A consistent approach to understanding school infrastructure implementation in a variety of contexts

Overview

Countries: Armenia, Indonesia, Mongolia, Samoa, Tonga

Stakeholders: All countries include entities like Ministry of Education, Ministry of Finance, Disaster Management Agencies, Ministries of Public Works or Infrastructure, Urban Development Authorities, school committees / managers, contractors and consultants.

Hazards: Earthquakes (all countries); flooding and severe seasonal climate variations (Armenia and Mongolia); tsunamis, tropical cyclones and volcanoes (Indonesia, Samoa and Tonga)

Summary: This case study is based on five country diagnostics carried out by Arup as part of the GPSS in 2015-16. The steps taken to map stakeholders, analyse their capacity and capability, and chart the implementation process include: literature review, consultation and technical auditing.

The literature reviews were generally conducted remotely over three to four weeks in order to identify and cross reference guidelines on the implementation process. This information can be drawn from Modules 2.1 and 2.3 of the Roadmap.

Consultation with stakeholders was conducted over one to two weeks in each country and based on semi structured interviews. Consultation must include a wide range of stakeholders from national government, local government, school management and the private sector in order to triangulate the data and ascertain the reality of the implementation process, the capacity and capabilities of each stakeholder.

This case study reveals that despite a wide range of contexts, stakeholders and capacities, a consistent approach to this step of the Roadmap can be successfully taken.

CONTEXT

Variety and similarities in country diagnostics

All the countries profiled have a legacy of colonialism or foreign occupation which influenced the origins of their institutional structures. Armenia and Mongolia are landlocked nations in Asia. Indonesia, Samoa and Tonga are island nations in Asia and the Pacific. These countries exhibit a wide range of demographic trends. Indonesia and Mongolia have expanding populations, while Armenia's population is in decline. Samoa and Tonga have fairly static populations. Armenia and Mongolia have highly urbanised and centralized populations in their capital cities, Yerevan and Ulaanbaatar City respectively. In contrast, Indonesia, Samoa and Tonga have highly dispersed populations.

Hazard events and exposure varies considerably. Frequent and consistent shocks (particularly earthquakes and tropical cyclones) in Indonesia, Samoa and Tonga regularly impact education infrastructure and lead to widespread awareness of hazard risk. It is estimated that Tonga experiences 4.4% annual GDP losses due to natural hazards. Armenia and Mongolia have a long history of dealing with extreme seasonal weather variations but both are currently adjusting to increased seismic risk to their aging and vulnerable ex-Soviet school building stock.

Indonesia and Ulaanbaatar City need to expand their education infrastructure capacity, however, there is no demand to expand in Samoa and Tonga. In contrast, 75% of schools in Armenia operate below capacity and there is an opportunity to consolidate schools and classrooms.

OBJECTIVES

Understanding roles, responsibilities and capacity of implementing partners

The objectives of diagnosing the implementation process are to understand the structure, strengths and weaknesses of the institutional and procurement processes, and to identify opportunities to improve the safety of education infrastructure. Stakeholder mapping (e.g. Figure 1) revealed decentralized governance in Armenia and Indonesia compared to the more centralized systems in Mongolia, Samoa and Tonga. The Ministry of Education in Armenia is responsible for 10% of schools nationwide whereas in Samoa, national government is responsible for all stages of the design and procurement of schools until they are handed over to school committees at completion. Understanding the nature of these institutional structures is crucial to supporting any interventions in both school infrastructure and its enabling environment.

Diagnosing the capacity and capability of these stakeholders allows bottlenecks or weaknesses to be identified and targeted for intervention. It is clear that five professionally trained engineers and building inspectors in Tonga is not sufficient to oversee the 177 schools nationwide. Conversely, the diagnosis also allows for underutilised capacity and capability to be identified and potentially harnessed. The National Emergency Management Office (NEMO) in Tonga have extensive knowledge of hazards, but their limited involvement in the planning process may mean that the best information available is not always being used.

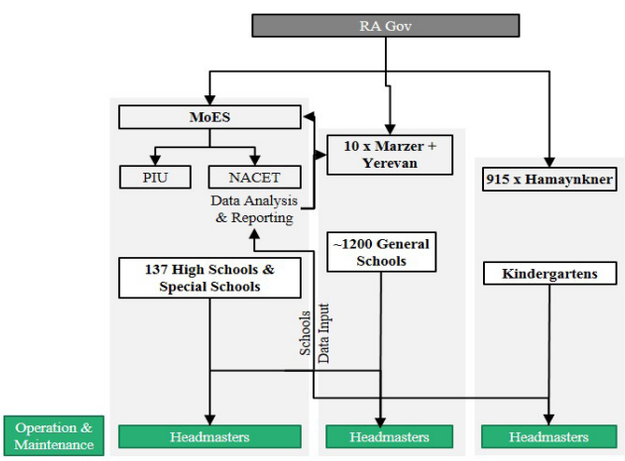

Figure 1. Example of stakeholder map from Armenia

METHODOLOGY

Stakeholder mapping and analysis

The steps taken to map stakeholders, analyze their capacity and capability, and chart the implementation process include: literature review, consultation and technical auditing.

The literature review is used to identify and cross reference guidelines on the implementation process. This information can be drawn from Modules 2.1 and 2.3 of the Roadmap. A recurring issue in these countries is a lack of building codes or technical guidance for retrofitting existing schools. Similarly in Indonesia, it was identified that confined masonry, which is the predominant construction typology for new schools, is not covered by the building code. Therefore, analyzing the implementation process must address how these unregulated activities are carried out in reality in an effort to identify opportunities for intervention.

Stakeholder maps are produced on the basis of desk reviews and consultation in order to document the network of actors and their interacting roles in the implementation process. In parallel, a process map or flow chart of the implementation process is developed through consultation to chart the process of selection, design, procurement and construction. Each stakeholder's responsibilities can be charted against each stage of the implementation process (see Figure 2)

The planning phase reveals a recurring lack of site selection and planning guidance. Multi hazard assessments are generally not conducted and land ownership tends to dictate the location of schools. This hinders the strategic organization of the education infrastructure portfolio and results in inappropriately located schools being unnecessarily exposed to natural hazards. There does not appear to be any planning regulations or approval process in Indonesia.

In the design phase, model school designs are used in Indonesia and Mongolia. However, in Indonesia, the variation of skills and materials across thousands of islands makes it challenging to adapt model school designs appropriately. Conversely in Tonga, the lack of model school designs requires communities, who may lack technical skills, to produce hazard resistant designs.

Lack of capacity in the approvals process is also a recurring theme. For example, in Samoa there were only five inspectors to review 500 building permits in 2015. In Tonga this is being addressed by the formation of the National Spatial Planning Authority Office specifically to review and issue building permits.

The procurement process typically involves the Ministry of Finance, particularly for larger schools. The value of pre-qualified contractors is clearly evident in Mongolia. Similarly, in Samoa, the black listing of contractors based on performance may improve procurement. In contrast, the award of contracts based on the lowest bidder with no concern for quality or technical capacity is a concern in Mongolia. In decentralized systems or with smaller contracts, e.g. Armenia, school committees or local communities are frequently responsible for procurement and construction management which is a role they often have little experience of.

Capacity in the construction phase varies widely across these case study countries. The lack of accreditation in Armenia has allowed an influx of low skilled contractors into the industry and there is a particular knowledge gap in terms of seismic detailing. Samoa has good technical capability but the number of professionally qualified engineers is limited and currently bolstered by foreign expertise, mostly from New Zealand. Retrofitting existing schools is a technically complex process which many building professionals are not trained in by default.

Construction oversight and quality control are systemic issues, especially in decentralized systems like Armenia and Indonesia where the capacity to conduct site inspections is inherently limited. The capacity of the public sector to provide oversight is a recurring challenge in all of these case study countries and the private sector may have s role to support this. The involvement of private sector consultants is common in Mongolia but only occasional in Samoa. However, independent accreditation of these professionals and the regulatory mandate to involve them is a common challenge. Geography is also a unique challenge in island nations like Indonesia, Samoa and Tonga where the logistics of accessing the territory can be time consuming and expensive.

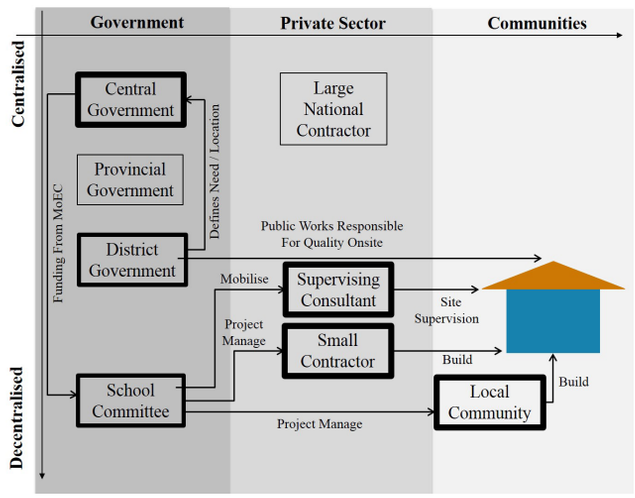

Figure 2. Stakeholder map of central funding stream for Indonesia

CHALLENGES & OPPORTUNITIES

Reaching safer schools at scale through centralized or decentralized systems

A key challenge illustrated through these case study countries is the navigation of either centralised or decentralised systems of governance. Centralized systems, e.g. UB City, Samoa and Tonga, tend to have clear roles and responsibilities which allows for successful coordination and prioritization. However, the inability to provide adequate public sector capacity for oversight and quality control nationwide is a concern. Conversely decentralized systems, e.g. Armenia and Indonesia, tend to have overlapping or fragmented roles and responsibilities which can lead to a lack of coordination and responsibility. However, local stakeholders struggle to provide the technical capabilities at the community level.

The presence of non-state stakeholders in the funding and procurement of off budget or private schools is a challenge for several national governments. The influx of such stakeholders in Mongolia was a direct response to economic decline but has resulted in a variety of typologies and standards which are more challenging to manage at the national level. Conversely, in Tonga, the Latter Day Saints schools are widely considered to be better than the norm.

Institutional transition is a challenge in several countries. Particularly in Mongolia and Armenia, the collapse of the Soviet Union in 1991 and subsequent withdrawal of support prompted the collapse of the Mongolian economy and government institutions. The re-building of institutional capacity is a work in progress. The planning process for buildings in Tonga is presently in a state of transition which creates uncertainty around the selection of schools and the approvals process.

OUTCOMES

Strategic capacity and capability development

The development of site selection and planning guidance would benefit most of these case study countries. This guidance should include hazard information, site conditions, and building configuration, and could reduce the exposure of new school infrastructure to hazards, as well as assessing retrofitting options for existing schools. These should be supplemented with illustrated training for planners.

The potential role of private sector consultants in the design and oversight stages is evident across all these case study countries. However, focused training on seismic detailing and retrofitting would improve their capability to adequately provide these services. Moreover, independent accreditation would bolster the reliability of these services.

Training the construction industry in retrofitting techniques would be of benefit across all these case study countries. This could include assessment methodologies, design guidelines and workman training in construction detailing. Given the scale of construction required, retrofitting techniques need to be broadly promoted and adopted in order to expand the capacity and improve the capability of the construction industry.

Learning

- Centralized systems need greater capacity to successfully oversee implementation nationwide. Decentralized systems need improved capabilities at the local level to successfully implement.
- Site selection and planning should be considered an integral part of the implementation process and must consider multi-hazard assessments.
- It is important to triangulate input information from different sources to support an evidence based analysis which does not rely on opinion of single source.
- Mapping out stakeholder roles, responsibilities and reporting lines graphically is a useful way to communicate key findings back to stakeholders for confirmation.

Find out more

Read:
Guidance Notes on Safer School Construction, GFDRR: https://goo.gl/3KH8Xx

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