Strategic Resource Identification and Prioritization Methodology for Nation Reconstruction

By

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Abstract

The military as an agent of the nation will continue to grapple with the burden of nation reconstruction and capacity development for the foreseeable future. The military has performed this role throughout history—ensuring the safety and security of the local populace, assisting with reconstruction, and providing basic sustenance and public services. Military forces will continue to support the civilian agencies charged with leading these complex endeavors and play a vital role in nation reconstruction and capacity development in both pre and post conflict environments. The Strategic Resource Identification and Prioritization (SRIP) methodology is a systems approach to indentifying how and what resources should be utilized in identifying and closing the gaps between current and target levels of service or capacity. Though mainly developed for the Army's Commander's Emergency Response Program (CERP), the methodology has been demonstrated in Afghanistan as a structured way to prioritize projects for nation building and capacity development. SRIP methodology is a systems approach to indentifying how and what resources should be utilized in identifying and closing the gaps between current and target levels of service or capacity.

Keywords: Strategic assessment, value focused thinking, nation reconstruction, systems process, capacity development, multi-objective value analysis

Introduction

The military as an agent of the nation will continue to grapple with the burden of nation reconstruction (NR) and capacity development (CD) for the foreseeable future. This function is not new. In support of civilian agencies, the military has performed this role throughout history--ensuring the safety and security of the local populace, assisting with reconstruction, and providing basic sustenance and public services.

For our purposes we define NR as the reconstitution of a state's physical and organizational infrastructure. NR implies that a functioning state existed prior to its current form, whether through war or economic collapse. CD is the process of increasing a state's governmental, economic (to include infrastructure), and security personnel systems to the point where the state is prosperous, safe, and fully sovereign entity. NR and CD are not mutually exclusive- good practices combine the merits of both endeavors.

The ability to exploit traditional military gains in the form of NR and CD has increased dramatically within the past two decades as prolonged conflicts continue to challenge military leaders.

The greatest threats to our national security will not come from emerging ambitious states but from nations unable or unwilling to meet the basic needs and aspirations of their people. Here, the margin of victory will be measured in far different terms from the wars of our past. However, time may be the ultimate arbiter of success: time to bring safety and security to an embattled populace; time to provide for the essential, immediate humanitarian needs of the people; time to restore basic public order and a semblance of normalcy to life; and time to rebuild the institutions of government and market economy that provide the foundations for enduring peace and stability.

- Department of the Army, 2008

Yet, in spite of current operations and stated future expectations, soldiers at all levels are often not trained in NR and CD, complex interagency challenges, or the holistic approach needed to develop projects that are sustainable and support the shared developmental goals. Moreover, the critical piece of identifying high-impact projects is largely unstructured at the tactical level (the level of command where execution actually takes place). This paper presents a structured methodology in developing NR and CD projects/portfolios irrespective of the operational environment or echelon of command.

Given the greater demand by the US and international communities for improved results from assistance funds, the US Government must become more efficient and accountable in planning and executing its projects and programs. We will define projects and programs as US funded, non-military development operations. The guidelines we present establish priorities for US assistance programs.

As with any system, there is a life cycle to any NR or CD campaign- they do not go on indefinitely. While NR and CD cannot be performed in a simple sequential manner, the life cycle presented in Exhibit 1 highlights those functions that become the most important as a NR or CD campaign progresses. These functions build upon each, never forgotten or abandoned, rather resourced differently throughout the life cycle. The exact time periods associated with *Immediately, Short, Mid* and *Long* terms remain open to commanders, subject to the current state of the operational environment. From the US military's perspective, Iraq could be considered to be in the *Long Term* phase of the life cycle. Security and governmental functions are being transferred to Iraqi authorities, while enduring partnerships continue to be refined. Military forces in Iraq continue to promote economic development and the ability to govern, but in a supporting role vice executing role.

Naturally, as resourcing increases and decreases throughout a life cycle inevitable conflict arises- often in the form of competition amongst the numerous stakeholders in a NR or CD campaign. The diverse set of stakeholders aligned with NR or CD projects is displayed in Exhibit 2. This figure represents these stakeholders from the perspective of military forces. This exhibit is not intended to establish the importance of each stakeholder, rather align these players in broad categories; thus helping to understand the complexity of interagency collaborations.

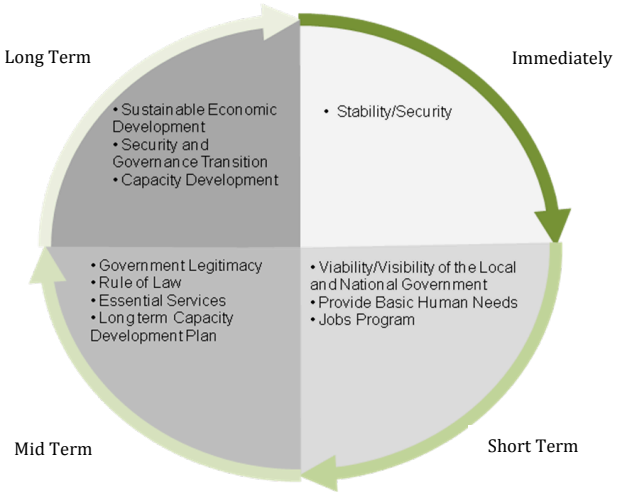

Exhibit 1. Life cycle perspective on how investment should be made in products, services, and capacity to support reconstruction activities

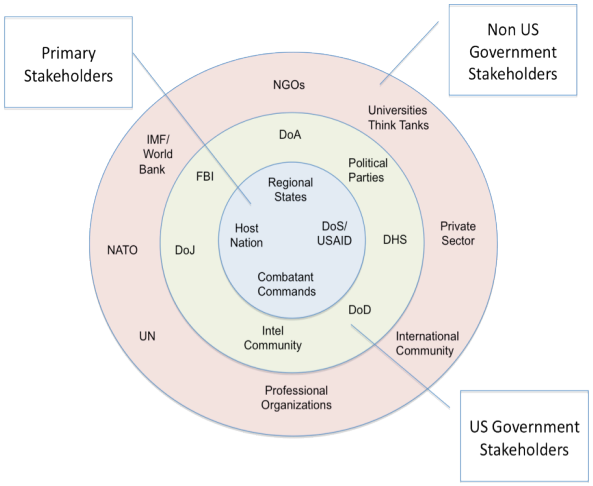

Exhibit 2. Government, non-government, and primary stakeholders involved in the execution of NR and CD projects (modified from the Department of the Army, 2009)

Strategic Resource Identification and Prioritization Methodology

While Exhibits 1 and 2 demonstrate competing objectives amongst a diverse set of stakeholders, , Exhibit 3 endeavors to systematically identify gaps, align goals, and allocate resources in the execution of a NR / CD plan. The Strategic

Resource Identification and Prioritization (SRIP) methodology is a typical systems engineering development process model. Often called the Vee or V model it is used as a systems development model designed to simplify the understanding of the complexity of developing systems such as the processes associated with "defining the need" and "implementing a solution" for NR and CD. We adapted the V representation for our problem because the NR and CD investment problems are complex systems requiring stakeholder analysis, development of alternatives, analysis of alternatives, implementation, and assessment. The V model allows a structured process for developing solutions to the resource allocation problems. This process is the key element of our methodology.

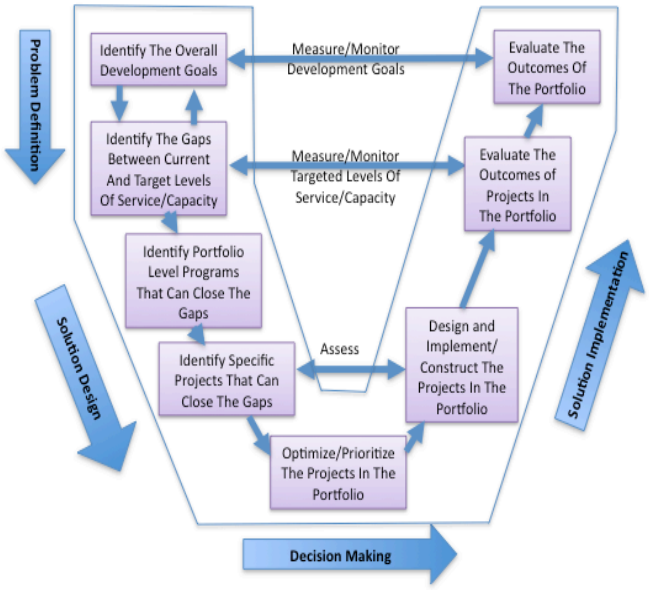

Exhibit 3. Strategic Resource Identification and Prioritization (SRIP) methodology

For this paper we focused on the "Optimize/Prioritize the Projects in the Portfolio" step in the SRIP. Much work is needed in problem definition phase of the SRIP. Research is currently underway to develop a quantifiable and defensible methodology to identify gaps between the current and target levels of service and capacity that align with the overall development goals.

Current Project Identification / Optimization Techniques and Guidelines

An example of current practices can be found in *Money as a Weapon System Afghanistan, USFOR-A (United States Forces- Afghanistan) Pub 1-06, CERP* (Commander's Emergency Response Program) *SOP, December 2009*. This publication primarily serves as a "*How to"* manual for the use of CERP - the primary means by which the US military finances NR and CD projects in a deployed environment. Pub 1-06 states that:

Commanders will coordinate with GIRoA (Government of the Islamic Republic of Afghanistan) agencies, civil affairs (CA) elements, engineers, Provincial Development Committees (PDCs) and/or Provincial Reconstruction Teams (PRTs) to gain the greatest effect while meeting the urgent humanitarian and reconstruction needs of the Afghan people.

- USFOR-A Pub 1-06, page 26

At first glance this is a daunting task- and it is. In military jargon, *commanders* imply those responsible from battalion-equivalent through coalition levels. The decree gives a sampling of potential stakeholders- GIRoA agencies, CA elements, engineers, and PRTs. It indirectly alludes to potential trade-offs, high pay-off versus humanitarian and reconstruction needs. Yet, the most non-descript declaration is "to gain the greatest effect". How do we do this? What affects do we desire? How do we measure success? What if the campaign shifts focus?

This problem is precisely what we intend to address throughout the remainder of this paper. Achieving the "greatest effects" becomes an optimization problem because we deal with constrained resources in any NR or CD campaign. Additionally, we must define of which these effects (objectives) consist. We must outline means upon which to measure these objectives (value measures). We must be able to present defendable courses of action (portfolios of projects). And finally, we must be able adjust our findings if desires change (sensitivity analysis).

Services and Capacity Development Resource Prioritization Methodology

"The purpose of war is to build a better peace"
- Saint Augustine

We chose multi-objective value analysis process, which ranks alternatives to assist in selection of the preferred alternative, for our "Optimize/Prioritize the Projects in the Portfolio" step in the SRIP. Specifically, it is useful in enhancing decision making for allocation of resources and solidifying support for a particular portfolio of projects. Using the objectives we obtain from a review of the various stakeholders, literature, etc., resource prioritization based upon this methodology is well suited to portfolio prioritization and/or optimization. The model will help to identify an appropriate mix of projects at this level, to maximize overall value.

It is important to first identify what is meant by the term "portfolio". A portfolio or mix of post-conflict reconstruction projects may be viewed at two levels. At the upper level the portfolio is a compellation of projects that target various lines of effort originating from a campaign, vision, defined objectives or any other means of a centrally focused plan. At the lower level the portfolio is the mix of projects from each of the stakeholders involved in the post-conflict reconstruction effort. A representative sample of the agencies or stakeholders, with their own portfolio of projects for a post-conflict country, includes the Department of Defense (DoD), Nongovernmental Organizations (NGOs), United States Agency for International Development (USAID), the World Bank, International Organizations, Commanders Emergency Response Program (CERP), etc.

The multi-objective value analysis process begins with a value hierarchy that systematically breaks down a system (or problem) into primary functions, associated objectives, and value measures (quantitative means to "score" competing alternatives). The core outcomes or functions are broken down into central tasks, and the central tasks identified can be further broken down into evaluation criteria in the value hierarchy model. The evaluation criteria presented here are representative critical tasks that may be performed during NR or CD operations. Their scope is not meant to be specific, as the execution of each task is situationally dependent.

As the evaluation criteria are dependent upon the specific situation and unique environment, they are not presently assigned local weights in the value hierarchy model. It is not predetermined which, if any, of these evaluation criteria will be a factor so they cannot be assigned "constant" local weights in the model. Appropriate evaluation criteria and local weights will need to be determined, based on current information and decision-maker input, when applying the model.

A swing weight matrix (see Parnell and Trainor, 2009) is used to assign weights based upon the importance and variation (range) of the value measure to the decision makers and stakeholders. The definition of importance and variation is different for each decision and requires focused thinking. The task is similar to defining two constructed scales. Variation may be easier to discuss as the "impact of the value measure range on the decision".

Multiple measures can be placed in the same cell with same or different weights. Again, the value hierarchy described previously does not depict constant local weights for the evaluation measures because these measures may not always be appropriate for the specific situation and environment. In addition, some information may not be available or does not currently exist, so this must be taken into account when determining appropriate measures. For example, local agencies may not openly share information regarding productivity, or there may not be a method in place to measure the unemployment rate in a particular rural area. Appropriate evaluation measures and local weights will need to be determined, based on current information, when using the model. Often in data-starved cases, subjective evaluation measures may need to be developed; in these cases the use of subject matter expert opinion is likely the best option.

Multi-objective value analysis (Kirkwood, 1997) uses an overall value function which combines the multiple evaluation measures into a single "value total" of each alternative, which is merely a combination (read portfolio) of projects. Thus, different mixes of projects in a portfolio may be compared to determine the appropriate mix for maximizing value. Multi-objective value analysis is useful for structuring the judgments used in

assessing the value of projects that comprise a reconstruction portfolio in an organization with multiple and conflicting objectives. Multi-objective value analysis methods are based upon structured objectives, evaluation measures, value functions, and weights.

The overall value function has the form

$$\text{Portfolio Score} = \sum_{n=1}^{N} \omega_a \omega_b \omega_c \omega_d V(x_n)$$

where N = the number of projects in the portfolio, ω_a= the core outcome local weight, ω_b = the central task local weight, ω_c= the evaluation criterion local weight, ω_d = the evaluation measure local weight, and $V(X_n)$ = the value or score assigned to project x from all n evaluation measures.

While an individual project may be originally drafted to focus on one specific evaluation measure, this same project can have secondary or unplanned effects on another unrelated evaluation measure. For example, providing generator power to neighborhoods in Baghdad may increase power output (possible value measure). Yet, once in place criminal elements may gain control of these generators and subsequently exhort money from the same neighborhood. This project thereby increases criminal activity (another possible value measure). The overall value function allows for scoring this possibility.

In the value function above, ω_a and ω_b are predetermined using the values from the weighted scoring models for each environment. Decision makers maintain the flexibility to manipulate the function to fit the current situation by reassessing ω_c and ω_d, the evaluation criterion and evaluation measure local weights. Often this may come to pass as a campaign moves along in its life cycle.

When ω_c and ω_d have been determined for the current situation, the model can be used to find the right mix of projects to maximize value or support a combination of core outcomes within a fixed budget portfolio. This is where the model can show how to maximize overall value. Simply, the mix of projects with the highest overall score adds the most value. We can therefore view projects as a function of cost, labor hours, or some other variable to make logical and defensible decisions.

When using multi-objective value analysis a structured approach is taken to develop the weights, objectives and functions. In our Afghanistan example we present objectives and functions based upon a detailed study conducted by the primary stakeholders utilizing subject matter experts (SMEs) along with a comprehensive literature review. We then conducted a workshop using SMEs to develop the weights. This Afghanistan example provides a realistic model to demonstrate the utility of this structured approach. Ultimately this top down approach outputs a defensible, detailed solution set for the allocation of resources.

A structured decision process involving funding agencies and local governments should be used to develop objectives and functions. One such methodology is Value Focused Thinking (Keeney, 1992). Once these objectives have been developed, the task of developing values measures and subsequently assigning weights can begin. Some type of quantifiable method in obtaining needs, wants and desires from stakeholders at all levels must be conducted (focus groups, interviews, surveys, research). In general, there is often very little disagreement on objectives and functions, and even on how to quantify the value measures. However, during the critical step of assigning importance (weight) to each value measure is when stakeholder *desires* must be reflected. This is often not as straight-forward and can prove to be contentious. For example, one group of stakeholders might place a high value upon security. Whereas another group of stakeholders, such as the local populous, may place a higher weight on meeting basic needs. Stakeholder buy-in is critical with all parties agreeing to the framework. Sensitivity analysis can play a key role here to show how varying the weights over different ranges can have little or major impact on the objective function. Those value weights that have minor impact on the ultimate decision, discovered during sensitivity analysis, could be increased to placate disparaged stakeholders (a political move that would not pollute the engineered, optimized solution set).

The model's primary use is in a multi-objective value analysis process, which ranks alternatives to assist in selection of the preferred solution set. Specifically, it is useful in enhancing decision making for allocation of resources and solidifying support for a particular portfolio of projects. Using the objectives we obtained from a review of

the various DoD, Department of State (DoS), multinational military peacekeeping force, etc., our resource prioritization methodology is well suited to portfolio prioritization and/or optimization. This model seeks to identify an appropriate mix of projects in order to maximize overall value.

Resource Prioritization in Afghanistan

The high-level function hierarchy that was developed based upon SMEs, stakeholder analysis, and a detailed literature review is shown in Exhibit 4. Note the fundamental objective for our model, and likely most NR/CD projects, is to promote democracy and a self-sustainable nation.

Exhibit 4. Functions used for the Afghanistan recourse prioritization model

The primary functions outlined above, *Establish Security and Stability*, *Promote Good Governance*, and *Promote Economic Development* are not intended to be sequential in order of execution. These functions, at times executed in a building block fashion, all must be addressed in order to achieve the fundamental objective of facilitating a democratic and self-sustaining nation. It is best not to get into the chicken vs. egg argument in terms of what function must be done first, rather agree that these are the primary functions that must be addressed. That finding comes from SME input, stakeholder analysis, and further research as discussed in the previous paragraph.

Normally a systems engineer would present a tiered functional hierarchy of the functions presented. For brevity, we will present the shortened value hierarchy for our model. Underneath each of the three primary functions we aligned objectives (derived from stakeholders, literary review, and SMEs)- reference Exhibit 5. One could argue that several of the objectives can be aligned under two or more of the primary functions. For example, does providing health services promote economic development or good governance? For our primary stakeholder, the US Embassy in Afghanistan, this objective aligned better with economic development since this objective was structurally embedded into a branch of the organization that focused on economic development. Instead of wrestling with the primary stakeholder on the placement of this objective, we discovered, subsequently through sensitivity analysis, that moving this objective underneath *Promote Good Governance* would have negligible effects on the outcomes of the model; another example of empowering a stakeholder without violating the integrity of the model.

To expedite the modeling process, we used our objectives as de facto value measures with SME opinion being the unit of measurement for each. We created simple Likert scales for each objective and value measure. The idea being that an evaluating officer from either US Agency for International Development or the DoS could evaluate a project across each value measure using a simple 5 point scale. The results of their evaluations could be easily translated into linear value scores. At this point it is necessary to obtain levels of importance from all concerned parties. As previously discussed, this is often a difficult process and one that must be later subjected to one-way sensitivity analysis.

Once the levels of importance and variation (discussed later) are defined, all the value measures are placed in the cells. In some instances we can assign weights at different levels in value hierarchy. Ideally this should be done solely at the value level below the objectives- allowing the stakeholders to debate one set of weightings. Yet, in order to capture importance across the primary functions (much like a progressing campaign plan) we allowed for weightings across the entire value hierarchy. One measure is assigned an arbitrary un-normalized weight (e.g., 100). The highest or lowest weighted cells are the best place to start. Any swing weight technique can be used, e.g. balance beam or value increment to assess the remaining weights. Global swing weights are obtained by normalizing the weights as shown below.

$$w_i = \frac{f_i}{\sum_{i=1}^{n} f_i}$$

Where w_i = un-normalized matrix swing weight corresponding to value measure i.

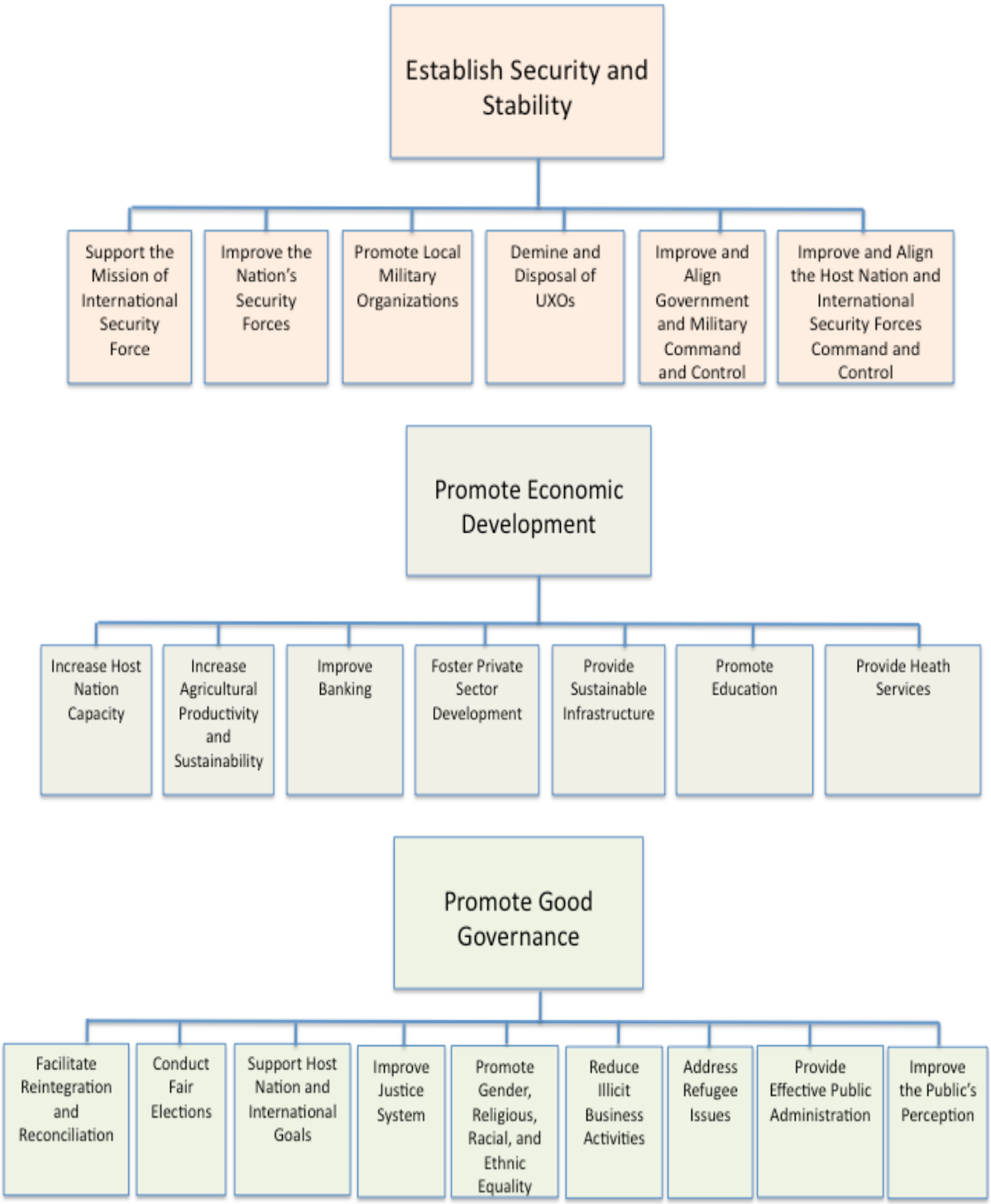

Exhibit 5. Function and objectives/ value measures used for the Afghanistan recourse prioritization model

The assessment of importance and variation will be different for each decision and requires hard thinking. Our weighting assessment was compiled using a Swing Weight Matrix, as shown in Exhibit 6. The task is similar to defining two constructed scales. Variation may be easier to discuss as the "impact of the value measure range on the decision."

		Importance of the Value Measure to the Decision Makers and Stakeholders		
		High	***Medium***	***Low***
Variation in Measure Ranges	***High***	• Improve the Nation's Security Forces • Conduct Fair Elections • Improve the Public's Perception • Increase Host Nation Capacity • Foster Private Sector Development • Provide Sustainable Infrastructure • Promote Education	• Support the Host Nation and International Goals • Facilitate Reintegration and Reconciliation • Improve the Justice System	• Reduce Illicit Business Activities
	Medium	• Improve and Align the Host Nation and International Security Forces Command and Control • Improve and Align the Government and Military Command and Control • Promote Gender, Racial, Religious, and Ethnic Equality • Provide Effective Public Administration • Provide Heath Services	• Support the Mission of the International Security Force	• Promote Local Military Organizations
	Low	• Increase Agricultural Productivity and Sustainability • Improve Banking		• Demine and Dispose of UXOs • Address Refugee Issues

Exhibit 6. Swing weight matrix for the Afghanistan resource prioritization model

One of the most important plots from this type of analysis is a Cost versus Value Plot as shown in Exhibit 7. Here we are highlighting the amount of bang versus buck amongst our 10 portfolios. Since all the variables are linked throughout the workbook, as weightings and scorings may change, the resulting plot is automatically adjusted in Excel.

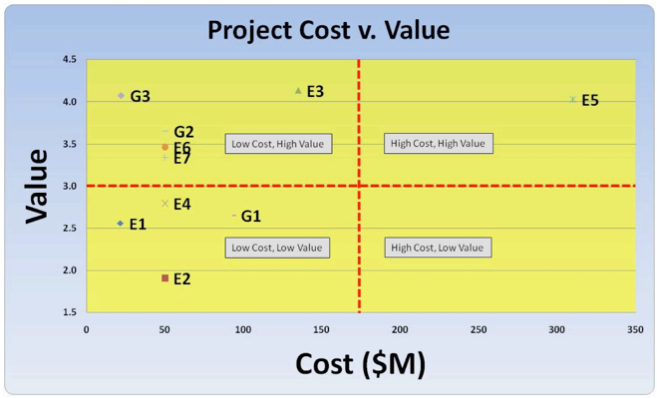

Exhibit 7. Cost versus value for portfolio of projects for the Afghanistan problem

Research Needed in Support of SRIP

Much research has been conducted in support of portfolio optimization and prioritization. Research has been conducted using agent based modeling, data envelopment analysis (Farr and Parnell, 2000), various forms of value hierarchy and scoring (Carroll, et al., 2008), etc. However the biggest research challenges involve developing development goals both at the local and strategic levels. Probably the most utilized tool is the DoS's Interagency Conflict Assessment Framework (ICAF). ICAF involves four steps consisting of

1. Evaluate the context of the conflict,
2. Understand core grievances and social/institutional resilience,
3. Identify drivers of conflict and mitigating factors, and
4. Describe opportunities for increasing or decreasing conflict.

The process mainly consists of interviews and SMEs. However, a more quantifiable and thus defensible scoring schema is needed.

As a follow on to the resource prioritization methodology, a more quantifiable and defensible methodology is being developed, using the four steps of the ICAF as the starting point.

Conclusions

Any methodology to develop projects and capacity as part of a stability and reconstruction (S&R) operations involves many stakeholders with complex short and long term investment decisions. In this paper we have presented a methodology to prioritize projects and assess their value. The model contained herein is functional to demonstrate the methodology but certainly is in need of further development to include

- Validation of the weights and scoring schema,
- Visual basic programming to make the model more user friendly, and
- Being used in an actual problem to validate its utility and to develop recommendations for improvement.

The SRIP methodology is a first step at developing a comprehensive methodology (i.e., systems approach) for prioritizing and optimizing project portfolios.

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