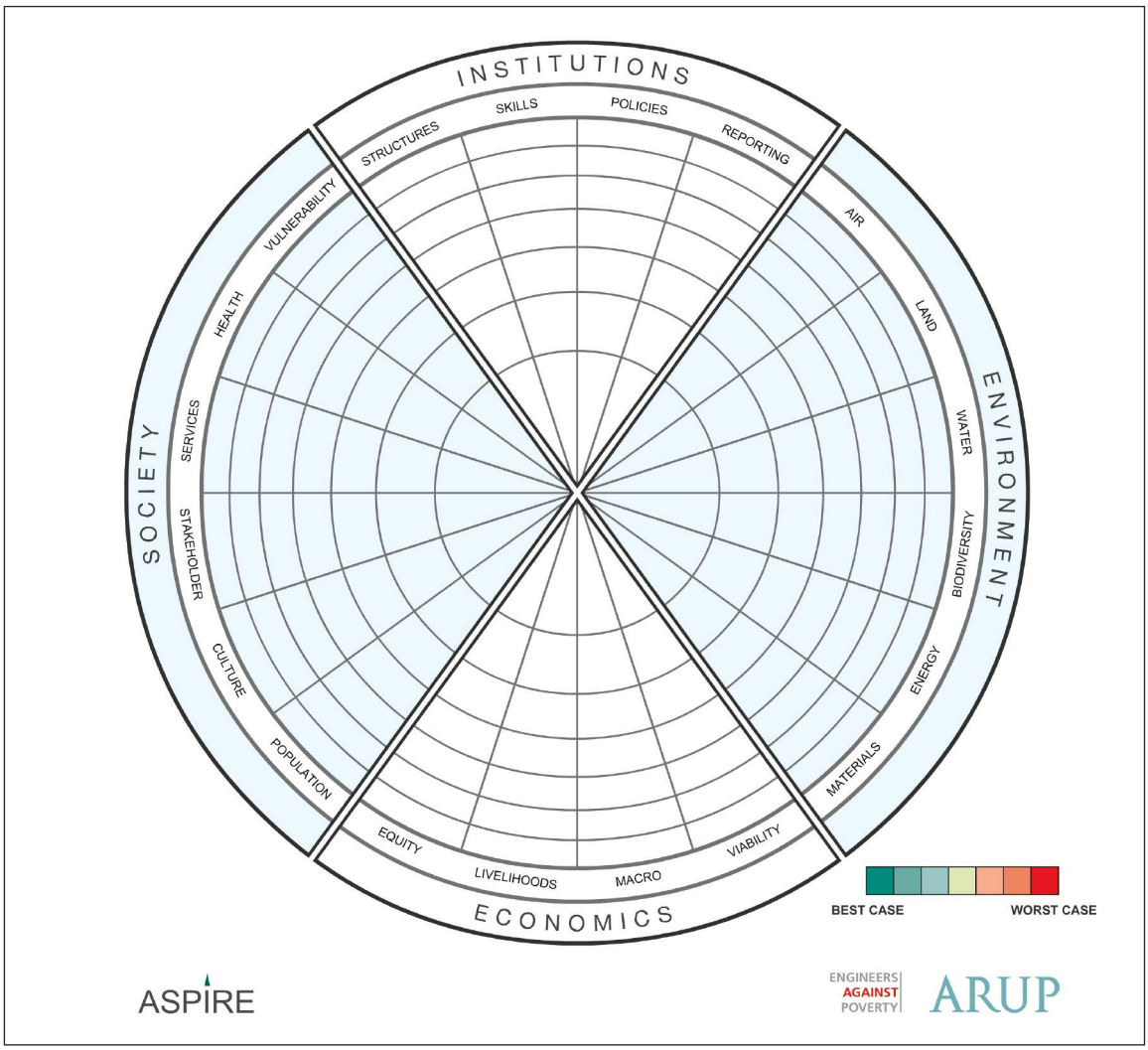

Figure 2: ASPIRE Keystone

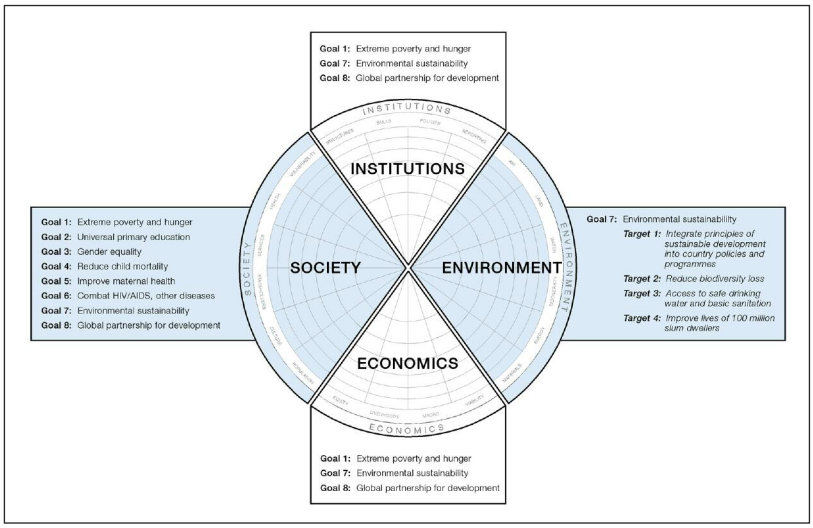

Figure 3: ASPIRE and MDGs

particular project's objectives can be identified from amongst the overall list of 96 sub-themes and used as the basis for more detailed monitoring and evaluation on a quantitative basis.

A further consideration in this indicator development process was how ASPIRE could support the assessment of performance against the Millennium Development Goals (MDGs) as discussed previously in section 2.3. Figure 3 maps the MDG goals on the ASPIRE framework. It should be noted that, generally, it is not possible to directly measure performance of infrastructure projects against the MDGs. For example, reducing hunger or improving health and education outcomes requires broad-based multi-dimensional interventions that extend beyond the boundaries of most infrastructure projects. However, understanding how

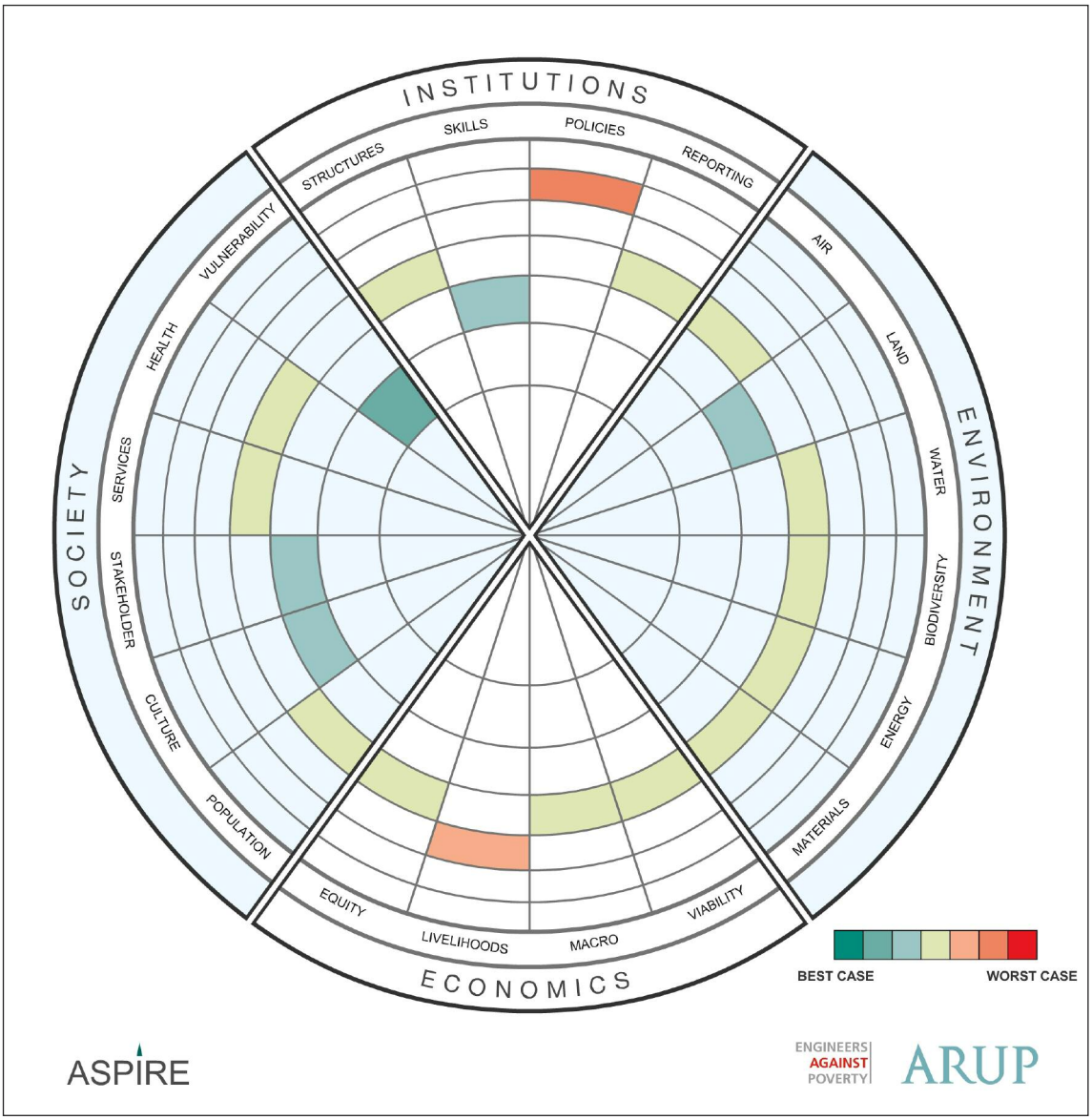

Figure 4: Typical ASPIRE Assessment output

infrastructure can be designed to integrate with other programs or to be the focal point for broad-based multi-sector interventions is central to achieving the MDGs.

4.3 Software

The ASPIRE software has been designed to be easy to use and understand, so that it can be operated and understood by project managers, planners and engineers who may not have specialist knowledge of sustainability and poverty reduction issues. Key considerations in developing the software were:

- It should be easy to use and understand so requires minimal training;
- It should not be too data intensive so that moderate time and resources are required to carry out an assessment;
- There should be a high degree of transparency in terms of data input and output and both should be able to be checked and audited to ensure quality and consistency;
- The output should be tabulated as well as presented graphically; and
- It should be easily accessible via the Internet.

The software utilises Microsoft Windows. It leads the user through a series of questions, and provides illustrative best and worst cases to assist in allocating a non-weighted score to each of the sub-themes. If the user requires more information to help with decision-making, ASPIRE also provides ready access to background information for each sub-theme through the software. The user then has to enter a short justification for each score. These scores are then aggregated for each theme to provide a high level, graphical output. A 'traffic light' system is used to indicate strengths (green) and weaknesses (red). See Figure 4.

The detailed steps for carrying out an ASPIRE assessment are outlined in the User Manual.

4.4 Assessment Methodology

In the process of developing the software it was considered important also to develop a clear methodology for undertaking an assessment using ASPIRE. This was divided into 4 key stages and 10 key steps were identified as shown in Figure 5. Further details of each step are provided in the User Manual.

Initiating the assessment	**Step 1: Define boundaries and objectives** • Understand the scope of the project and define objectives • Define the assessment boundary
	Step 2: Identify stakeholders • Identify the primary and secondary stakeholders • Identify the stakeholders to be consulted
	Step 3: Review list of sub-themes • Review list of sub-themes for relevance • If a sub-theme needs to be removed then provide justification
	Step 4: Policy and regulatory framework • Understand the regional or national policies and regulations • Assess the impacts of policies and regulations on the project
Data collection and entry	**Step 5: Data collection** • Collect data through primary and secondary sources • Verification of data
	Step 6: Data entry • Enter data in the ASPIRE software in the data entry menu • Justify all the indicators – 'sub-themes'
Review	**Step 7: Initial Outputs** • Keystone diagram • Excel Report
	Step 8: Feedback to project team/stakeholders • Initial outputs to be communicated with team/stakeholders • Agreement on areas requiring review or modification
	Step 9: Review ASPIRE based on feedback • Update ASPIRE based on feedback from team/stakeholders • Carry out further rounds of iteration and feedback if required
Reporting	**Step 10: Final outputs and reporting** • Generate final outputs • Write the assessment report

Figure 5: The ASPIRE Road Map

5. PROJECT LIFE CYCLE

This section discusses the analysis carried out in order to develop a generic project life cycle (PLC) which was used to explore how ASPIRE might be used at various stages of project development. In order to maximise the impact and applicability of ASPIRE, it was considered important to develop a tool that, as well as being used at the early stages of project concept development, could be used to promote informed decision making throughout the project cycle right through to evaluation of completed projects. In addition, it should be flexible so that it can be used in a number of ways (e.g., to inform the brief, promote dialogue between partners, carry out gap analyses, undertake options comparison, facilitate ongoing monitoring and evaluation of multi-phased projects, and promote institutional learning).

5.1 Project Life Cycle Analysis

A review of four major donors' project life cycles was carried out to compare their stages and definitions. The outcome of this review is shown in Figure 6. Based on the analysis, a generic project life cycle with six key stages at which sustainability and poverty impacts need to be considered was identified. These are shown in Figure 7 and described briefly below.

Stage 1: Policy Development

This will normally be carried out at a national level to identify relevant national policies and priorities which can then inform broad project criteria in discussion with key national stakeholders.

Stage 2: Identification

The vision, goal and objectives for the project are defined and agreed at this stage. Stakeholder analysis and some preliminary high-level consultations are important and necessary components to ensure that the priorities of all potential delivery partners, champions, beneficiaries and even possible detractors are taken into consideration.

Stage 3: Design

At this stage one or more infrastructure project options can then be identified based on the project objectives and their feasibility assessed. Detailed requirements for delivering the project are developed. Measurable indicators of performance will need to be agreed. Project design will include developing a scope of works, scheme design, programme and budget. Agreement also needs to be reached with any project partners on the preferred management model for delivering the project.

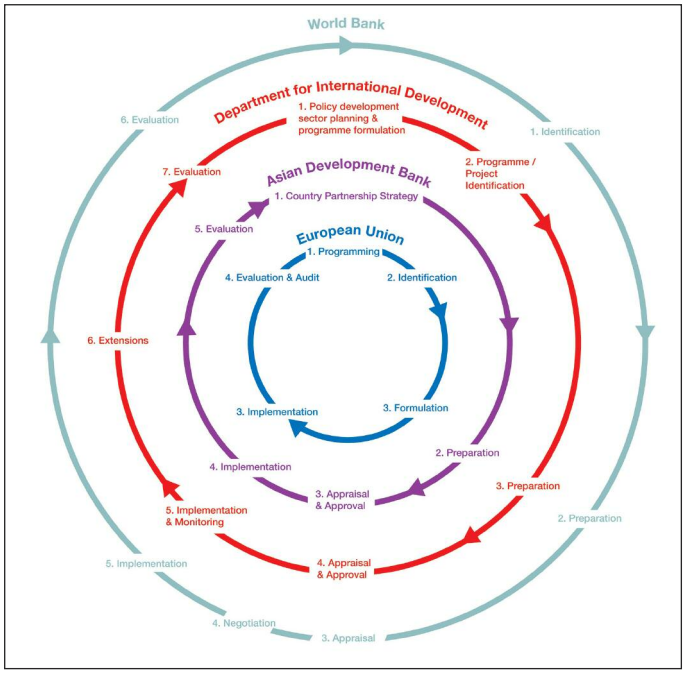

Figure 6: Comparison of selected donor project lifecycles

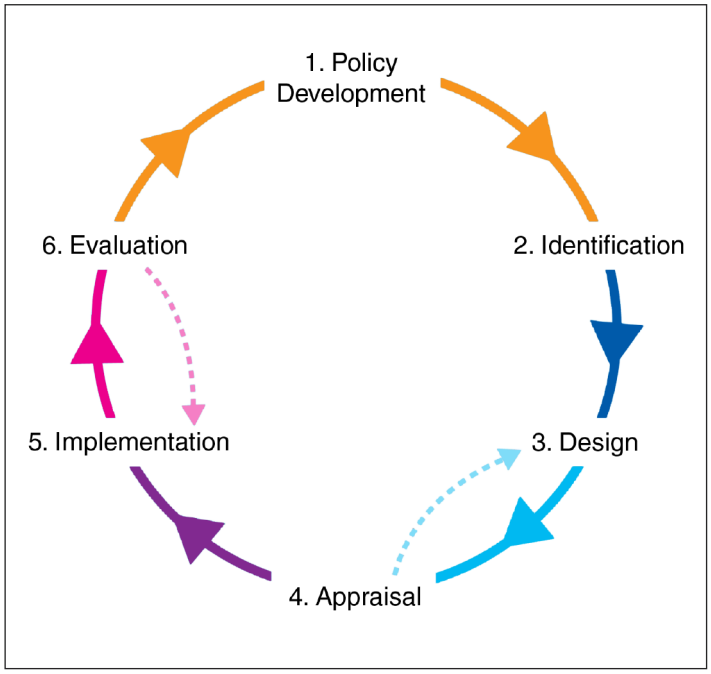

Figure 7: Simplified generic project life cycle

Stage 4: Appraisal

This is the stage at which the project design is reviewed to check that it meets all the policy and project criteria in the most effective, equitable, sustainable, efficient and replicable manner. This is the chance to ask difficult questions about impact, sustainability and risks, and if there are concerns or weaknesses there needs to be a mechanism to go back and improve the project design before moving on to implementation. This feedback loop to refine the design is shown in Figure 7.

Stage 5: Implementation

This stage includes not only the detailed design and construction or installation of facilities but also the ongoing operation and maintenance. There is less scope at this stage to influence the shape of the project since most of the decisions relating to poverty impact and sustainability will have been finalised in Stages 2 and 3. However, ongoing monitoring of the agreed performance indicators should be included in Stage 6 to provide a feedback loop as shown in Figure 7. This helps to identify areas where the intended impacts are not being achieved, or the project is under-performing.

Stage 6: Evaluation

Evaluation is an important part of the cycle to learn lessons which can inform future projects. However, it is not always routinely undertaken on project completion. An evaluation may be undertaken after several years of operation and should draw on information from all the previous stages of the project cycle to assess performance at the earlier stages.

5.2 ASPIRE Applications

An Arup project team was then asked to review ASPIRE and consider how it might be used on a significant large scale infrastructure project. Table 6 summarise the outcome of this exercise.

Additional, up-front investment will be needed to carry out analysis at the start of the project cycle. Such investment is crucial to ensure that sustainability and poverty reduction are included at the outset, and will be most effective if there is a multi-disciplinary team with strong communication capabilities to interact effectively with external and internal project stakeholders. The graph shown in Figure 8 illustrates the cost-benefit of involving stakeholders in the decision-making process at the start of the project. Adapting designs and processes to meet the needs of the poor from the outset is significantly less costly than trying to effect changes later in the project.

Step Number	Project cycle stages	Activities/Analysis	Can ASPIRE be used?
1	Policy Development	Baseline assessment	✓
		Raising awareness/training	✓
2	Identification	Master planning	✓
		Feasibility study	✓
		Options evaluation	✓
		Risk identification and analysis	✓
		Gap analysis	✓
		Stakeholder analysis and mapping	✓
		Identification of key performance indicators	✓
3	Design	Concept design review	✓
		Stakeholder consultation	✓
4	Appraisal	Design review	✓
		Stakeholder consultation	✓
5	Implementation	Monitoring	✓
		Stakeholder consultation	✓
6	Evaluation	Time series evaluation	✓
		Comparison of projects	✓
		Auditing	✓
		Whole life project monitoring	✓
		Post project evaluation	✓
		Raising awareness/training	✓

Table 6: Applying ASPIRE during various stages in the project cycle

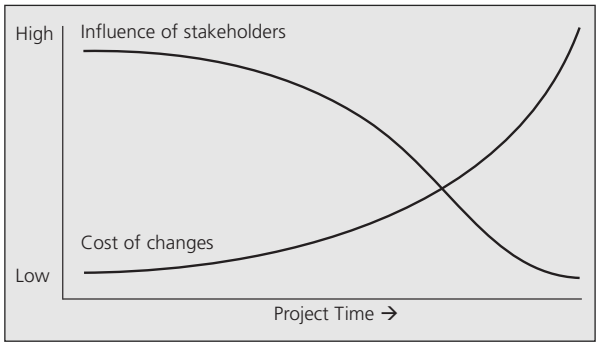

Figure 8: Influence of stakeholders v. cost of changes to infrastructure projects

6. CONSULTATION & TESTING

6.1 Market survey

Following the literature review, comparative analysis and development of the conceptual 4 – quadrant model, an initial questionnaire was sent out to 45 private sector, academic, non-governmental and government organisations. Its purpose was to assess the demand for such a tool and how sustainability and poverty reduction issues were currently being prioritised and addressed among these organisations (Appendix B). 20 responses were received and this information was then used in developing the indicators and software.

6.2 Testing

An initial version of the ASPIRE software was trialled on nine different infrastructure projects between December 2008 and May 2009. These projects were selected to provide a cross-section in terms of scale, sector, geography and participants (see Table 7). Four projects were selected in sub-Saharan Africa ranging from large scale donor-funded/public sector interventions to NGO supported community based projects. A post-disaster reconstruction project was chosen in Sri Lanka. The remaining two projects in the UK and US are considered exemplars of sustainable development based on assessments using SPeAR and/or other tools (e.g. LEED, BREEAM).

Testing organisations were asked to provide detailed feedback on the use of ASPIRE through a standardised questionnaire. The purpose of the testing was to assess ease of use of the software as well as to encourage debate on the tool's overall themes and appraisal methodology (Appendix C).

Projects sheets for several test projects have been included in Appendix D. These provide background information about the project, discuss how the ASPIRE assessment was carried out and also the key lessons for the project from the assessment process.

6.3 Outcomes

The feedback from the testing stage highlighted several areas in which the software content and user interface could be improved. It also revealed the diversity of potential applications that the testing organisations considered appropriate for ASPIRE.

User Interface

- Overall users found the software intuitive and easy to use even at their initial assessment.
- Various improvements were made to the software in response to user feedback including navigation between and within screens; data entry; saving draft assessment; speed of output generation.

Themes & Sub-Themes Content

- Considerable feedback was offered by users on the sub-themes' categorisation and content. This was used in finalising the sub-

Table 7: ASPIRE Test Projects

Name of Project	Location	Sector	Testing Organisation	Details of Project
Community Water and Sanitation project	Nairobi, Kenya	Water & Sanitation	Maji na Ufanisi/Arup	Toilet block built by community
Tsunami Housing Construction	Kalutara, Sri Lanka	Housing	Croix-Rouge de Belgique - CRB	Technical supervision for housing construction
Chyanyana Irrigation Pilot Project	Kafue, Zambia	Irrigation	Private Infrastructure Development Group (PIDG)	Irrigation project jointly run by small scale farmers and commercial farmers
Gautrain, Rapid Rail link	Joburg, South Africa	Transport (Rail)	Arup Johannesburg	80km rail link construction
Kindergarten Project	Ghana	Construction (Education)	Arup/Sabre Trust	Develop and build a prototype kindergarten
Greywater Management Project	Cape Town	Water & Sanitation	University of Cape Town	Options for sustainable grey water management at community level
Post Tsunami school and health facility reconstruction	Sri Lanka	Construction (Education & Health)	UNOPS	21 schools and 33 health clinics
Angwin Eco Village	California, USA	Housing	Arup	275 housing units and 66 acre land
Greenfield Site	Bristol, UK	Construction (Commercial)	Arup Bristol	Office scheme near existing semi rural communities

themes (indicators) and the accompanying questions, and best and worst case guidance.

Scoring & Assessment

- Users reported that most of the information required to conduct an ASPIRE assessment was readily available from existing project documentation or had been collected for other reporting requirements.
- Some users commented that, because the keystone diagram shows the average score of 5-6 sub-themes, particularly good or bad performance on particular sub-themes could be masked. An option to generate a 'best' and 'worst' case chart which depicts the highest and lowest scoring sub-theme for each theme was added so that it is possible to break down and track sub-theme performance graphically.
- During the testing process, the ASPIRE team noticed differences in how individuals approached scoring. For example, how 'average' performance was indicated tended to be very subjective. To prevent inconsistency in the use of the tool, the best and worst case scenario wordings for each sub-theme, which are the basis for assigning a score, were edited, and more guidance on scoring best practices has been provided in the user manual.
- The format of the keystone image and the reports has also been updated to better meet the needs of users.

Applications

- All testers, from engineers to academics, reported that the ASPIRE themes and sub-themes were relevant to their projects. ASPIRE was considered to be a more comprehensive appraisal tool than those currently being used to assess poverty reduction and sustainability performance, and users expressed interest in adopting the use of ASPIRE as part of their standard practices for project development. In particular, users noted the importance of a tool like ASPIRE to enable their organisation to 'zoom out' from the technical, project driven focus to a longer-term project sustainability perspective at all stages of the project cycle.
- A major finding of the testing was that the scale of reference in the tool could be difficult to match with the particular project being assessed, since an NGO working on a small community project may have different areas of focus than a large scale private sector infrastructure project. Flexibility has therefore been built into the tool to address this diversity by allowing limited exclusion of sub-themes from assessments.
- Additionally, due to particular reporting requirements within some organisations, opportunities for customisation were identified so as to align ASPIRE with existing internal frameworks, and this service has been included in the overall business offering.
- A minority of testers initially felt that their projects did not focus specifically on poverty reduction and therefore would not necessarily benefit from an ASPIRE assessment. This perspective highlights the gap that ASPIRE is attempting to fill in re-orienting project appraisal from a purely environmental perspective to include the wider social, institutional and economic impacts.
- The testing stage also highlighted that ASPIRE could potentially be applied in the developed country context where there is increasing recognition of the need to identify social as well as environmental impacts. There is scope in the future to adapt ASPIRE to this context.

6.4 Conclusion

The testing process has demonstrated that the ASPIRE model provides a useful analytical framework for programme and project managers, engineers and monitoring and evaluation specialists to understand and evaluate the implications of infrastructure provision and its contribution to poverty reduction and sustainable development throughout the project cycle. It has provided confidence that ASPIRE meets the key specifications defined at the start of the development process, namely:

- Facilitates the design and delivery of sustainable pro-poor infrastructure;
- Integrates into the project life cycles of users;
- Provides appropriate performance indicators;
- Is easy to use by project team members;
- Creates simple graphical outputs that can be understood by non-experts to facilitate engagement with key stakeholders; and
- Can be used to monitor and assess whole life performance of projects.

APPENDIX A: ASPIRE INDICATORS - KEY REFERENCES

Organisation for Economic Co-operation and Development (OECD) (2006) *Promoting Pro-Poor Growth – Infrastructure.* OECD, Paris.

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Department for International Development (DFID) (2006) *Eliminating World Poverty – Making Governance Work for the Poor*. White Paper on International Development. DFID. London.

Fenner, R A, Cruikshank, H J and Guthrie P M (2006) *Widening engineering horizons: addressing the complexity of sustainable development*. Proceedings of the Institution of Civil Engineers, Engineering Sustainability 159, December 2006 Issue ES4 pp 145-154.

Hawkins, J, Herd, C and Wells, J (2006) *Modifying infrastructure procurement to enhance social development*. Institution of Civil Engineers & Engineers Against Poverty, London.

United Nations Environment Programme (UNEP) and The International Council for Research and Innovation in Building and Construction (CIB) (prepared by Du Plessis, C.) *Agenda 21 for Sustainable Construction in Developing Countries*. CSIR Building and Construction Technology, Pretoria.

APPENDIX B: INITIAL MARKET SURVEY QUESTIONNAIRE

ASPIRE: a unique collaboration between Engineers Against Poverty and Arup to support the integrated appraisal of poverty reduction and sustainability performance of infrastructure developments.

A survey of interest for a new appraisal tool.

From initial consultations with key stakeholders we have identified that:

1. Many organisations involved in infrastructure provision are dealing with the complex challenges of ensuring sustainability and making positive contributions to poverty reduction.

2. There is a lack of simple and effective tools to address these challenges in an integrated way.

ASPIRE is being developed to respond to these needs. The ASPIRE project team is now seeking organisations interested in utilising ASPIRE for their projects and operations. We would like to know if such a tool would be useful and relevant to the work of your organisation and would be grateful if you could answer the following questions:

Which of these best describes your organisation? (mark with an X)							
Private sector		Government		Government agency		NGO	

	Question	Yes	No	Answers & comments
1	Is poverty reduction a key strategic or commercial driver for your organisation?			
2	Is sustainability a key strategic or commercial driver for your organisation?			
3	Does your organisation currently use any formal frameworks or tools for assessing poverty reduction impacts? If so please name.			
4	Does your organisation currently use any formal frameworks or tools for assessing sustainability? If so please name.			
5	From the information you have received on ASPIRE do you think that it could add value to your existing processes and activities? If yes, at what stage(s) of the project lifecycle do you think it would be most useful: project identification, planning & design, implementation or post-project evaluation?			
6	Would you be interested in receiving more information on ASPIRE?			
7	Would you or one of your colleagues be interested in meeting one of our project team to discuss a possible collaboration to pilot ASPIRE on one of your projects? If yes, please provide contact details.			

APPENDIX C: TESTING FEEDBACK QUESTIONNAIRE

1. Does your organisation currently use any frameworks or tools for assessing sustainability and/or poverty reduction impacts? If so please name.	
2. Did you find ASPIRE easy to use?	
3. What application(s) do you see for the ASPIRE tool within your organisation?	
4. What are the targets/drivers that ASPIRE would help you meet? (These might be international development targets, national government objectives or organisational mandates)	
5. What would be the other benefits to your organisation of adopting ASPIRE?	
6. How would your organisation use the results of ASPIRE to change project design and delivery?	
7. Are any barriers foreseen to implementing the proposed design and delivery changes?	

8. Do you currently collect all the information necessary to complete ASPIRE?	
9. At what stage(s) of the project/programme lifecycle do you think ASPIRE would be most useful: project/programme identification, planning & design, implementation, monitoring or post-project/programme evaluation?	
10. At what geographical level would you use ASPIRE: community, national, or regional?	
11. Are all the themes and sub-themes currently included in ASPIRE relevant?	
12. What improvements/changes would you suggested to make ASPIRE more a) User friendly? b) Relevant for its intended application?	
13. Do you think that ASPIRE can increase the likelihood of an infrastructure project producing sustainable and pro-poor outcomes?	
14. If ASPIRE has been tested on a project(s) we would like the following information if possible (we will only use any data from you with your permission):	• One page introduction and image for the case study project • ASPIRE keystone output • ASPIRE excel report output • Comments specific to the case study

APPENDIX D: CASE STUDIES

ASPIRE

Case Study:

Arup Infrastructure Gautrain Rapid Rail Link Gauteng, South Africa

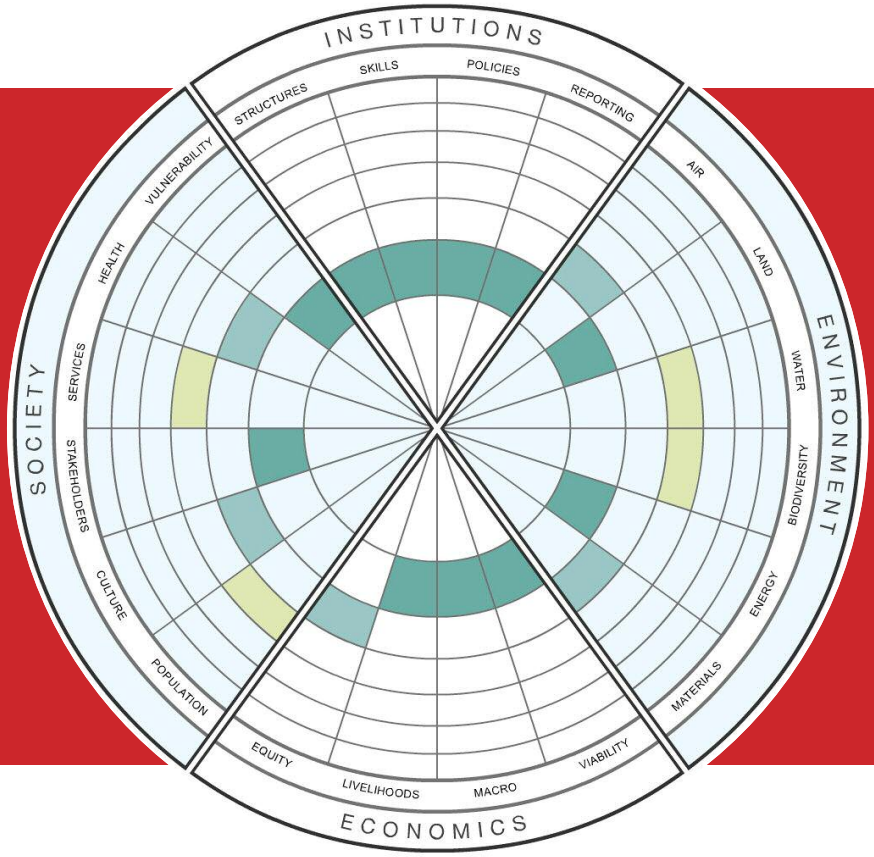
Source: Arup South Africa

Rapid rail link

Project Description

The proposed Gautrain Rapid Rail Link entails the construction of a modern, state-of-the-art rail network consisting of two spines: a north-south spine linking the two major cities of Pretoria and Johannesburg (a commuter service), and an east-west spine linking Sandton and the East Rand at Rhodesfield in Kempton Park (a commuter service), together with a dedicated service linking Sandton and JIA airport. A network length of approximately 80 km is planned, with provision for future extensions. Gauteng is the economic hub of South Africa, generating more than 36% of the country's Gross Domestic Product (GDP), whilst covering less than 2% of the country's total surface area. Gauteng therefore plays a vital role in the national economy and it is important to prevent this being undermined by traffic congestion. Furthermore, land development in Gauteng has historically been distorted and, in many cases, has not been supported by an adequate public transportation system.

ASPIRE Keystone



The ASPIRE assessment has been carried out by members of the Arup Johannesburg team, who are the technical reviewers for the development of the Gautrain link.

The assessment was carried out at the Implementation stage of the project life cycle, during the further stakeholder consultation phase of work and has been valuable in highlighting the importance of stakeholder involvement in the successful evolution of the scheme as well as the robust financial viability.

Arup Infrastructure **Gautrain Rapid Rail Link** Gauteng, South Africa

ASPIRE Assessment

Institutions

The Gautrain Rapid Rail Link scores notably highly within the Institutions quadrant of the ASPIRE assessment. This is owing to the involvement of a private sector consortium which is well resourced and under strong contractual obligation to include capacity of local companies. National and Provincial Government approvals are in place; a multi-stakeholder review called the 'Gautrain Integration Report' checked that all aspects of the project would be aligned with other transport institutions and as well as with national, provincial and local development and transport policies. Further to this, the Provincial government has a well resourced project office to manage the project and staff within the project office have the skills, financial resources and organisational capacity to meet responsibilities. The scheme has a record of good public relations and has been opened to inspection by members of the public during key stages of the development process.

Environment

Strengths of the Environment quadrant include Energy and Land elements, where the project is encouraging a new development philosophy in South Africa of higher density mixed use, high quality developments at stations and transport nodes. This is a welcome development in the context of an otherwise very low density, unsustainable development culture. Biodiversity and water score relatively poorly, owing to the major impact on water/riverine systems through disposal of water during construction. Tunnelling has had an impact on groundwater and aquifers which are part of the resource of public water authorities. Little advance planning for impacts of such water extraction took place. Furthermore, trees on route have sometimes been felled without adequate consideration of alternatives or replacement.

Economics

A significant amount of training and empowering of local labour and businesses will be undertaken to deliver the project. Interestingly, the Equity strand still scores comparatively lower than the other Economics themes, as there has been some debate about access to public transport for low income communities in South Africa, as the main beneficiaries in the near term will likely be current transport users in middle and high income groups. Ensuring open access and fare levies to benefit all socioeconomic groups would have resulted in a higher evaluation, but through an integration report, the project has outlined the positive indirect impacts on employment opportunities and the fact that other transport systems are likely to become more efficient and accessible in the long term as a result of the operation of Gautrain. Taking these limitations into account, the project still performs strongly in the Economics quadrant due to its focus on equal opportunities, transparent contracting practices which promote ethical competition, high labour standards, long term operational viability and strategic alignment with regional and national infrastructure policies.

Society

Within the Society quadrant, the Services and Population themes appear to be weaker than others because the indicators within these themes had neither a positive nor negative impact to the project and were therefore given an average/neutral score. For instance the focus of the project is improving transportation for current users, and access to other key services such as primary education provision, telecommunications and fuel sources is not the primary focus so the assessment assumes a neutral stance on the project impact on community cohesion along the transport corridor. However, in-depth analysis of income levels and land use was conducted to assess the project's value over the next 20 years, which plans for possible changes in population, and there are strong accountability and grievance mechanisms in place to ensure that all construction, social and environmental commitments are delivered, leading to higher scores in the Stakeholder theme.

ASPIRE

Case Study:

Maji Na Ufanisi Community Water & Sanitation Project Nairobi, Kenya

Source: Maji na Ufanisi / Arup

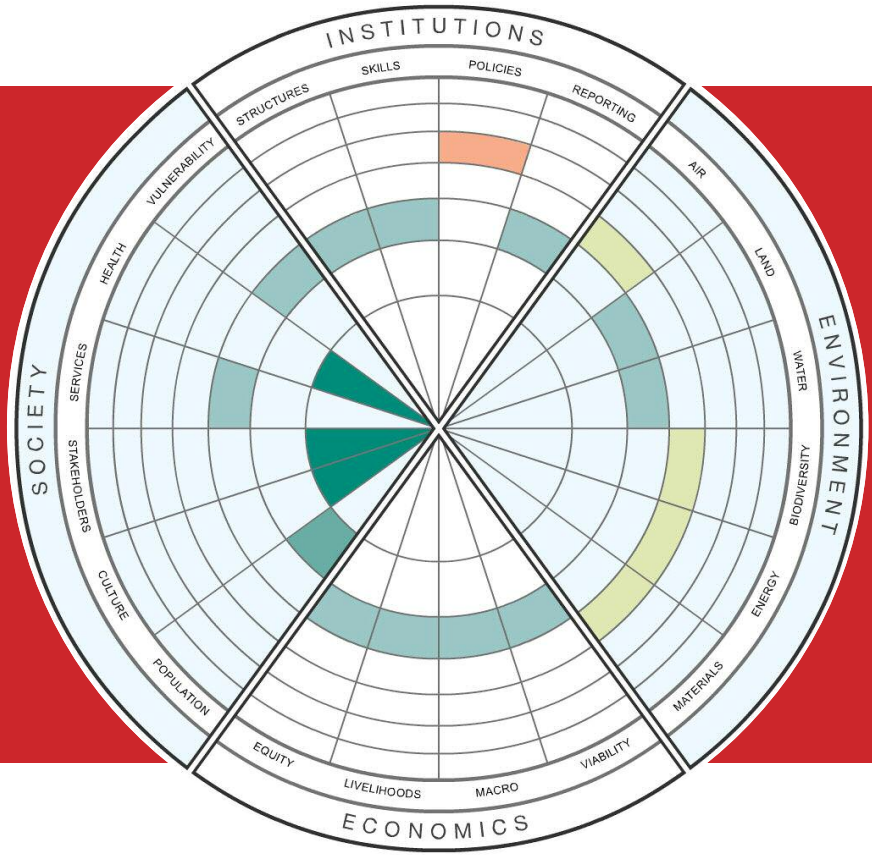
A water-sanitation-shower block in Kiambiu

Project Description

The project is a water and sanitation project in the informal settlement of Kiambiu in Nairobi, Kenya, supported by Arup. The project involves the construction of shower and latrine blocks with a single water kiosk constructed alongside. Five blocks have been constructed since 1999 and they provide clean water, safe sanitation and shower facilities for approximately 70% of the 60,000 people living in the settlement.

The project is supported by a Kenyan based Non-Governmental Organisation (NGO) called Maji na Ufanisi. Maji initiated the project by consulting with the local community to identify the key water and sanitation needs of the settlement. In order to encourage community ownership of the project, the community donated labour for construction and formed a Community Based Organisation (CBO) responsible for the blocks, known as Kiambiu Usafi Group. Once constructed, the CBO took total control of the management of the blocks which includes financial matters, cleaning, and operation and maintenance.

ASPIRE Keystone



The ASPIRE assessment was undertaken by Arup staff who travelled to Kenya to obtain inputs from local staff working for Maji na Ufanisi and the local community.

The assessment was carried out at the Evaluation stage of the project cycle, forming a post project evaluation. The use of ASPIRE at the Evaluation stage was extremely valuable for helping Arup staff to prepare for the trip to Kenya, as the indicators focused the team towards the relevant issues. According to the assessor, because the project performed very well in most areas, it is an exemplar of small-scale construction projects in the developing country context and will serve to inform similar future projects.

Maji Na Ufanisi Community Water & Sanitation Project Nairobi, Kenya

ASPIRE Assessment

Institutions

The Institutions quadrant highlights some key strengths of the project as well as some governance weaknesses that may pose a threat to the future success and management of the project. Firstly, socioeconomic analyses were conducted by Maji before project implementation, and a structured monitoring and evaluation process has been put in place to ensure proper channels for feedback between the CBO and Maji na Ufanisi and to conduct annual SWOT (Strength, Weaknesses, Opportunities, Threats) analyses. In addition, this project strategically aligns with the aims of a number of government initiatives, and the capacity of local government is well understood by the CBO and Maji. However, the key governance issue related to the project is the lack of legitimacy of the slums, and, although unlikely, the government could theoretically evict residents from the settlement at any time.

Environment

The project demonstrates consideration of the impact on the local environment. In particular, sewage from the toilet facilities is disposed of to a trunk sewer, as opposed to direct to a local river, and there is now high awareness among the community about the sewage cycle and need for proper block ventilation and sanitary facilities. During construction, the efficient use of raw materials prevented wastage and reduced costs, and measures were taken to limit dust and particulate emissions into the air according to the Kenyan Building Act and EIA recommendations. Some issues identified by the appraisal for further development include greater consideration of renewable energies (e.g. use of methane as heat/energy source) and improvement of ambient air quality at the toilet blocks.

Economics

The project performs strongly in terms of economic viability as demonstrated by the raising of sufficient funds from the first project for the construction of four new blocks. The project has also led to important multiplier effects such as encouraging a variety of micro enterprises and buying and leasing plots of land within the community, and the CBO has been able to use project assets as collateral for bank loans, increasing access to finance. Equity is also a key theme, in that services at the kiosk are affordable to local residents to ensure equitable access and that any financial benefits are invested back into building more blocks for community use. Areas which could be more fully addressed in the future include greater consideration of Health & Safety guidelines and the incorporation of a structured risk management strategy. However, the insecurity of land tenure on the site will remain an ongoing threat to the overall viability of the project.

Society

The approach of Maji na Ufanisi of identifying the key community needs and engaging with the community from the project inception has led to on-going community ownership and wider community cohesion on a range of different developmental issues beyond water and sanitation provision. The project is also good example of cross-tribal cooperation, especially considering the post-election violence in 2008. Cultural preferences and beliefs regarding sanitation, such as clear gender separation of facilities and outside water taps for Muslims, among others, were incorporated into the project to serve the widest possible range of needs in the community. Increased levels of community organisation and enterprise are helping to build a stronger case for the formal and legal recognition of the settlement by the local authorities. When scaling up such initiatives, however, greater attention to the possible impacts of in-migration, as groups vie for access to the improved services, should be paid, as this is already an area of concern in the current project.

ASPIRE

Case Study:

Sabre Trust Kindergarten Building KEEA District, Ghana

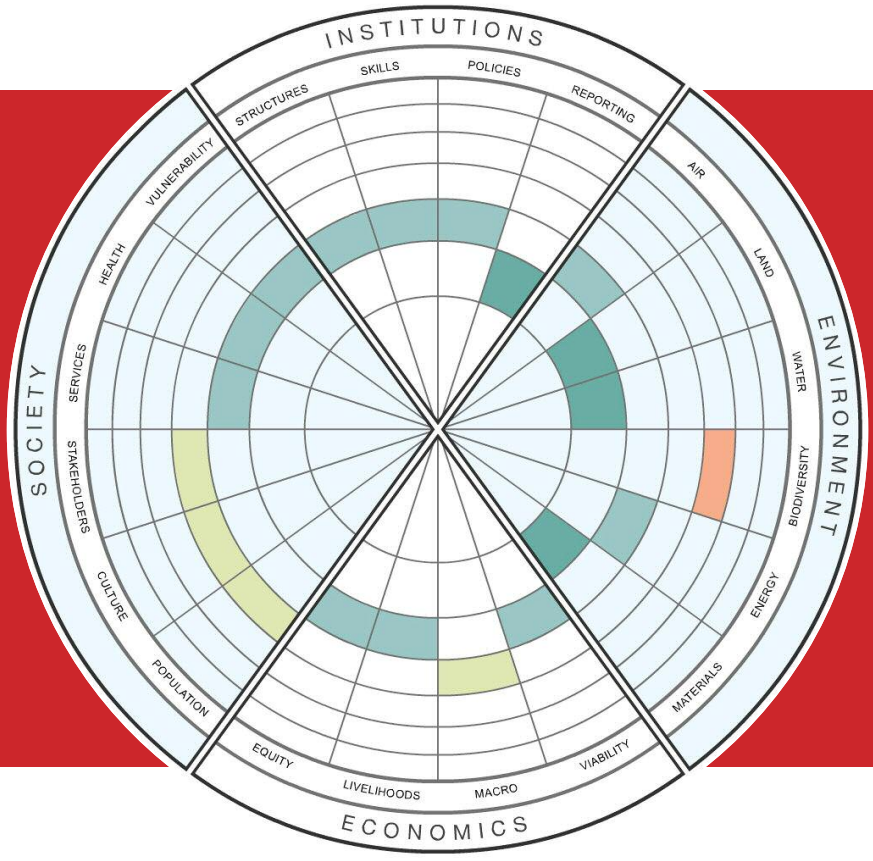
Source: Arup

Start of construction phase of Kindergarten

Project Description

Arup has worked in partnership with the Sabre Charitable Trust and Davis Langdon LLP to develop and build an exemplary prototype kindergarten building for the Dwabor community in the KEEA (Komenda-Edina-Eguafo-Abrem) District of Ghana. The intention is to design and construct a kindergarten for 180 children. A secondary function of the building is to act as a community centre outside school hours to provide space for a clinic or additional community facilities. The vision for the project is to make a meaningful and measurable difference to the community users and, upon scaling up to a country-wide initiative, to the wider Ghanaian education sector.

ASPIRE Keystone



The ASPIRE assessment has been carried out by members of the Arup team with input from the Sabre Trust.

An initial ASPIRE assessment was conducted at the Identification stage of the project life cycle as a Gap Analysis of the project brief. This output was tabled in the stakeholders meeting and various team members used the assessment to provide data and address the gaps in the project through the design phase. A second assessment was then carried out during the Appraisal stage to review the design. The keystone shows the output generated at the Appraisal stage.

Sabre Trust Kindergarten KEEA District, Ghana

ASPIRE Assessment

Institutions

Overall, the project performs well in the Institutions quadrant. This is due to the focus on project replication and project-government coordination through involving the appropriate local, regional and national government stakeholders, while also enhancing the role of civil society in the design and construction phases. In addition, the project is linking together the local community with an international NGO for ongoing support, and links have been established with the School of Architecture and Building Technology. Training of the local community on building design and construction will be conducted as necessary to ensure that appropriate skills and capacity for maintenance are available at the local level. However, the ASPIRE assessment highlighted the limited local government capacity for ongoing financial support, which will need to be addressed to ensure successful replication of the school building programme to the national level.

Environment

Strengths of the project are notable in the Environment quadrant. The Water and Land themes feature particularly strongly, owing to the infiltration drainage system which will be used during the project's lifetime, the Ventilated Improved Pit (VIP) latrine facilities which are designed to minimise any land or water pollution from sewage, the potential for rainwater harvesting on site, and the use of planting around the site to prevent soil erosion. The other elements, including Energy and Materials, also score fairly well, due to low-energy design parameters and the use of recycled materials for construction. However, the assessment revealed a gap in project planning in the Biodiversity theme, as there are no specific conservation practices or an environmental risk management plan in place. This highlights the tensions inherent in balancing social and environmental concerns of a small versus large infrastructure project. While the biodiversity element may not have as large a role to play for this rural prototype, further consideration is needed when scaling up to the national level.

Economics

The kindergarten prototype is to be an example of best practice whilst aligning with all relevant Ghanaian policies, legislation and guidelines for education provision, leading to a strong performance in the Viability theme for its long term integration into existing structures. However, one possible area of concern for the long-term viability of the school is the Education Authority's responsibility for maintenance of the kindergarten and sanitation infrastructure, as it is uncertain that sufficient funds and capacity will continue to be available for successful management of the site. Other strengths include the equitable distribution of benefits to the community, in that the school provides free kindergarten instruction to community children, as well as the ongoing maintenance and teaching posts which will enhance livelihood opportunities in the area. The Macro theme performs comparatively less well than others, mainly because some of the indicators evaluated, such as the potential multiplier effects on business and local production, have not yet been fully integrated, as they are more appropriate to the scaling up phase of the project rather than the prototype phase.

Society

The key strength of the Society theme is undoubtedly the project's provision of free pre-primary educational and community facilities where they did not previously exist. Additionally, the project provides greater access to sanitary facilities and drinking water on site. All elements of the building are designed to be context and technology appropriate for the rural Ghanaian location, but an innovative design has addressed the structure to the specific physical and learning needs of young children in ways that traditional schools in Ghana have not done in the past. Scores are somewhat lower in the Population and Stakeholder strands, however. This is mainly because, at the time of the initial assessment, a formal process for stakeholder identification and community involvement in decision-making (outside of the school design) had not yet been fully integrated into the project. Present and future population dynamics and possible displacement are not recognised in the current analysis, as this is only a small pilot project. However, it has been noted that further exploration of these issues is needed when the project is scaled up to a national level school building initiative.

ASPIRE

Case Study:

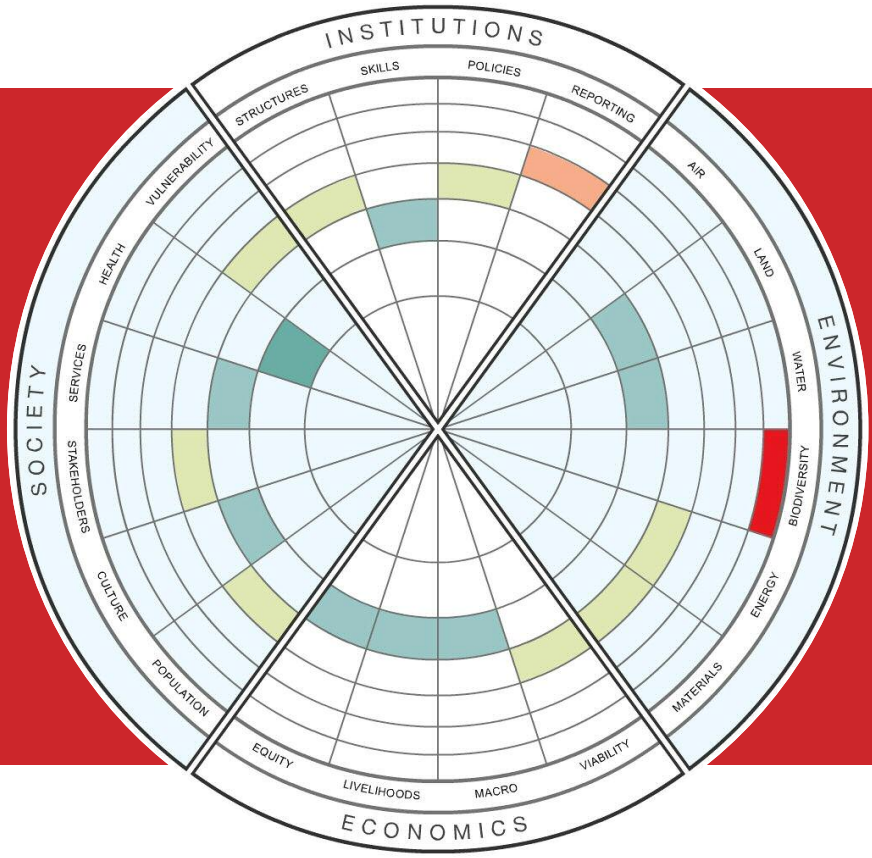
Belgian Red Cross
Tsunami Reconstruction Housing Project
Sri Lanka

Source: Belgian Red Cross

Project Description

The Belgian Red Cross (CRB) has been engaged in a project to construct approximately 450 houses in the Kalutara district of Sri Lanka since early 2005, providing technical supervision throughout the construction phase. The houses are for people who lost their homes in the tsunami that hit the island on 26th December 2004. In approximately half of the cases, the beneficiaries own land outside the new coastal buffer zone, a planning instrument preventing construction close to the coastline. These beneficiaries' houses have therefore been constructed on the site of their old house. For the remaining beneficiaries, the houses are constructed in 'new settlements'; on land donated by the government in a relocation site. The vast majority of the houses (all but 52) were constructed following the 'cash-for-housing' principal: beneficiaries are given cash grants to construct their homes in 7 installments and take responsibility for construction themselves. CRB provides technical supervision and control payments to ensure beneficiaries are completing each stage.

ASPIRE Keystone



ASPIRE evaluation of the housing reconstruction project was carried out by the Belgian Red Cross.

The assessment was carried out at the Evaluation stage of the project life cycle, forming a post-project evaluation. ASPIRE provided a valuable composite assessment of a housing scheme in Sri Lanka. Feedback from the assessor suggested that ASPIRE would be particularly applicable at the initial stages of a similar project, during the Policy Development and Identification stages, as this would help to encourage implementers to include sustainability measures where not previously considered.

Belgian Red Cross **Tsunami Reconstruction Housing Project** Sri Lanka

ASPIRE Assessment

Institutions

Scores varied across the Institutions quadrant, with a good performance in the Skills theme. This is because there was little civil society capacity at the start in the new settlements, as they were formed of people who had not previously lived together. The project has worked with the beneficiaries to form Community Based Organisations (CBOs) in all of the new settlements, and these CBOs are in the process of registering with the government and will play a central role in the maintenance of facilities and livelihoods and education programmes, thereby strengthening civil society participation and project-government coordination. However, the assessment indicates that improvements could be made in the Policies and Structures themes. Little health and safety training was carried out for those doing the construction and there was little analysis of the rule of law and its impact on the project. The team are now making an attempt to understand aspects of land rights law that are important to the housing beneficiaries and communicate this information to them.

Environment

Key Environment strengths of the project lie in the incorporation of landscaping to prevent soil erosion and the enhanced water availability provided through connections to mains, tube wells and rainwater harvesting systems. However, Biodiversity was identified as a key area for improvement, as there was no environmental management plan in place, and, under the Water theme, the assessment highlighted that only one site had a sustainable drainage system, whereas the other housing developments actually increased risk of flooding to neighbouring areas due to the use of existing poorly maintained drains. There was also not sufficient consideration of energy efficiency or impacts on indoor or ambient air quality in terms of construction or design. However, given budgetary constraints and the fact that this was a 'cash for housing ' project (i.e. each beneficiary was responsible for purchasing materials and managing implementation themselves) this would have been difficult.

Economics

The ‘cash for housing’ project design maximised local sourcing and local job creation as beneficiaries sought out the resources and labour for the build themselves from the surrounding communities. In addition, because beneficiaries are the primary builders, housing designs necessarily use appropriate local technology which can be cost effectively maintained using locally available skills, tools and materials. These factors identified the Livelihoods, Equity, and Macro themes as areas of key project strengths. However, while the Macro theme was strong overall, the assessment revealed that Tsunami housing reconstruction significantly affected the money supply in the local economy and caused high levels of inflation, but little consideration was given to the impact this might have in the initial project plans. Viability did not score as well compared to other strands evaluated due to a lack of assessment of risks and the future costs of carbon associated with the project.

Society

Scores within the Society quadrant were notably strong, particularly within the Health and Services themes, as the project improves the quality of life for local communities through enhanced access to water and sanitation infrastructure. In particular, each house has an indoor toilet connected to a septic tank, either Western or squatting style, depending on people's preferences. Solid waste workshops will be carried out with the new communities to improve their understanding of how to separate organic from non-organic waste, how to make compost and how to grow a home garden. The Culture theme also scores relatively highly, owing to the amount of community infrastructure, such as community centres, children's play parks and libraries, that has been provided, and the project ensures access to both members of the new community and the host community. ASPIRE also highlights that a potential threat to the project is its sensitivity to conflict, owing to the mixing of old and new communities, which sometimes causes tension between groups. Given the high levels of conflict in the country, a more detailed analysis of conflict would have been beneficial.

ASPIRE

Case Study:

Arup
Angwin Eco Village
California USA

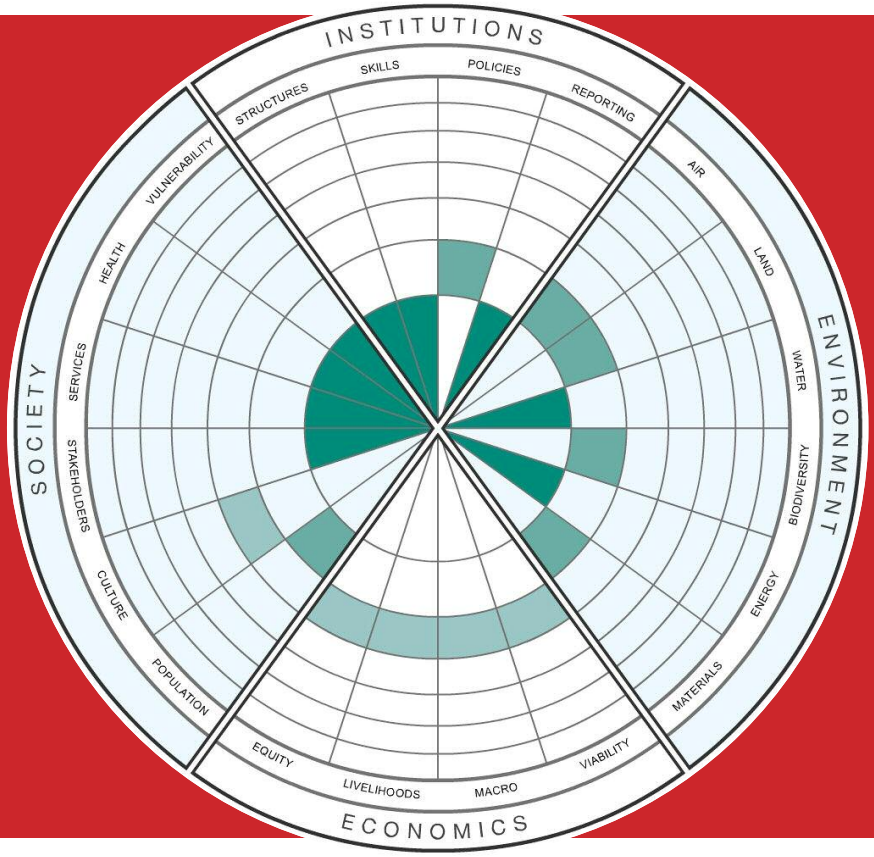
Source: http://www.angwin-ecovillage.com/retail.html

Artist Impression: Proposed Angwin Eco Village

Project Description

Angwin is located in the Napa Valley in California, USA. The vision behind the development of Angwin Eco Village is to create a community with strong commitment to sustainability, social equity and environmental preservation. Currently at the master planning stage, proposals include 275 housing units and a 105-unit retirement/assisted living centre on land owned by Pacific Union College. The development will be built on 66.1 acres of both green and brownfield land. In association with this development, Pacific Union College will permanently preserve over 1,000 acres of agricultural and forest land and provide an additional 52 acres, which will effectively protect its land from any future housing development.

ASPIRE Keystone



The ASPIRE assessment was carried out by staff from the Arup San Francisco team, who have played a key role in the formulation and development of the Angwin master plan over the past two years.

ASPIRE has been applied during the Identification stage of the project life cycle, during the master planning process for the Angwin Eco Village scheme. Overall, the Angwin Eco Village performs highly in the integrated appraisal evaluation, although the developed country context means that the results are somewhat distorted and that comparisons with other project results should be treated with caution. The assessor suggested ASPIRE would be valuable from the outset and could be used as an 'actions' tracker, to continuously track performance throughout the project's longevity and life cycle, through to Evaluation.

Arup Angwin Eco Village California, USA

ASPIRE Assessment

Institutions

Reporting, Skills and Structures scores are notably high, owing to the effective communication ethos developed for stakeholders, the innovative approach to community planning, and the effective government-project coordination in the master planning phase. Extensive communication with stakeholders and members of the community has clearly been instrumental in the development of the scheme. For instance, in addition to a number of consultation meetings on the planning and education aspects of the project, an informative website has been created which provides non-technical summaries for the community, and project plans involve the local community as key participants in monitoring and evaluation of the project after completion.

Environment

The project also performs well within the Environment quadrant, particularly within the Energy and Water themes, owing to provision for on-site energy generation and the use of recycled wastewater, spring water and rainwater to meet demand. Care has also been taken to avoid negative impacts on the on-site stream and local biodiversity during and after construction. The re-use and development of brownfield land is also crucial in the high performance within this strand, although this is counteracted by the amount of greenfield land, including some forest areas, which will also be developed.

Economics

Performance within the Economic quadrant highlights some gaps in the current planning for the Angwin Eco Village project. Equitable access to economic benefits and the impact on the livelihoods of the local community score comparatively low against the other themes evaluated by ASPIRE due to a lack of planning for local sourcing and employment creation at this stage. Also, although many aspects of environmental and political risks have been considered, the social risks associated with economic viability have not yet been fully assessed. However, the project proponent expects that these elements will be further explored at later stages of the project cycle.

One area which is notably missing from the current plans is a more thorough exploration of the potential for carbon offsetting as a mechanism to enhance financial viability of the scheme.

Society

The project performs strongly against the Society quadrant indicators. This scoring is particularly high because the project is sensitive to its impact on the community, particularly on vulnerable groups such as the elderly, and attempts to incorporate existing structures and practices into the new design to promote continuity. Existing schools will receive significant upgrades as a result of the project, creating better linkages between the local community and services, going beyond the traditional project boundary. In addition, the overall design process has been iterative and has included extensive community consultation to mediate differing viewpoints and to accommodate those whose homes and/or property will be affected by the plan. Areas which will require further consideration would be the inclusion of the local Adventist religious community into the master plan and how the construction and post-construction waste streams will be managed.

ASPIRE

Case Study:

InfraCo Africa
Chyanyana Irrigation Pilot Project
Kafue District, Zambia

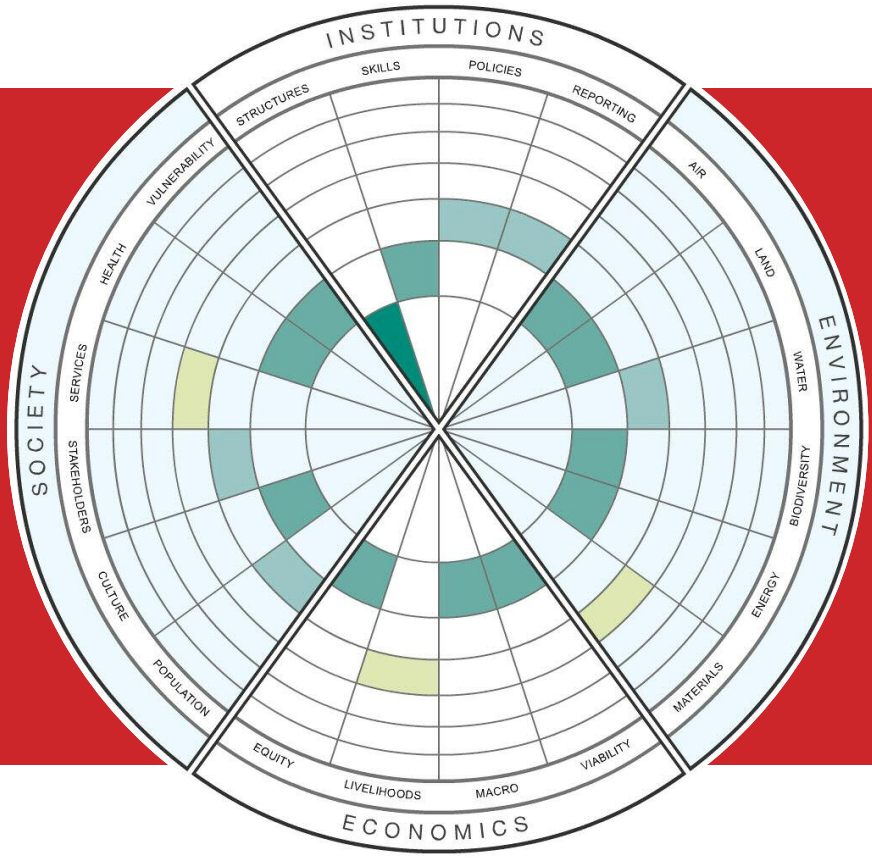
Source: PIDG

Chyanyana Co-operative Board Members

Project Description

The Chyanyana irrigation project serves as a joint venture between a commercial farming enterprise and small-scale farmers in the Kafue district of Zambia. It has been developed by InfraCo Africa, a project development company that aims to stimulate greater private investment in African infrastructure development. Small farmers lack the means to buy capital intensive irrigation equipment, and as a result, they experience low yields and are limited to one annual growing season. Ten percent of the smallholders depend on World Food Programme aid as a result of insufficient income generation from farming. This pilot project seeks to combine the land resources of smallholders into a commercially viable co-operative society in which farmers get access to irrigation, technical support and agronomy advice in exchange for setting aside a majority of their land for commercial farming. Irrigation will support two crops per year and substantially higher yields per crop. The positive impacts of the project are expected to be greatly increased smallholder incomes as well as access to more plentiful and varied crops, which will improve nutritional status, reduce dependency on existing food aid, and increase collective voice and bargaining power through the farmers co-operative. The project has been under development since 2007, and the first phase of the project is now under construction.

ASPIRE Keystone



This ASPIRE assessment has been carried out by a DFID / Private Infrastructure Development Group (PIDG) team in consultation with local stakeholders in Zambia.

The assessment was carried out at the Implementation stage of the project life cycle as a monitoring assessment. The indicators from the ASPIRE assessment were discussed by the PIDG team in Zambia with local stakeholders, and the outputs from the discussion were used as a basis for the ASPIRE assessment.

InfraCo Africa **Chyanyana Irrigation Pilot Project** Kafue District, Zambia

ASPIRE Assessment

Institutions

The project performs particularly strongly in the Institutions quadrant, and notably within the Structures and Skills themes. The appropriate local government, private sector and civil society structures are in place to ensure effective delivery of the project, and the project is supporting the creation of a co-operative of local smallholder farmers to encourage participation and involving and building capacity with local government officers. However, a few areas for improvement have been identified. Due to the early stage of implementation, no comprehensive health and safety policy was in place, and it has been noted that comprehensive monitoring and evaluation systems need to be put in place, as the current system is mainly tracking financial performance.

Environment

The project scores fairly highly in the Environment quadrant, particularly in the Air, Land, and Energy strands. Renewable energy sources have been incorporated into the project, as hydroelectric power from the national grid will be used to run the irrigation pivots, and a solar borehole will be used for the resettled colony. A full Environmental Impact Assessment has been carried out to IFC standards and has been peer reviewed by local, independent consultants. Environmental management is proceeding in accordance with the recommendations set out in an Environmental Management Plan. The Materials theme scored comparatively lower because the irrigation equipment needed for the project cannot be locally sourced in Zambia, although regional suppliers in South Africa have been selected.

Economics

Strengths identified within Economics include the integration of robust financial viability analysis since inception. There has been a detailed consideration of non-monetary costs and benefits, such as setup and running of the co-operative, and the project is a commercially managed operation with a "for profit" motive. Sophisticated financial models, which are refined and updated periodically, are used to evaluate the project, and all debt is professionally managed. The weaker performance in the Livelihoods theme points to a potential negative distortion to the future local economy if there is increased in-migration to the project area. This may result in increased demand for infrastructure, which has yet to be planned.

Society

The project seeks to improve food security and nutrition of beneficiaries through increasing crop yields and availability of a diversity of foods for smallholder consumption, resulting in a strong performance in the Health and Vulnerability themes. As part of the EIA, a formal identification of all stakeholders was made, and each of the 126 members of the co-operative have been given formal land title for their small holdings, so local stakeholders also played a key part in project decisions. The project has been sensitive to socio-cultural issues in that smallholders decided where the pivots would be located and where the relocation site would be positioned in conjunction with the project team to avoid disturbance of graves, provide areas for ancestral spirits and areas to pray for rain, among others. Gender equity has also been considered as women are wholly integrated within the co-operative structure, with 3 women serving on the board. However, there are still areas for improvement identified in the Services theme. In particular, the need to address communal meeting space and provide better transport links has been noted. At present, transport links are limited and mainly restricted to public mini-buses, which run infrequently, or expensive, private vehicle service.

ASPIRE

Case Study:

Arup
Greenfield Site
Bristol, UK

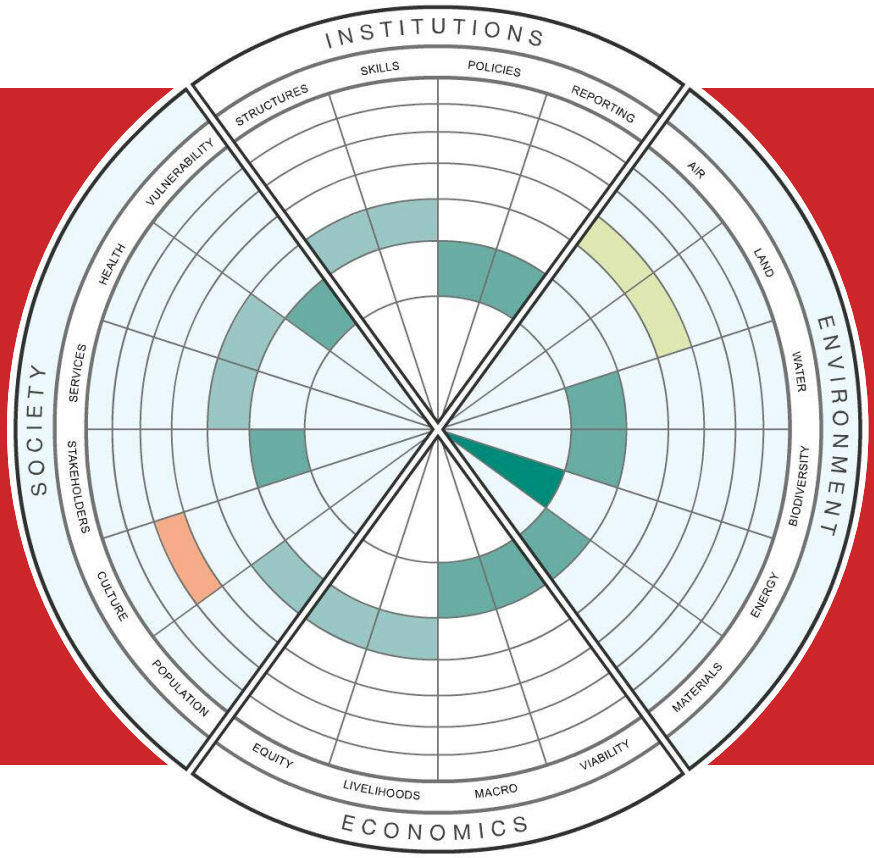
Source: Arup Bristol

Greenfield Site, Bristol

Project Description

The site tested by ASPIRE is a 'greenfield' site, located north of Bristol, in the UK. The site is owned by a private developer, although the identity of the client and exact project location remains confidential. The proposed development is predominantly an office scheme, which is surrounded by small, mature, semi-rural existing communities. The scheme is looking to create new types of employment in the local area and to create constructive links with the existing communities. The primary aim of the ASPIRE assessment was to test the applicability of the software in a developed country context. An assessment for the potential of the site's contribution and impact had previously been carried out using SPeAR, and whilst SPeAR is a powerful tool for building assessments, it was felt that ASPIRE might be relevant for larger scale projects.

ASPIRE Keystone



The ASPIRE assessment was carried out by members of the Arup Sustainability team in the Bristol office.

ASPIRE has been applied at the Identification stage of the project life cycle, in the Feasibility stage of site development. The ASPIRE assessment demonstrates the potential application of the tool in a developed country context. Poverty focused themes such as Equity and Vulnerability were useful in identifying key issues for this proposed development.

Arup **Greenfield Site** Bristol, UK

ASPIRE Assessment

Institutions

The project performs quite strongly in the Institutions quadrant, as thorough monitoring and evaluation systems have been put in place with open dissemination of information to stakeholders, and a range of media channels have been used to ensure effective communication. In terms of further improvement, ASPIRE has highlighted that there is a potential gap in local government delivery capacity associated with the project. In addition, there is scope to enhance innovation as a core value of the project design.

Environment

Performance of the scheme within the Environment quadrant is variable, highlighting the environmental issues associated with developing an agricultural, greenfield site next to a motorway. The project performs well in the energy category owing to the integration of onsite wind turbines and combined heat and power (CHP) into the potential development design. Performance is also strong in the water and biodiversity categories. Although the development site is within a floodplain, Sustainable Urban Drainage Systems (SUDS) will be designed into the scheme to reduce the risk of flooding and run-off into the surrounding area. Water quality targets have also been established and consumption targets will be established and monitored. In terms of air quality, the site is next to a motorway, therefore existing air quality is poor, although it is made clear that appropriate mitigation will be suggested. The land element of the scheme scores low because it is a greenfield site in an area adjacent to housing. The impact of these factors can therefore be monitored and re-evaluated using ASPIRE and potential mitigation measures suggested during the Design and Appraisal stages.

Economics

The macroeconomic theme scores highly, mainly owing to the scheme providing increased opportunities for new local businesses and enhancement of the economic vitality of the local area. The economic viability of the project is also judged to be relatively strong, due to an alignment with national and regional growth policies. In terms of Equity, the project scores fairly well, but because the office development will mainly cater for skilled workers and blue-chip companies, it has been noted that the economic benefits, such as provision of jobs for local people, may not be equally distributed to the surrounding communities. ASPIRE also highlights that little consideration has been given to the future cost of carbon, although there is a detailed understanding of most of the costs and benefits associated with the project over the entire lifecycle.

Society

Certain strands of the Society quadrant score relatively highly, notably within the Vulnerability and Stakeholder themes, owing to a fully resourced consultation scheme and consideration of the physical vulnerabilities associated with the scheme (e.g. flood risk). There are also strong elements of community involvement associated with the development, although there is concern that local farming practices may be diminished. The lower performance in the Culture theme highlights the need for the project to take sociocultural diversity, gender equity and local practices into greater consideration in the project plans, as these have not yet been fully addressed.

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ASPIRE has been funded jointly by the
Institution of Civil Engineers Research & Development
Enabling Fund and
Arup's Design Technical Fund

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