SUSTAINABLE ROADS FOR FRAGILE AFRICAN STATES

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WHAT IS SUSTAINABLE INFRASTRUCTURE?
Factor 8: the challenge

(Sustainable Infrastructure in Fragile States)

Given that infrastructure is not an ‘engineering artifact’ but an ‘agent of change’, is it possible to imagine infrastructure systems that can meet the needs of twice today's population with half today's resources while providing twice the livability?(*)

F8=2³ Opportunity in Fragile States

(*) Next generation Infrastructures, Delft University the Netherlands
Factor 8: the challenge

Complexity
Socio-Techno-Economic system

Enabler

Change
# Contents

## SECTION

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   - Strategic Infrastructure: prioritize and deliver

2. **UNOPS Sustainable Infrastructure: the Vision**
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5. **Case study**
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   - Warrap roads – South Sudan
   - Development of National road design manual – South Sudan

6. **What is Sustainable Infrastructure?**
## Global Infrastructure

### Challenges

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<th>Description</th>
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<tr>
<td>101</td>
<td>USD billion annual cost – in excess fuel cost and time – of road congestion in the US - <strong>effectiveness</strong></td>
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<tr>
<td>57</td>
<td>USD trillion global infrastructure investment needed 2013-2030 - <strong>need</strong></td>
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<td>Years (average time to obtain complete permitting for a power infrastructure in EU - <strong>bureaucracy</strong></td>
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<td>70</td>
<td>% of water in Nigeria is 'non-revenue' unmetered or stolen – <strong>waste/losses</strong></td>
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<tr>
<td>0</td>
<td>(Gain in construction labour productivity in the past 20 years in Japan, Germany and the US - <strong>efficiency</strong></td>
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<td>2.5</td>
<td>USD trillion additional infra financing by 2013 if institutional investors meet their target - <strong>gap</strong></td>
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Source: McKinsey Global Institute, 2013
Global Infrastructure

Opportunities

1 ($/trillion annual savings from viable 60% improvement in infra productivity - efficiency)

30 % (potential boost in the capacity of many ports through more efficient terminal operations - efficiency)

1.2 ($/billion overall NPV of Stockholm’s congestion-charging scheme - policy)

15 (% potential saving fro streamlining infra delivery efficiency)

20 (% reduction in Denmark’s road maintenance costs via a total cost of ownership approach - responsibility)

Source: McKinsey Global Institute, 2013
Strategic Infrastructure: prioritize and deliver

Road map to effective and efficient infra (global)

- Investments aligned (economic, social, industrial environment)
- Sub-Saharan Africa needs 10% of GDP for maintenance ops
- Needs vs. Investment gap $1 trillion (Global)
- ROI for Infra is 5-25%
- Need to ‘prioritize infrastructures’ (economic infra)
  1. Transport facilities (air, sea and land),
  2. Utilities (water, gas, electricity etc),
  3. Flood defences;
  4. Waste management;
  5. Telecommunications networks

- Need of ‘effective’ and ‘efficient’ delivery

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UNOPS Sustainable Infrastructure: the Vision

UNOPS mandate* and comparative advantage

- Project Management, Infrastructure and Procurement

UNOPS Strategic Plan 2014 – 2017**

- New delivery practice: **Sustainable Infrastructure**: To contribute to the ability of countries to design, construct and maintain infrastructure, integrating and balancing social, environmental and economic considerations.
- Strategic must win: **Leadership in Sustainable Infrastructure**

*United Nations General Assembly resolution A/RES/65/176 (20 Dec 2010)
** Executive Board decision 2012/16
Leader in Sustainable Infrastructure

FOCUS AREA

RISK REDUCTION & RECOVERY
- Vulnerability Assessments
- Watershed Management
- Shelter

TRANSPORT
- Roads
- Bridges
- Airstrips

PUBLIC BUILDINGS
- Prisons
- Hospitals
- UN-Buildings

COMMUNITY INFRASTRUCTURE
- Schools
- Housing
- Waste Management
- Water & Sanitation

Disaster Resilient Engineering
Renewable Energies

SERVICE TYPES

CONSTRUCTION SERVICES (planning & design, construction, site supervision, contract management)
- Roads
- Bridges
- Airstrips

NON-CONSTRUCTION SERVICES (advisory services)
- Development of technical specifications
- Organizational strengthening
- Training & professional development

* The products/services mentioned under each Focus Area are some examples. UNOPS works on a wider range of projects other than the above mentioned list.
Where we work

Infrastructure global portfolio (2012)

Map legend

Countries with projects supported by UNOPS

The circles on this map represent the volume of UNOPS operations in the country in millions of US dollars. They represent the approximate midpoint of the designated country and do not refer to an exact location.

Countries:
- Serbia: $9 million
- Kosovo*: $7 million
- Iraq: $8 million
- Afghanistan: $117 million
- Pakistan: $6 million
- India: $8 million
- Myanmar: $70 million
- Somalia: $43 million
- Palestine: $17 million
- Sri Lanka: $9 million
- Cambodia: $6 million
- Thailand: $7 million
- Sudan: $28 million
- Ethiopia: $16 million
- Kenya: $8 million
- South Sudan: $94 million
- Libya: $7 million
- Democratic Republic of the Congo: $35 million
- Senegal: $6 million
- Morocco: $6 million
- Guatemala: $21 million
- Haiti: $37 million
- Argentina: $39 million
- Paraguay: $6 million

This map is for illustrative purposes and does not imply the expression of any opinion on the part of UNOPS, concerning the legal status of any country or territory or concerning the delimitation of frontiers or boundaries.

Top 10 countries of implementation

Transport $91 M
Public Buildings $65 M
Community Infrastructure $28 M
Risk Reduction & Recovery $9 M

TOP 10 countries where UNOPS Implemented infrastructures projects in 2013

1. Afghanistan
2. South Sudan
3. Haiti
4. Congo, The Democratic Republic
5. Guatemala
6. Peru
7. Iraq
8. Kosovo
9. Serbia
10. Palestine
Key results in infrastructure 2013

$1 billion/year global portfolio

$338M expenditure in Infrastructure

3,560 km of roads were constructed or rehabilitated

39 schools, 40 administrative buildings

6 police stations, 7 courthouses, 7 prisons

81 bridges designed & constructed

14 hospitals, 14 health clinics & 7 medical facilities

"The new roads have really changed our lives. Now we can access schools, hospitals and markets easily."

Mohammadullah, Afghan farmer working on UNOPS roads

Haiti

Sri Lanka

Afghanistan

Brazil

Pristina
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‘Roads’ for Sustainable Development

WHEN IS A ROAD #NOTJustARoad?

Roads linking women to services in the Democratic Republic of Congo

Economic Growth

Environmental Impact

Social Justice & Inclusion

National capacity
Infrastructure Economic Return

Source: The World Bank, 2003

© International Road Transport Union (IRU) 2007
Gender & job creation

SAFETY
- Road safety in highways and trade corridors (without facilities for pedestrian mobility and protection) going through rural areas is a major issue, especially for women and children
- Road traffic injuries are leading cause of death among adolescent girls in high- and upper-middle-income countries

TRAVEL TIME
- Changing demographic and land-use patterns have made the distance to fields, water and firewood sources greater
- Road access reduces travel time (especially for women who spend more time in transport activities in Africa)

HEALTH
- ~ 75% of maternal deaths could be prevented through timely access to essential health care → key role of transport & road infrastructure

EDUCATION
- Strong link between girl's school enrolment and road access
- School enrolment > in communities with paved roads and the percentage of children enrolled in schools declines the farther away the schools are
- World Bank case study from Morocco: girl's school attendance increased by over 40% after a new road was put in

JOB CREATION
- Increasing productivity of labour, access to markets for labour and goods, reduce the time of marketing produce & expand access to services

Source: World Bank, WHO
Measuring Infrastructure Sustainability

Before the construction

- Sustainability Markers
- UNOPS internal tool

During Design and Construction

- Good design for reduced environmental impact
- EMS – ISO14001
- Quality-ISO 9001

Benchmarking the success

- CEEQUAL – the Civil Engineering Awards Scheme

Excellence: standards

Sustainable Project Management

Procurement & Contracts
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UNOPS works throughout the entire road transport system, strengthening institutions, building national capacity, and building infrastructure.
The importance of operations and maintenance

- Impact of climate changes to transport
- Adaptation cost upfront lower than downstream (E+S+E)*
- Benefits from Adaptation outweigh cost (do maintenance)
- Sub-Saharan Africa needs 10% of GDP for maintenance operation and new infrastructures
- Reliable, functional and secure RTS: Balancing act …
  1. Access for mobility for All
  2. Transport System Functionality
  3. Limiting Greenhouse gas (GHGe)

Source: Stern 2007; ADB 2005, World Economic Forum, PwC

* £1 reduction in road maintenance results in a £1.50 cost to the wider Scottish economy and society (Source: transport Scotland)
Addressing Roads Sector Capacity Challenges

Road Sector Challenges

- Poor levels of capacity in private sector firms leading to poor levels of construction quality and inefficiencies within the RTS system.
- Misaligned vocational training and education system leading to under-qualified laborers and young engineers.
- Outdated management structures see road departments embedded within several layers of administrative bureaucracy.
- Human resource constraints due to an acute shortage of qualified and experienced technical and managerial staff and workers.
- Weak information management systems due to poor political will and either unsustainable solutions or poor fit.
- Inadequate financing for maintenance and capital investments resulting in congestion, poor road safety and pollution.

Our Approach

- Provide “on the job” training and mentoring to embed basic skills
- Proactively build the capacity of suppliers and improve their bidding and construction quality.
- Improving institutional structures to improve coordination, efficiency and effectiveness.
- Separation of the client and supplier functions and organisations leading to the privatization of the supplier organizations
- Establishment of an executive agency or a commercialized (client) organization
- Community and user participation through oversight boards
- Improving management information systems and performance management systems
- Seeking additional sustainable sources of financing
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The development objective of PARRSA is to **increase the agricultural productivity** and to **improve the marketing of plant and animal production by small farmers in targeted areas**. It covers the Province of Equateur in three districts of North Ubangi, South Ubangi and Mongala as well as the Pool Malebo in Kinshasa. The PARRSA includes three components: (I): Improvement of agricultural and animal production; (II): Improvement of infrastructures; (III) Building capacity of the Ministry of Agriculture, Fisheries and Livestock and the Ministry of Rural Development, Project Management and follow up and evaluation.

**Challenge**

Selection of the roads, markets and warehouses:
- 3 districts on a participative basis involving the local communities and authorities.
- Rural roads link (1) agricultural areas for production to markets; (2) to fluvial ports; and (3) interconnected with national/provincial roads.

Selection criteria of markets:
- Space for construction responding to the standards of setting-up of the rural markets;
- Sites in public domain vs. private concessions;
- Importance of the market for the flow of production and for agricultural transactions;
- Management of the market by the beneficiaries;
- Women in the management of the market.

Selection criteria of warehouses:
- Warehouses in rehabilitation zones;
- Communities to manage warehouses;

**Solution and Deliverables**

UNOPS has delegated contracting authority for the management and execution of component II **Improvement of infrastructure** by:

- Construction construction/rehabilitation of 2,500 km of agricultural roads,
- Rehabilitation and construction of 4 markets and 16 warehouses,
- Irrigation infrastructures covering surface area of 2,000 hectares

The objective of this component is to establish a link between the production areas by improving markets access in the project intervention areas. This component includes two sub-components:

i. road rehabilitation of agricultural services,
ii. improvement of infrastructure in Equateur.

**Sustainability aspects**

- Use of Locally sourced Materials
- Work with local firm for capacity building
Case Study: PARRSA in DRC

La route avant les travaux

La route après les travaux

Le pont de Nyalolo avant les travaux

Le pont Nyalolo après les travaux
Case Study: PARRSA in DRC

During the construction...
Case Study: PARRSA in DRC

Impact on gender
Elected members of management committee

- Rural Market of Businga
- Rural market of Isabe
- Karawa Warehouse
- Bozene Warehouse

Men  Women
Case Study: Warrap Roads in South Sudan

**Challenge**
SSRF Warrap State Stabilization Programme focuses **specifically on improving stability and security in priority areas affected by conflict**. To this end, and to ensure the delivery of effective and well-targeted stabilization and recovery programmes in Warrap State, the South Sudan Recovery Fund (SSRF) through UNDP and implemented by the United Nations Office for Project Services (UNOPS).

**Detail**
- **Project Name**: SSRF Warrap State Stabilization Programme
- **Location**: South Sudan
- **Ref / Project ID**: 78572
- **Status**: ongoing
- **Source / Funding**: South Sudan Recovery Fund (SSRF)/$10m
- **Point of Contact**: Jan Raats, JanAR@unops.org

**Solution**
The project consists of clearing and widens, horizontal centre line re-aliening, restoring construction of drainage structures, development of maintenance strategy and capacity building of Ministry of Physical Infrastructure of the Warrap State.

**Deliverables and Sustainability**

**Main deliverables**
- Construction of Warrap – Mushaar Road 45 Km
- Construction of Warrap – Mushaar Road 40 Km
- Construction Of Four Police Posts
- Training Ministry Staff
- Assessment Of Makwac-apaboung Road
- Selection of the roads, markets and warehouses:

**Sustainability**
Despite the project value, UNOPS used its Short Form Contract (Green Book) for three main reasons:
- Limited complexity of the project
- UNOPS was to provide the designs
- Desire to attract local contractors (capacity building)
Case Study: Warrap Roads in South Sudan
Case Study: Warrap Roads in South Sudan

Measuring the impact

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<th>Outputs</th>
<th>Intermediate outcomes</th>
<th>Impact</th>
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<tr>
<td>USD</td>
<td>Road construction</td>
<td>Road constructed</td>
<td>Travel time reduced</td>
<td>Security increased and level of ethnic conflict reduced</td>
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<tr>
<td>Time</td>
<td>Police posts construction and furnishing</td>
<td>4 police posts constructed and furnished</td>
<td>Presence of local Gov. increased</td>
<td>Job creation</td>
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<tr>
<td>Staff</td>
<td>MoPI staff training</td>
<td>10 operating MoPI staff trained</td>
<td>Traffic increased</td>
<td>Gender balance</td>
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<td>Job opportunities increased</td>
<td>Access to social services increased</td>
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<td>Access to rule of law facility improved</td>
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Assumptions
- Weather, qualified contractor, skilled manpower
- South Sudan politically stabilized, Other agencies supports stabilization, DDR
- People have means to use the road, MoPI has budget and capacity to take over the maintenance
Case Study: Development of national road design manual

Challenge

An East African country, suffering from decades of conflict and poor economic growth, sought to build the necessary roads infrastructure to facilitate much needed economic growth and regional trade. To do so, the national authority, with the assistance of DFID and UNOPS, needed to create a national standard for low volume roads design and construction to guide contractors and ensure efficient public expenditure on roads.

Solution

The engagement prepared design manuals for low volume roads appropriate for the local context of an East African country. UNOPS’ experts took into account local conditions including traffic, climate, public sector and the available capacity for road construction and maintenance.

The manuals also considered local resources of materials, equipment, labour, contractors and crosscutting issues such as gender and environment. Importantly, the manual leveraged regional successes in Low Volume Road (LVR) Manuals.

Examples of deliverables

The primary project outputs are design manuals for low volume roads with the following components:

- Design Standards for low volume roads
- Complementary interventions
- Design standard for small structures
- Trail bridges manual
- Road Manual
WHAT IS SUSTAINABLE INFRASTRUCTURE?
WHAT IS SUSTAINABLE INFRASTRUCTURE?
Thank you!

Questions?