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Economic Results of CDD Programs: Evidence from Burkina Faso, Indonesia and the Philippines

In Community-Driven Development (CDD) programs, communities identify, prioritize, design and execute small-scale investments. While relevance and community ownership have been high, it is also crucial that these public investments meet economic feasibility criteria and generate adequate rates of return. This note summarizes the results of three recent ex-post economic analyses of CDD programs in Burkina Faso, Indonesia and the Philippines. In all cases, the overall portfolio had relatively high economic rates of return, with conservative estimates ranging from 21 to 68 percent. Quantifiable benefits of the roads, water supply systems, schools, productive projects and other investments were significant, including documented time savings, increases in local production and revenues, and savings on the cost of inputs and services, among others. In addition, a comparison of CDD-implemented infrastructure projects with comparable government programs found that CDD projects consistently generated greater cost efficiency, with savings on unit costs channeled into additional community infrastructure initiatives.

Investment Selection Using the CDD Approach

Community-Driven Development (CDD) is an approach that transfers control over resources and decision-making to local communities. CDD programs provide grants for small-scale investments that are chosen, designed and implemented by communities.

Typically, some type of facilitation, carried out either by staff of the program or delegated to NGOs or local governments, guides a locality through an analysis of its needs and identification of potential investments.

Another basic feature of many of these programs is that they provide a broad menu of options to communities. These menus usually include basic infrastructure like water supply and roads, social services including health and education interventions and productive investments in areas like small-scale irrigation, agricultural production or development of informal sector activities.

These key features, namely that they are demand-driven (i.e. the portfolio is not known in advance), that the investments are very small in scale, and that there is multi-sectoral choice, make it difficult to estimate ex-ante the expected economic rate of return of a future portfolio of CDD program investments.

In response to this challenge, CDD programs have adopted several screening mechanisms to ensure that CDD programs deliver services in a cost effective manner:

- Facilitated community needs assessments and participatory local planning processes are carried out to ensure that investments reflect consumer preferences, resulting in allocative efficiency.

- Eligibility criteria usually put forth in an Operational Manual exclude investments which generate low economic returns (e.g. administrative buildings). Technical and cost guidance is provided, often by applying unit cost or cost per beneficiary parameters, to promote adoption of least cost approaches.
- Technical experts from sectoral ministries, local governments or the private sector may help design and/or screen the actual intervention chosen.
- Communities directly manage the procurement process, raising transparency and creating an incentive for cost control when they can use any savings for additional investments.

Assessing Economic Costs and Benefits in Three Countries

A great deal has been published about the overall performance of these programs in terms of impacts on household and community welfare, but ex-post economic analysis has been applied in only a handful of cases. To assess whether these project identification and screening processes have been effective in ensuring that investments are economically justifiable, this note summarizes recent findings on ex-post economic analysis of three CDD programs:

- Burkina Faso's Community-Based Rural Development Project (known by its French acronym PNGT) initiated under the Ministry of Agriculture in 2001. At the time of the ex-post economic analysis in early 2007, over 12,000 subprojects had been financed at a value of US$39 million.
- Indonesia's Kecamatan Development Program (KDP) started in 1998 under the Ministry of Home Affairs, with over US$750 million invested in over 70,000 villages by the end of Phase II in 2004. The study focused on Phase II.
- In the Philippines, the Kapitbisig Laban Sa Kahirapan – Comprehensive and Integrated Delivery of Services (KALAHI-CIDSS) Project was launched in 2002 under the Department of Social Welfare, with over 1,400 subprojects completed or on-going as of the 2006 Mid-Term Review.

All three programs have similar objectives, namely to strengthen local communities' ability to plan and manage their development. They seek to empower local communities and improve local governance. All three delegate a significant degree of responsibility to local actors to identify, appraise and implement small-scale investments.

Scope and Methodologies

Each program recently commissioned an ex-post economic analysis of its portfolio of investments.[1] The analyses aimed to assess the economic benefits and impacts of these programs and to verify the soundness of the ex-ante sub-project selection and screening procedures.

In each case, the most common types of investments were selected and a sample of completed sub-projects was visited to measure ex-post the costs and benefits. The types of subprojects studied represented between 65 and 82 percent of their respective portfolios. There was a great deal of dispersion in subproject types between the programs. The water sector was the only common sector studied across all three countries. The sectors covered for each country were:

- Burkina Faso – water supply, literacy training centers, erosion control fences, compost pits, teacher housing, classrooms, and animal vaccination facilities (65 percent of total portfolio).
- Indonesia – water supply, roads, bridges and irrigation (68 percent of total portfolio).
- Philippines – water supply, roads, classrooms, health facilities and daycare centers (82 percent of total portfolio)

The valuation of benefits from these community investments included both the monetary benefits like increased revenue or reduced outlays for services and those quantifiable benefits for which a monetary value could be assigned, like the value of time savings. In general, benefit levels were calculated using conservative assumptions.

Benefits for which it was difficult to attach a monetary value, like reduced infant mortality from

investments in water supply and health facilities, were not included. Indirect benefits such as stronger community participation and better local governance were also not included in the quantifiable benefits, nor were the expected benefits of higher levels of social capital, closer matching between supply and demand, more inclusive access to local public goods, and better access to information.

Costs included in the analyses comprised initial investment costs (including community contributions) as well as future operations and maintenance. In the Philippines and Burkina Faso cases, initial investment costs included both the direct costs of the investment itself and the indirect cost of community facilitation, supervision and program management. For Indonesia only the direct costs of the infrastructure were considered.[2] It is not uncommon, as in the case of PNGT in Burkina Faso, for communities to generate small savings that can then be applied to other public works, but these savings were not taken into account in the analysis.

Standard economic analysis methodologies were used, with some variations across the three countries. For example, in the cases of Indonesia and the Philippines, financial costs were converted to economic costs to account for price distortions using national shadow price conversion factors for labor, materials and the exchange rate. These official conversion factors were not available for Burkina Faso. In the Philippines, input from the field visits were used to develop a model subproject for each type rather than estimate the rate of return on each sub-project reviewed. In Indonesia subprojects with exceptionally high ERRs (over 100 percent) were excluded while they were retained in the Burkina Faso case. As a result, the findings are not directly comparable across the three countries.

Sensitivity analysis was carried out in the PNGT and KALAHI-CIDSS studies to assess the robustness of the findings to changes in either costs or benefits.

In terms of sample sizes, in Burkina Faso, 59 projects were surveyed out of the approximately 7,000 subprojects undertaken in 2004-2005. The KDP study carried out economic impact analysis of 113 completed subprojects. For the KALAHI-CIDSS program, the team visited 85 sites. The results for Burkina Faso and Indonesia are indicative given the large number of projects completed. In the Philippines, the sample represented 20 percent of the subprojects completed over the past 16 months.

In addition to the economic rate of return analysis, each study compared cost efficiency in terms of the unit costs of infrastructure constructed through the CDD approach with other national infrastructure programs. This is particularly important since economic rates of return are only one approach to economic analysis, and less reliable in cases of small-scale projects with high external or non-quantifiable benefits.

The three countries have national poverty reduction policies that call for a minimum service level of primary education, health care, safe water and road access. The key issue is not whether these types of investments have high returns, but rather which delivery mechanism provides a least-cost solution in the face of the huge resource requirements necessary to reach these goals.

Overall Findings on Economic Rates of Return (ERRs)

Economic rates of return were calculated for the sample of subprojects visited. While they can be compared within a given country, they are not comparable across countries for the reasons previously indicated. Key findings presented in Table 1 include:

- ***In all three studies, the overall economic rate of return on the CDD program was above the country's hurdle rate for acceptable investments.*** Weighted ERR levels for the sample portfolios demonstrated relatively high levels of economic impact. The weighted ERRs for the sample portfolios ranged from 21 to 86 percent depending on the country and underlying assumptions, per Table 1 below.

Table 1: Economic Rates of Return

	Burkina Faso PNGT	*Philippines Kalahi-CIDSS*	**Indonesia KDP**
Roads and bridges		19-22%	52%
Water:			39%
Pumped	11-55%	58%	
Gravity		65%	
Literacy Training Centers	n.a.		
Stone fences	116%		
Compost Pits	250%		
Teacher housing	1%		
Classrooms	n.a.	16%	
Livestock Vaccination Parks	2%		
Health center		20%	
Day care		16%	
Irrigation			68%
ERR	**61-86 %**	**21%**	**53%**

- ***In Indonesia and the Philippines, returns were strong for each type of sub-project, with greater variability in Burkina Faso.*** Referring to Table 1, for KALAHI-CIDSS and KDP, the average for each type of investment was above 15 percent, a typical social discount rate (e.g. the threshold used in the Philippines). There was the widest dispersion in Burkina Faso, where animal vaccination facilities and teacher housing were not fully justifiable in economic terms.
- ***In general, social infrastructure like classrooms, teacher housing and health centers had lower ERRs than economic infrastructure***, which is typical of investments where many of the future benefits could not be fully quantified.
- ***There were several cases of very high economic rates of return.***[3] For example, in the KDP study, 8 subprojects visited had ERRs in excess of 100 percent. The most frequently seen examples were roads that provided access to previously isolated villages where, before the road, all produce had to be hand carried or carried in small amounts on motor cycles for kilometers before reaching the nearest market. Likewise, a number of irrigation projects were able to more than double the area under cultivation as well as channel water from local springs during the dry season. In some cases this resulted in triple benefits: (1) additional area cultivated; (2) two crops per year instead of one; and (3) increased fertility due to timely watering. The resulting increases in yields per hectare were very significant. In Burkina Faso, compost pits had an ERR of 250 percent and a payback period of one year. These low cost investments were found to typically double production or corn and millet per hectare. Stone erosion control fences and the use of compost combined to increase yields and areas under cultivation.

Water Supply

All three studies reviewed water supply projects, which were among the most requested investments in these CDD programs. The water systems included wells and boreholes and both pumped and gravity systems. The average ERRs ranged from 11-55 percent in Burkina Faso's PNGT[4], 58-65 percent in the KALAHI-CIDSS project[5] and 39 percent in KDP. Within the water portfolio there were wide variations, however. For example, in the Indonesia program, the ERR for the 41 KDP water projects studied varied between 3 percent and 86 percent. The vast majority were economically viable, with only 7 out of the 41 showing ERRs of lower than 15 percent.

Quantifiable benefits included time savings from less distance to fetch water, cost savings on non-incremental water consumption, and the value of increased water consumption due to the

investments. For example, in the Philippines, water system investments saved households an average of 43 minutes per day of fetching water and increased per capita consumption from 10 to 14 liters per day. In Burkina Faso, the value of the time savings was less important than the value of the incremental water production.

Health benefits such as reduced incidence of waterborne diseases were not considered, nor were any increases in animal health or time saved from herding livestock to previous water sources for those wells that serviced animals. Human productivity increases from freed up time, such as better school attendance and greater production from gardens and orchards were reported but not empirically measured.

Roads and Bridges

Roads were studied in the Philippines and roads and bridges in Indonesia. Average ERRs in the Philippines case were 19 percent for road improvement and 21 percent for construction. In Indonesia, road investments were concentrated in relatively isolated villages and produced consistently high ERRs that averaged 52 percent.

Quantifiable benefits from road investments include:

- Time savings – for example KDP roads on average reduced a 2 hour walk into a 30 minute ride.
- Increased sales of agricultural products. For example, the KALAHI-CIDSS project estimated a reduction in post harvest losses of 2.5 percent.
- Cost savings in transporting agricultural inputs to the farm site and produce to market.

Other benefits not included in the calculations include easier access to social infrastructure and services, less wear and tear on vehicles, increased property values, and changes in the product mix towards higher value crops.

Irrigation

KDP was the only program of those studied that had significant investments in small-scale irrigation. These projects had the highest average ERR of the KDP portfolio at 68 percent, ranging from 8 to 203 percent, with only one project having less than 15 percent.

In terms of quantifiable benefits, the area under cultivation in many cases more than doubled. In addition, the reliable supply of non-rain dependent water enabled two harvests per year instead of one. In many cases, the availability of reliable water also had a significant impact on crop fertility resulting in even higher yields.

Villagers at a KDP rural road construction project

Other Productive Projects

Other productive subprojects studied include erosion control fences made out of stone (*cordons pierreux*), compost pits (*fosses fumières*) and vaccination facilities in Burkina Faso. The economic results for the erosion control and compost subprojects were extremely high, averaging 116 and 250 percent respectively. Vaccination facilities, however, had low economic returns, averaging 2 percent. This was largely a result of relatively low numbers of users, with a more acceptable (above 10 percent) rate of return when vaccinations approached 6,000 per year.
For the erosion control and compost subprojects, quantifiable benefits were the increase in agricultural production. For example, the compost investments tended to double annual millet production, paying for themselves within two years. For the vaccination facilities, benefits were calculated based on the

Villagers at a KDP rural road construction project

willingness to pay by livestock owners, with vaccination park fees historically quite low. Benefits in terms of improved animal health and time savings in making facilities more accessible were not quantified.

Social Infrastructure

Social infrastructure like schools, teachers housing, health centers, literacy training centers and day care centers were included in the PNGT and KALAHI-CIDSS studies. In the Philippines study, the economic rates of return for schools, health centers and daycare facilities were 16, 20 and 16 percent respectively. In Burkina Faso, economic rates of return were not calculated for classrooms and literacy training due to data limitations. Instead, analysis focused on cost efficiency (see section below). For teachers' housing, benefit-cost ratios were positive, but the ERRs were low when comparing the cost of constructing new teachers housing with local housing rental rates mainly because there is very little rental housing in rural areas of sufficient quality.

Economic benefits of school investments in the Philippines were quantified based on higher enrollment and lower dropout rates which increased the number of children with additional years of schooling. For example, primary enrollment rates were estimated to increase from 85 to 96 percent in participating villages. This additional schooling translates into higher future incomes as result of the returns to education in the Philippine labor market, estimated at 14 percent for each additional year of schooling. Benefits of health care facilities were calculated using the proxy of willingness to pay to visit a health center. And for day care, benefits were calculated based on the effects of longer schooling and parents' time savings, the latter accounting for almost 50 times the benefit level of the former.

Several of the benefits from social infrastructure could not be quantified, including the benefit of a literate society, improvements in morbidity and mortality, and better learning from healthier children, for example. Benefits of having teachers present in rural zones in terms of increased attendance and education quality could not be estimated.

Sensitivity Analysis

Sensitivity analysis was conducted in the Philippines and Burkina Faso studies to measure the robustness of these outcomes in the face of changes in costs or benefits:

- The Philippines study found that costs could escalate by 18 percent or benefits decrease by 15 percent and the overall portfolio would remain above the opportunity cost of capital. The results further showed that the economic returns to all subprojects react more strongly to decreases in the annual benefit stream than to increases in investments costs.
- In the Burkina Faso PNGT study, the high return projects like compost pits and erosion control fences could withstand significant increases in costs or decreases in benefits (30-50 percent) and still remain economically viable. The same was not true for animal vaccination facilities where neither substantial decreases in cost (30 percent) nor large increases in user fees (up to 900 percent) made the projects economically viable given the overall low utilization numbers.

Cost Efficiency

All three studies found significant unit cost savings from the CDD approach. These cost savings help explain the relatively high returns to the CDD portfolios. In comparing the average direct cost per unit (including community counterpart contributions), for example per square-meter constructed of a building or per kilometer of road, with benchmarks from comparable non-CDD government projects, the cost savings were substantial in almost all cases (see Table 2). For example, classrooms in Burkina Faso built by the PNGT are less than half the cost of those procured through competitive bidding to private contractors and adjudicated by the national procurement board on behalf of the Ministry of Education. In Indonesia, the report found that "*numerous factors like isolated locations, double and triple handling of materials and frequent on-site design modifications all conspire to make it virtually impossible for commercial contractors to compete with KDP on a cost basis.*"

Table 2: Estimated Unit Cost Savings of CDD Approach

	Burkina Faso PNGT	*Philippines Kalahi-CIDSS*	**Indonesia KDP**
Roads and bridges		8 -59%	32%
Water supply	(-14%)	71- 76%	36%
Literacy Training Centers	9-23%		
Teacher housing	43-51%		
Classrooms	60-66%	7%	
Livestock Vaccination Parks	6%		
Health center		44%	
Day care		(-20%)	
Irrigation			24%

Recommendations to Optimize Economic Impact

- ***Closely monitor operations and maintenance performance***. The economic viability of many of the community investments was sensitive to a large decrease in benefits. These could result from inadequate operations and maintenance either via a shorter lifespan for the investment or a reduced stream of benefits, like a water system that repeatedly breaks down from lack of adequate preventive maintenance. The ex-post reviews in all three countries have found adequate operations and maintenance, with some outstanding questions about longer-term road maintenance in Indonesia, but it is an issue that requires continued vigilance and feedback from the field on actual performance.
- ***Contain indirect costs***. Unit costs savings can be undermined if indirect costs are allowed to balloon. While many of these expenses, like community capacity building and social facilitation, are considered to be important contributors to project success and may be viewed as an investment in their own right, they also represent costs that will need to be offset with benefits if economic viability is to be achieved.
- ***The number of actual beneficiaries is often a crucial determinant of economic viability***. These figures should be verified in the ex-ante appraisal process based on experience from the field. For example, not all villagers may chose to send their children to school or use a certain water source. Facilitation can also be useful in promoting greater local utilization of infrastructure built, for example through awareness-raising to use safe water sources even during the rainy season when access to non-potable water is abundant. A further example, from the Burkina Faso study, entails the literacy training centers, which were underutilized if used solely for literacy training and would benefit from up-front space utilization planning to optimize the building.
- ***Appropriate technical design can optimize benefits***. For example construction standards for roads can include more long-lasting materials and greater emphasis on correctly designed permanent drainage, which is the major cause of premature damage. Water investments may also be over-dimensioned where the operational costs of extracting the water is inferior to the water user fees, leading to a lack of financing over the long-term to keep the systems running. Guidance on appropriate technologies and adequate levels of user fees should help prevent over-dimensioning investments.
- ***Simple cost per unit and cost per beneficiary cut-off points can screen out lower return investments***. For example, in Burkina Faso it appears that a minimum of 6,000 animal vaccinations per year is necessary to economically justify a vaccination facility. There are typically minimum numbers of students or minimum population in a catchment area for schools and health centers, norms which are usually developed by the sectoral ministries to ensure optimal utilization of space and personnel.
- ***Involve local government in operations and maintenance***. As sectoral responsibilities are increasingly decentralized and O & M comes under the mandate of local governments, the local government-community linkages on basic services becomes more critical. For example, in

the KDP program, projects are "*handed over to their communities"* and as such, have no formal status or recognition from the local government. As a result they are not entitled to ask for funds from government sources. A change in status would entitle KDP projects to receive small amounts of road maintenance funds. Management of the infrastructure would still remain in the hands of the village utilizing the systems already established by KDP, which would provide cost savings to the local government.

Recommendations to Improve Economic Analysis

All three studies faced a challenge in gathering data on economic benefits. Ex-post field visits by specialized teams are expensive and resources often do not permit a representative sample size when programs are financing thousands of village projects each year. To ensure that quality data is available when the project team decides to implement a rigorous economic analysis, it is advisable that:

- ***Ex-ante appraisal should estimate the expected, quantifiable benefits.*** The ex-ante appraisal has rarely provided reliable baseline information upon which to base an ERR calculation. In part, this is because the information was not seen as useful, particularly when no ex-post analysis is done. However, program managers can ease the burden of the ex-ante analysis by providing a typical benefit series for each type of project and instructions on how to quantify these benefits, as well as a checklist to ensure that no potential benefits have been overlooked
- ***Integrate ex-post data into the program MIS.*** In general, all three programs lacked up-to-date information on the current utilization of the infrastructure created by the program. The development of simple monitoring tools that can be completed by the local management committees would be sufficient for a program, through its management information system, to better quantify and track the benefit stream from its investments.
- ***Review impact evaluation instruments to make them applicable to economic analysis***. These days, most CDD programs carry out impact evaluation including extensive household surveys. If structured as such, the questionnaires can be used to gather quantitative data on benefits. For example, time savings collecting water, changes in agricultural production, transit times and average payment for various services, among others, can all be calculated from household survey results. These surveys usually have more robust sample sizes than can be feasibly achieved through ex-post field visits.
- ***Disseminate findings of economic analyses***. There is a general misconception that small-scale projects in low-income rural communities are basically social in nature and rarely economically justifiable. However, the three studies cited here found consistently high economic returns to CDD programs working in remote rural areas. This confirms that resources in CDD projects are well spent not only from a social and equity perspective, but also in terms of value for money and economic impact. Such results can better inform the public debates about the best development approaches.

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[1] Konate, S. (2007) « *Analyse Economique et Financière des Investissements Communautaires du PNGT2 »*, Ouagadougou. PNGT.

Araral, E., C. Holmemo (2007) "Measuring the Costs and Benefits of Community Driven Development: The KALAHI-CIDSS Project, Philippines" World Bank – Social Development Paper 102.

Torrens, A (2005), "Economic Impact Analysis of Kecamatan Development Program Infrastructure Projects": Jakarta, World Bank.

The Indonesia and Philippines reports are available on the World Bank intranet at http://eapcddflagship

[2] In the KALAHI-CIDSS program, indirect costs were 43 %, including social preparation/facilitation 25%, TA capacity building 17% and monitoring and evaluation 2%. For the PNGT program in Burkina Faso indirect costs were estimated at 21% total, of which national level coordination 7%, provincial coordination 6% and supervision, monitoring and evaluation 8%.

[3] In the KDP study, the projects with returns over 100 percent were eliminated from the analysis in order not to distort the sector averages. In the PNGT study, all of the projects in two categories: compost pits and erosion control stone fences had such high returns and so they were included.

[4] The higher figure is from the estimates of water production increases reported by the villagers and the lower figure from some technical estimates of system capacity.

[5] The higher figure is for gravity-fed systems and the lower one for pumped water systems due to the added expenses of running the pumps.

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