Citizens' Charter Afghanistan Project Returns and Cost Comparisons

Afghanistan Reconstruction Trust Fund
Third Party Monitoring - Supervisory Agent

Management Systems International

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This paper was prepared by MSI staff to contribute to the discussion and understanding of the important development challenges facing policymakers and practitioners.

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Executive Summary

The World Bank seeks to evaluate the returns on completed development subprojects funded under the Citizens' Charter Afghanistan Project (CCAP), during calendar years 2018 and 2019. Subprojects covered six types: rural bore wells, rural small-scale irrigation, urban potable water network extensions, urban and rural road rehabilitation, rural solar mini grids, and urban power network extensions. Data was collected by MSI engineers through direct observation of project utilization and surveys of project beneficiaries in November 2019. Detailed assumptions of benefits accrued from each project type and ongoing cost calculations are presented along total project initial costs obtained from Bills of Quantity (BoQs) and used to calculate Economic internal rate of return (EIRR). The EIRR is used to calculate the net value of each subproject studied.

CCAP subprojects are found to be economically viable, with few exceptions. Rural tertiary roads have the lowest average EIRR at 19%, well above the 6% comparative social discount rate. The highest EIRR is with rural small-scale irrigation projects (239%). Cost comparisons are performed against subprojects of similar types in the same district, where data is available. Project component unit costs are found to vary across districts but are often lower when compared to subprojects of the same type and location funded by non-ARTF sources.

The costs of urban road subprojects raise a significant concern regarding cost accounting and data reporting. The reported total subproject costs in BoQs provided by the IDLG project team are often identical for different subprojects within a province, despite the projects having largely different scopes, demonstrated by the number of kilometers built. Subprojects in the same province should have relatively similar unit costs. That these subprojects cost the exact same amount, regardless of the amount of road built, suggests that the costs were not accurately reported, or that costs may have been incurred, paid by ARTF, to reach a pre-determined spending goal. The exact cause is not clear, as there is insufficient time and resources to fully investigate the cause. It should be noted that each subproject with identical costs are in urban centers in Balkh, Kandahar, and Nangarhar provinces.

Table E1 presents summative reporting across subproject types for urban and rural subprojects in this study.

Table E1: Summarized Report Findings by Subproject type and Urban/Rural Location

Rural - MRRD

Subproject Type	Number of Subprojects	Average of EIRR	Average of % Cost of Non-CCAP Subproject	Technical Quality (out of max 5 scale)
Rural - MRRD				
Bore Well	27	54%	NCDA	3.59
Irrigation	19	239%	NCDA	3.64
Roads	3	19%	NCDA	3.7
Grand Total	**49**	**104%**	**NCDA**	**3.64**

NCDA = No Comparison Data Available

Urban - IDLG

Subproject Type	Number of Subprojects	Average of EIRR	Average of % Cost of Non-CCAP Subproject	Technical Quality
Urban - IDLG				
Roads	11	169%	110%	3.44
Grand Total	**11**	**169%**	**110%**	**3.44**

I. Introduction

World Bank, in cooperation with the Afghanistan Ministry of Rural Rehabilitation and Development (MRRD) and Independent Directorate of Local Governance (IDLG) funded a series of community driven development subprojects as a part of the Citizens' Charter Afghanistan Project (CCAP). These subprojects focus on improving access to minimum services such as potable water, roads, and electricity. The World Bank requested MSI to measure the benefits of these subprojects with the aim of evaluating their returns. Specifically, the World Bank requested an economic internal rate of return (EIRR) analysis for each subproject type and a comparative cost analysis. EIRR is a useful tool for examining returns on investment over time, using real data to calculate the interest rate at which a project's costs and benefits are equal when discounted over the project's anticipated lifetime. This may be compared to a discount rate, which shows what a country might reasonably expect from other investments, given the country's growth rate. Following direction from the World Bank, the discount rate here is assumed to be 6%, given Afghanistan's relatively low expected growth over the next five years. By using cost data obtained from the Afghan government and beneficiary data from surveys and direct observation, this report seeks to examine the returns on investment for each project type.

II. Data Collection

MSI quality assurance engineers collected primary data through beneficiary interviews, subproject observation and utilization at each subproject site. CDC office bearers were interviewed to understand the number of households benefiting from the subproject and beneficiaries observed to measure subproject utilization. For example, A local community member was hired to count the number of cars using the road while the engineer completed the subproject construction inspection. The same process was used to record the number of hourly, bore well users. Material unit rates were recorded from local markets on the day following the site visit to have the most recent, localized material cost data for each subproject. MSI engineers were accompanied by CCAP provincial engineers at each site selected for this research.

Subproject sampling frames included only subprojects classified as "completed" in the CCAP management information system (MIS) as of October 17, 2019. Subprojects were randomly selected from this sampling frame and both beneficiary interviews and utilization observations were completed at each site. The bore well subproject sampling frame was created using MRRD MIS subproject classifications including: shallow well digging, percussion tube shallow well boring and deepening, rotary tube well boring and deepening and underground water reservoir construction. The Irrigation subproject sampling frame included the following MIS classifications; canal rehabilitation, gabion wall construction, pipe scheme and protection wall construction. The tables below, present the total completed and selected subprojects by sector from both MRRD and IDLG sections in the CCAP MIS as of October 25, 2019.

Table E2. Sampling Frame and Selected Rural Subprojects

Rural Subproject Type	Number of Completed Subprojects	Number of Selected Subprojects
Bore Well	496	27
Irrigation	421	19
Tertiary Roads	16	3
Grand Total	**933**	**49**

Table E3. Sampling Frame and Selected Urban Subprojects

Urban Subproject Type	Number of Completed Subprojects	Number of Selected Subprojects
Primary Roads	53	11
Grand Total	**53**	**11**

Secondary data was reviewed from both CCAP subproject BoQs and similar subproject BoQs for subprojects funded by non-ARTF sources in the same districts where available. All similar subproject BoQs were acquired from MRRD and IDLG project teams through respective line ministries. Urban road subproject BoQs funded by UN Habitat were provided by the IDLG engineering department. The MRRD engineering department collected similar project BoQs from the Regional Programs Coordination Office funded by the Asian Development Bank and the Water Supply and Sanitation program funded by UNICEF. Non-comparable subproject BoQs and BoQs received after data collection, limit the possibility for more detailed cost comparisons.

III. Limitations

Data collection for this study was limited to one month (November 2019) with no follow-up opportunities due to the end of the ARTF II TPM contract. MSI attempted to acquire comparable BoQs from MRRD and IDLG colleagues in October of 2019 but were unable to obtain the necessary documentation prior to the start of data collection in November. The lack of comparable BoQs prior to site selection means that the data collected offers only valid comparisons between similar subprojects, completed in the same districts for comparable construction components by unit cost.

When BoQs were received form the ministry project teams in November, many BoQs were for similar sector subprojects such as irrigation but different subprojects types. One example of non-comparable BoQs is of a Gabion wall constructed by a donor other than the World Bank which cannot be compared to the irrigation Canal constructed under CCAP in the same district.

Field instruments were designed, and teams trained during the final two weeks of October in order to complete data collection before the end of the contract. This expeditious approach caused certain data to be missed during field work, limiting some of the EIRR calculations to time savings. Subprojects where data were unsuccessfully collected or deemed, “unreliable” are presented for each subproject in section IV Cost and Benefit Data and Assumptions.

Additional project types were examined as part of the contract: urban power grid extensions, rural solar mini grids, and urban potable water supply network extensions. In each case, proper data quantifying recipient benefits could not be collected in the time allotted for the contract. This is not to say that such subprojects are without benefit, however, merely that information which allows those benefits to be put in numerical terms could not be collected. From beneficiary surveys, electrification grants the ability to purchase and use devices like home appliances to save time on daily necessary activities, televisions to inform and entertain, and mobile phones to ease long-distance communication. Increasing the availability of potable water chiefly benefits the population by reducing the prevalence of water-borne diarrheal diseases, which lowers mortality among children, as well as improves productivity in adults, as fewer sick days are necessary. These initial benefits may also incur long-term secondary effects, such as greater ability for higher education gained with increased leisure time, which could not be measured within the contract's scope, but will likely have substantial positive impacts on the country.

IV. Cost and Benefit Data and Assumptions

Initial costs are a straightforward matter: Bills of Quantity (BoQs) are kept by MRRD and IDLG detailing materials, resources, and costs per subproject. Benefits are more difficult to ascertain. Rural development subprojects may lead to returns that are often non-monetary, such as time regained that may be used for other activities, or returns that may not manifest for many years, such as those from better education. In some instances, in-depth research on those benefits has been conducted that may be cited and used as the basis for current projects. In the absence of prior research, direct observations from beneficiaries may be used to estimate benefits. Long term benefits are especially difficult to estimate, particularly given available data, however the non-monetary benefits may be estimated with certain assumptions, like placing a monetary value on time saved. This is appropriate insofar as respondents spoke frequently of the time CCAP projects saved them. As such, the additional time gained by respondents can be used to measure benefits accrued from each subproject.

The question of how much to value time is central to this analysis. Afghanistan has a relatively high unemployment rate, 8.8% in 2018 and 2017. [1] Ground observations indicate education is relatively limited in rural areas of the country, with instruction often occurring in informal settings. Therefore, in the absence of detailed professional background data for the beneficiary population, it is reasonable to assume that the next best option to leisure is work as unskilled labor. Each project has a listed daily rate paid to unskilled labor in the BoQ, and that is used as the benefit price of time saved. While each project may have additional benefits for which there are data, this report attempts to keep these benefits to those associated with time savings, where possible, to keep the reporting metrics as uniform as possible.

Other global assumptions are necessary for calculations:

a. Work days last eight hours.
b. Daily activities occur during daylight hours, twelve on average.
c. Human walking speed is 5 kilometers/hour.
d. The exchange rate of USD to AFN is 0.013 USD / 1 AFN, taken 12 DEC 2019.
e. All trips are considered round trips.

Bore wells

Benefits are estimated by taking the reported distance to the next nearest source of potable water, often a river, and calculating the time spent on each trip made to the next best source to get average time spent per trip. Daily wages are averaged to hourly and multiplied to produce the monetary cost of each trip. This is then multiplied by the number of people using the well on average per hour, and then extrapolated to annual usage.

DIST = Distance to next nearest potable water source
WAGE = Daily reported unskilled labor rate from BoQ (AFN)
DRAWS = Average number of people drawing water from the bore well per hour

$$Bore\ Well\ Benefit = \frac{2 * DIST}{5\ km/h} * \frac{WAGE}{8\ hours} * DRAWS * 8\frac{hours}{day} * 365\frac{days}{year}$$

Roads

Beneficiary surveys included the amount of time saved on average per user, per week for each subproject. Observation of the roads provided data on the average number of users of the road each hour. Some beneficiaries did not include a project life due to low maintenance needs of the road. In such instances, a maximum project life of twenty years was assumed. Benefits were calculated by taking the average number of users observed per hour, diving by two for round trips, extrapolating use to twelve hours of daylight, multiplying by the number of hours saved, and extrapolating to annual savings. Primary data collected on site to assess new businesses developed along the road and increased value of goods sold at market were unreliable and inconsistently completed with many respondents not responding to these questions and are excluded from findings presented in section VI.

USERS = Users observed on the road per hour on average
WAGE = Daily reported unskilled labor rate from BoQ (AFN)
HOURS = Weekly hours reported saved per user

$$Road\ Benefit = \frac{USERS}{2\ trips} * 12\frac{hours}{day} * \frac{WAGE}{8\ hours} * HOURS * 52\frac{weeks}{year}$$

Small Scale Irrigation Canals

Beneficiary surveys included the amount of time saved on average per household, per day for each subproject, and the number of households benefitting from the construction of the canal. One wage earner is assumed per household. Benefits were calculated by taking the number of households benefitting, multiplying by the hourly unskilled wage, multiplying by the average reported number of hours saved, and extrapolating to annual savings. While additional savings may accrue over time from increased crop yields, insufficient time has passed since project completion to allow for data collection after complete growing seasons.

HHS = Households reported benefiting from the canal
WAGE = Daily reported unskilled labor rate from BoQ (AFN)
HOURS = Daily hours reported saved per user

$$Irrigation\ Benefit = HHS * HOURS * \frac{WAGE}{8\ hours} * 365\frac{days}{year}$$

V. Operation and Maintenance (O&M) Costs

A key component of this analysis is to look at net benefits for each project type. Annual benefits are weighed against ongoing maintenance costs as well as initial construction costs. The BoQs provided by MRRD include detailed construction costs, but available data did not include explicit O&M costs available within the research timeframe. However, previous field work discovered that households contribute between ten and twenty AFN per month as able for maintenance costs on a given project. For ongoing O&M estimates, an average 15 AFN/HH/month is used. For small scale irrigation, the number of households is included as part of the data collection.

$$O\&M\ Costs = Households * 15\ AFN * 12\ months$$

For projects in which the number of households were not included as part of collection, the following methods were used to estimate the number of households in each project:

Road construction

Data collection observation included the numbers of users of the road per hour. This report assumes one distinct household is represented per trip, and that all trips are round trips.

$$Road\ Households\ = \frac{USERS}{2\ trips} * \ 12\ average\ hours\ daylight$$

Bore wells

Data collection observation includes people drawing water per hour. Assuming three water draws per day per household, and that drawing occurs during daylight hours.

$$Bore\ Well\ Households\ = \frac{DRAWS\ *\ 12\ average\ hours\ daylight}{3\ draws/HH/day}$$

VI. EIRR Results and Cost Comparisons

Net economic benefits are estimated by allocating the total costs as a first-year investment, then applying the difference of annual estimated benefits and estimated annual O&M costs. The IRR() Excel function was used to estimate EIRR over the relevant project timeframes.

Initial total costs are compared against the average costs for the subproject type, differentiated at the provincial level. These come from BoQs from non-CCAP funded projects. The provided BoQs fall into two categories: rural irrigation and urban roads. Bore wells are not examined for cost comparison because no comparable project BoQs were provided by either MRRD or IDLG. The table found in the appendix details the individual project findings for location, EIRR, cost effectiveness, and technical quality.

Rural Bore Wells

Twenty-seven bore wells in rural areas were examined. Three subprojects, CCAP-6575, CCAP-5254, and CCAP-5062, had significantly higher EIRRs, greater than 100%. Six, rural subprojects, CCAP-6133, CCAP-135, CCAP-130, CCAP-136, CCAP-7282, and CCAP-2381, experienced negative EIRR. Five of the six are in the Balkh or Daykundi regions, appendices 1 and 2 present the EIRR, technical quality and grading rubric for each subproject in this research. The Balkh region wells have a combination of high cost and short expected life, as little as three years. Daykundi wells have fewer households served, and so have lower annual benefit relative to initial capital costs. The results from the bore well analyses contain several large outliers, which will bias a simple average, skewing the results upward. Therefore, a set of Olympic statistics are presented below. Olympic statistics remove the top and bottom three observations, to control for outliers and provide a more generalizable set of results.

Table 1: Olympic Summary Statistics, Bore Well EIRRs

Min	-0.1170
Max	0.8654
Range	0.9824
Median	0.2841
Mean	0.3376

Table 2: Olympic Average EIRRs of Bore Wells by Province

Province	Average of EIRR
Baghlan	29%
Balkh	-5%
Daykundi	-8%
Faryab	16%
Kandahar	16%
Kunduz	32%
Laghman	28%
Nimroz	61%
Paktia	52%
Paktika	74%

Rural Irrigation

Nineteen small scale irrigation subprojects were included as a part of this report. Subprojects serving the largest numbers of households experienced the highest EIRRs, including both projects in Samangan (Average EIRR 666%), both in Kandahar (Average EIRR 270%), and one in Kunar (EIRR 883%). Beneficiaries in Samangan also reported slightly higher than average time savings, between 2.5 and 3 hours saved daily because of irrigation. The project in Kunar had the highest number of beneficiary households at 800 reported. Olympic statistics, removing the top and bottom three EIRRs, follow.

Table 3: Olympic Statistics of EIRRs for Rural Small Scale Irrigation Projects

Min	98%
Max	288%
Range	191%
Median	159%
Mean	165%

Table 4: Olympic Average EIRRs by Province for Rural Small-Scale Irrigation Projects

Province	Average of EIRR
Balkh	148%
Kandahar	270%
Khost	159%
Kunar	203%
Laghman	164%
Logar	125%
Paktia	98%
Saripul	115%

For cost comparisons, not all provinces with CCAP-funded irrigation subprojects had comparable non-CCAP-funded subprojects. More importantly, the subprojects, both CCAP and non-CCAP, do not generally have uniform reporting regarding project size and scope: greatly varied amounts of earth are removed in the initial excavation for each subproject, indicating substantial differences across subprojects. This makes a normalized project unit cost difficult to calculate. Therefore, the cost comparison analysis focuses strictly on unit costs for key line items. However, even within provinces where BoQs were provided by the ministry project teams, many subprojects were not comparable due to differing project type: comparing an underground kariz to an aboveground canal, or a protective wall made from boulders to one of poured concrete, is not an apples-to-apples comparison. Only two provinces, Balkh and Sar-i-Pol, contained subprojects of similar type, similar construction, and existing in the same district to allow cost comparison. The following tables show CCAP subproject provincial averages of costs for key construction components, compared to average costs from non-CCAP subprojects of a similar type in the same province. Costs for Balkh are in line with similar subprojects. Costs for Kunar, Nangarhar, and Sar-i-pol are smaller, however the cause is difficult to ascertain: non-CCAP subprojects do not have labor listed separately and may explain reported line-item-level unit cost differences. In Kunar and Sar-i-pol, differences in initial excavation amounts also suggest that subprojects vary greatly in scope, and, since a consistent measurement metric (e.g. canal or wall length) was not reported, further analysis is not possible with available data.

Table 5: CCAP- and Non-CCAP-Funded Rural Small-Scale Irrigation Unit Costs of Key Construction Components for Balkh Province, Khulm District, Averaged at the District Level (AFN)

Balkh Province, Khulm District			
	CCAP Unit Cost	Non-CCAP Unit Cost	CCAP/ Non-CCAP %
Excavation	135	240	56%
Stone Masonry	2803	3127	90%
Pointing	240	142	169%
Shuttering	190	489	39%
PCC	4321	5069	85%
Unskilled Labor	300	N/A	N/A

Table 6: CCAP- and Non-CCAP-Funded Rural Small-Scale Irrigation Unit Costs of Key Construction Components for Sar-i-Pol Province, Center District, Averaged at the District Level (AFN)

Sar-i-Pol Province, Center District			
	CCAP Unit Cost	Non-CCAP Unit Cost	CCAP/ Non-CCAP %
Excavation	175	220	80%
Stone Masonry	3054	2891	106%
Pointing	242	106	228%
Shuttering	300	668	45%
PCC	4973	4943	101%
Unskilled Labor	350	N/A	N/A

Except for pointing, CCAP subprojects are generally less expensive on a unit-cost basis in the Balkh province, but more expensive in Sar-i-Pol. It should be noted that non-CCAP projects do not explicitly separate the cost or amount of labor associated with construction from the materials, which likely attributes to part of the cost difference. However, the exact contribution cannot be calculated from the available data.

Urban and Rural Roads

Fourteen road rehabilitation/construction subprojects were examined for this report, situated in the Balkh, Kandahar, Nangahar, and Nimroz provinces. The costs for these subprojects raise a significant concern regarding cost accounting and data reporting. The reported total subproject costs are often identical for different subprojects within a province, despite the projects having largely different scopes, demonstrated by the number of kilometers built. Subprojects in the same province should have relatively similar unit costs. That these subprojects cost the exact same amount, regardless of the amount of road built, suggests that the costs were not accurately reported, or that costs may have been incurred, paid by ARTF, to reach a pre-determined spending goal. The exact cause is not clear, as there is insufficient time and resources to fully investigate the cause. It should be noted that each subproject with identical costs are located in urban centers in Balkh, Kandahar and Nangarhar provinces, managed by IDLG. MRRD road subprojects do not have costs which follow any noticeable pattern. One rural road subproject worth noting is CCAP-977, implemented by MRRD; this subproject is in Nangahar, where IDLG oversees other road subprojects that show identical costs, but CCAP-977 does not show the same pattern. While these concerns warrant further investigation, they fall outside the scope and constraints of this research.

Table 7: Total Costs and Distances for CCAP-funded Road Subprojects

Subproject ID	Province	Project Agency	Project Total Cost from BoQ (AFN)	Kilometers of Road Built for Project
CCAP-045	Balkh	IDLG	6298000	0.700
CCAP-048	Balkh	IDLG	6298000	1.560
CCAP-059	Balkh	IDLG	6298000	0.360
CCAP-8000	Kandahar	IDLG	4873333	0.600
CCAP-736	Kandahar	IDLG	6253333	3.877
CCAP-737	Kandahar	IDLG	6253333	0.825
CCAP-7990	Kandahar	IDLG	6253333	3.110
CCAP-8047	Kandahar	IDLG	6253333	3.705
CCAP-977	Nangahar	MRRD	1321875	3.000
CCAP-828	Nangahar	IDLG	6253334	0.763
CCAP-831	Nangahar	IDLG	6253334	0.693
CCAP-4550	Nimroz	MRRD	3400000	2.200
CCAP-4640	Nimroz	MRRD	3940000	2.000

In terms of EIRR, two road subprojects in Kandahar implemented by IDLG had EIRR in excess of 200%, CCAP-737 and CCAP-7990. These subprojects also have the highest number of people driving on them in a given hour. This makes sense, given the consistent cost numbers reported above. However, generally, EIRRs are very high, showing a large benefit to roads relative to costs. The following table shows Olympic statistics, removing the top and bottom two observations.

Table 8: Olympic Statistics of EIRRs for Road Rehabilitation subprojects

Min	12%
Max	158%
Range	146%
Median	114%
Mean	92%

Table 9: Olympic Average EIRRs by Province for Road Rehabilitation subprojects

Province	EIRR
Balkh	99%
Kandahar	139%
Nangahar	15%
Nimroz	40%

For cost comparison, out of fifteen CCAP road projects, ten BoQs for comparable projects were provided. Of those ten, several were for non-comparable projects, such as parking lots and solar lamp posts, or were in non-comparable districts. No comparable BoQs were provided for rural projects. For urban projects, UN-Habitat provided three comparable BoQs: one in Jalalabad City (Nangarhar Province) and two in Mazar-e-Sharif (Balkh Province). The project road lengths constructed for both CCAP and non-CCAP subprojects were included either in the BoQs or in collected data. This enables a unit cost analysis of the entire subproject, and those costs are reported in tables 10 and 11 below. However, due to the aforementioned concerns with total project cost, this analysis also includes costs of key construction components, comparing CCAP to non-CCAP sources.

Table 10: CCAP- and Non-CCAP-Funded Urban Road Rehabilitation Unit Costs of Key Construction Components for Nangarhar Province, Jalalabad City, Averaged at the City Level (AFN)

Nangarhar Province, Jalalabad City			
	Non-CCAP Unit Costs (AFN)	CCAP Unit Costs (AFN)	CCAP/ Non-CCAP
Excavation	504	207	41%
PCC for Road	5417	5511	102%
Shuttering	154	80	52%
Leveling/Compaction	49	17	34%
Base Course	991	677	68%
Unskilled Labor	385	350	91%
Project Cost/km	9901660	8607692	87%

Table 11: CCAP- and Non-CCAP-Funded Urban Road Rehabilitation Unit Costs of Key Construction Components for Balkh Region, Mazar-e-Sharif City, Averaged at the City Level (AFN)

Balkh Province, Mazar-e-Sharif City			
	Non-CCAP Unit Costs (AFN)	CCAP Unit Costs (AFN)	CCAP/ Non-CCAP
Excavation	90	86	96%
PCC for Road	4345	4072	94%
Shuttering	108	205	189%
Leveling/Compaction	15	45	310%
Base Course	784	633	81%
Unskilled Labor	442	323	73%
Project Cost/km	7654795	10176256	133%

Costs for concrete cement are relatively close in both cities. Non-CCAP subprojects tend to pay unskilled workers slightly more on a man-day basis. Mazar-e-Sharif CCAP projects tend to have much higher costs in the areas of shuttering and compacting, with costs in line across other categories. CCAP subprojects in

Jalalabad City tend to be less expensive on a unit cost basis than similar non-CCAP subprojects. While the subproject unit costs are relatively close between CCAP and non-CCAP subprojects, the averages hide substantial differences in subproject unit costs for individual subprojects, due to varying differences in subproject length, despite total subproject costs being identical within regions. It should be repeated that the costs for IDLG urban road subprojects require further investigation.

VII. Conclusion

The World Bank has funded a series of development subprojects under the CCAP. These projects are designed to improve access to minimum services like potable water, roads, and electricity. The World Bank contracted MSI to examine the costs and benefits of these subprojects. Findings for each subproject type are summarized in Table C1 below. Benefits were estimated based on assumptions primarily focused on time saved from each subproject. Additional savings, such as those from increased yields or from decreased distances, were not calculable with available information. Initial costs were taken from BoQs, and O&M costs were calculated as a function of contributions from beneficiary households.

Average EIRRs by subproject subtype were found to be positive, astoundingly so in some cases, particularly when compared to the standard discount rate of 6%. These subprojects were found to provide substantial benefits to users when time savings were considered relative to subproject costs.

Costs of CCAP subprojects were compared to non-CCAP subprojects by region. With the exception of roads, CCAP subprojects were found to be cost effective relative to other subprojects of the same type in the same region. As part of this portion of the analysis, concerning patterns were found in urban road subprojects: with roads built in the same areas having the exact same total costs, regardless of the length of the road built. In other instances, costs for the CCAP projects were either in line with or far below non-CCAP projects, often owing to decreased material unit costs. Labor costs were sometimes found to coincide across project funding sources.

Table C1: Summarized Report Findings by Project Subtype and Urban/Rural Location

RURAL - MRRD

Project Type	Number of Projects	Average of EIRR	Average of % Cost of Non-CCAP Project	Technical Quality
Rural - MRRD				
Bore Well	27	54%	NCDA	3.59
Irrigation	19	239%	NCDA	3.64
Roads	3	19%	NCDA	3.7
Grand Total	**49**	**104%**	**NCDA**	**3.64**

NCDA = No Comparison Data Available

URBAN - IDLG

Project Type	Number of Projects	Average of EIRR	Average of % Cost of Non-CCAP Project	Technical Quality
Urban - IDLG				
Roads	11	169%	110%	3.44
Grand Total	**11**	**169%**	**110%**	**3.44**

References

[1] “Afghanistan Unemployment Rate.” Trading Economics. Accessed from https://tradingeconomics.com/afghanistan/unemployment-rate, 12/11/2019.

Appendix A: Project List Detail Table

NCDA = *No Comparison Data Available*

Project ID	Region	Overseeing Agency	Urban/Rural	Constructed Feature	EIRR	Technical Quality
CCAP-3021	Samangan	MRRD	Rural	Irrigation	701%	4
CCAP-2887	Paktia	MRRD	Rural	Irrigation	84%	3.53
CCAP-3030	Samangan	MRRD	Rural	Irrigation	631%	4
CCAP-758	Kandahar	MRRD	Rural	Irrigation	251%	4
CCAP-2875	Paktia	MRRD	Rural	Irrigation	98%	3.5
CCAP-2763	Khost	MRRD	Rural	Irrigation	50%	3.75
CCAP-4713	Sar-i-Pol	MRRD	Rural	Irrigation	115%	3.45
CCAP-2786	Khost	MRRD	Rural	Irrigation	159%	3.75
CCAP-189	Balkh	MRRD	Rural	Irrigation	130%	3.7
CCAP-5403	Balkh	MRRD	Rural	Irrigation	166%	3.5
CCAP-4740	Sar-i-Pol	MRRD	Rural	Irrigation	114%	3.35
CCAP-7241	Kandahar	MRRD	Rural	Irrigation	288%	4
CCAP-3414	Logar	MRRD	Rural	Irrigation	103%	3.39
CCAP-3363	Laghman	MRRD	Rural	Irrigation	164%	3.95
CCAP-3393	Logar	MRRD	Rural	Irrigation	146%	3.21
CCAP-5201	Nangarhar	MRRD	Rural	Irrigation	50%	3.79
CCAP-4052	Kunar	MRRD	Rural	Irrigation	164%	3.23
CCAP-4061	Kunar	MRRD	Rural	Irrigation	242%	3.51
CCAP-4087	Kunar	MRRD	Rural	Irrigation	883%	3.17
CCAP-4254	Kunduz	MRRD	Rural	Bore Well	40%	4
CCAP-4238	Kunduz	MRRD	Rural	Bore Well	25%	3.88
CCAP-6133	Daykundi	MRRD	Rural	Bore Well	-5%	2.88
CCAP-6575	Paktika	MRRD	Rural	Bore Well	242%	3.61
CCAP-2868	Paktia	MRRD	Rural	Bore Well	47%	3.73
CCAP-5254	Laghman	MRRD	Rural	Bore Well	451%	2.82
CCAP-1532	Laghman	MRRD	Rural	Bore Well	28%	3.5
CCAP-6427	Baghlan	MRRD	Rural	Bore Well	20%	3.46
CCAP-1619	Baghlan	MRRD	Rural	Bore Well	17%	3.71
CCAP-1677	Baghlan	MRRD	Rural	Bore Well	49%	3.86
CCAP-7281	Kandahar	MRRD	Rural	Bore Well	18%	4
CCAP-6908	Paktika	MRRD	Rural	Bore Well	70%	3.49
CCAP-8415	Paktia	MRRD	Rural	Bore Well	37%	3.75
CCAP-7250	Kandahar	MRRD	Rural	Bore Well	15%	3.95
CCAP-135	Balkh	MRRD	Rural	Bore Well	-50%	3.52
CCAP-130	Balkh	MRRD	Rural	Bore Well	-5%	3.92
CCAP-4274	Faryab	MRRD	Rural	Bore Well	3%	3.81
CCAP-8409	Paktia	MRRD	Rural	Bore Well	74%	3.75

Project ID	Region	Overseeing Agency	Urban/Rural	Constructed Feature	EIRR	Technical Quality
CCAP-5062	Paktia	MRRD	Rural	Bore Well	152%	3.75
CCAP-4297	Faryab	MRRD	Rural	Bore Well	28%	3.64
CCAP-136	Balkh	MRRD	Rural	Bore Well	-19%	3.47
CCAP-4883	Paktika	MRRD	Rural	Bore Well	77%	3.58
CCAP-7282	Kandahar	MRRD	Rural	Bore Well	-19%	3.90
CCAP-4621	Nimroz	MRRD	Rural	Bore Well	57%	3.99
CCAP-4615	Nimroz	MRRD	Rural	Bore Well	41%	3.66
CCAP-4574	Nimroz	MRRD	Rural	Bore Well	87%	3.94
CCAP-2381	Daykundi	MRRD	Rural	Bore Well	-12%	2.78
CCAP-059	Balkh	IDLG	Urban	Roads	22%	3.5
CCAP-4640	Nimroz	MRRD	Rural	Roads	5%	3.87
CCAP-048	Balkh	IDLG	Urban	Roads	158%	3.42
CCAP-045	Balkh	IDLG	Urban	Roads	116%	4
CCAP-7990	Kandahar	IDLG	Urban	Roads	327%	3.27
CCAP-8047	Kandahar	IDLG	Urban	Roads	157%	3.33
CCAP-736	Kandahar	IDLG	Urban	Roads	157%	3.12
CCAP-737	Kandahar	IDLG	Urban	Roads	654%	3.63
CCAP-831	Nangarhar	IDLG	Urban	Roads	19%	3.54
CCAP-828	Nangarhar	IDLG	Urban	Roads	7%	3.16
CCAP-4550	Nimroz	MRRD	Rural	Roads	40%	3.99
CCAP-977	Nangarhar	MRRD	Rural	Roads	12%	3.25
CCAP-8000	Kandahar	IDLG	Urban	Roads	112%	3.64

Appendix B. Infrastructure Grading Rubric

Workmanship

5. VERY GOOD: The workmanship meets all the CCAP specifications. The project is sustainable over the entire design life and there is 100% functionality.

4.0-4.9. GOOD: The workmanship meets most CCAP specifications with minor deviations in workmanship quality that has no impact on the sustainability and the project has at least 90% functionality.

3.0-3.9. AVERAGE: The workmanship quality meets the major specifications, but deviations have caused reduced sustainability (no longer the design life) and decreased functionality between 70% and 90%.

2.0-2.9. POOR: The workmanship quality deviates significantly from the specifications. There is marked impact on the sustainability of the project and significant decrease in the functionality to between 40% and 70%.

1.0-1.9. VERY POOR: The project barely follows any specifications. The sustainability of the project is zero as there already is a need for serious reworking; functionality is below 40%.

Design

5. VERY GOOD: The design was created with full consideration of the site requirements. The design is fully appropriate and allows for 100% of intended functionality and design life.

4.0-4.9. GOOD: The design was created with the consideration of most of the site requirements; however, small considerations could have reduced wear and tear and lowered maintenance requirements. Intended functionality is between 90% and 100% and design life is not impacted.

3.0-3.9. AVERAGE: The design considered only the major site requirements. Some of the design was inappropriate for the site and caused the project to have between 70% and 90% of intended functionality and a shorter design life.

2.0-2.9. POOR: The design barely considered any site requirements. Much of the design is inappropriate and severely lowers functionality to between 40% and 70%. Sustainability is negatively impacted, and the project will require far more maintenance than otherwise would be necessary.

1.0-1.9. VERY POOR: The design does not consider any of the site requirements. The design is inappropriate, making the project unsustainable and non-functional (below 40%). Portions of the design may have not been feasibly implemented. If the project is currently working, it required serious deviations from the design to do so.

Materials

5. VERY GOOD: The materials meet all the CCAP specifications. The project is sustainable over the entire design life and there is 100% functionality.

4.0-4.9. GOOD: The materials quality meets most CCAP specifications with minor deviations in workmanship quality that has no impact on the sustainability and the project has at least 90% functionality.

3.0-3.9. AVERAGE: The materials quality meets the major specifications, but deviations have caused reduced sustainability (no longer the design life) and decreased functionality between 70% and 90%.

2.0-2.9. POOR: The materials quality deviates significantly from the specifications. There is marked impact on the sustainability of the project and significant decrease in the functionality to between 40% and 70%.

1.0-1.9. VERY POOR: The project barely follows any specifications. The sustainability of the project is zero as there already is a need for serious reworking; functionality is below 40%.