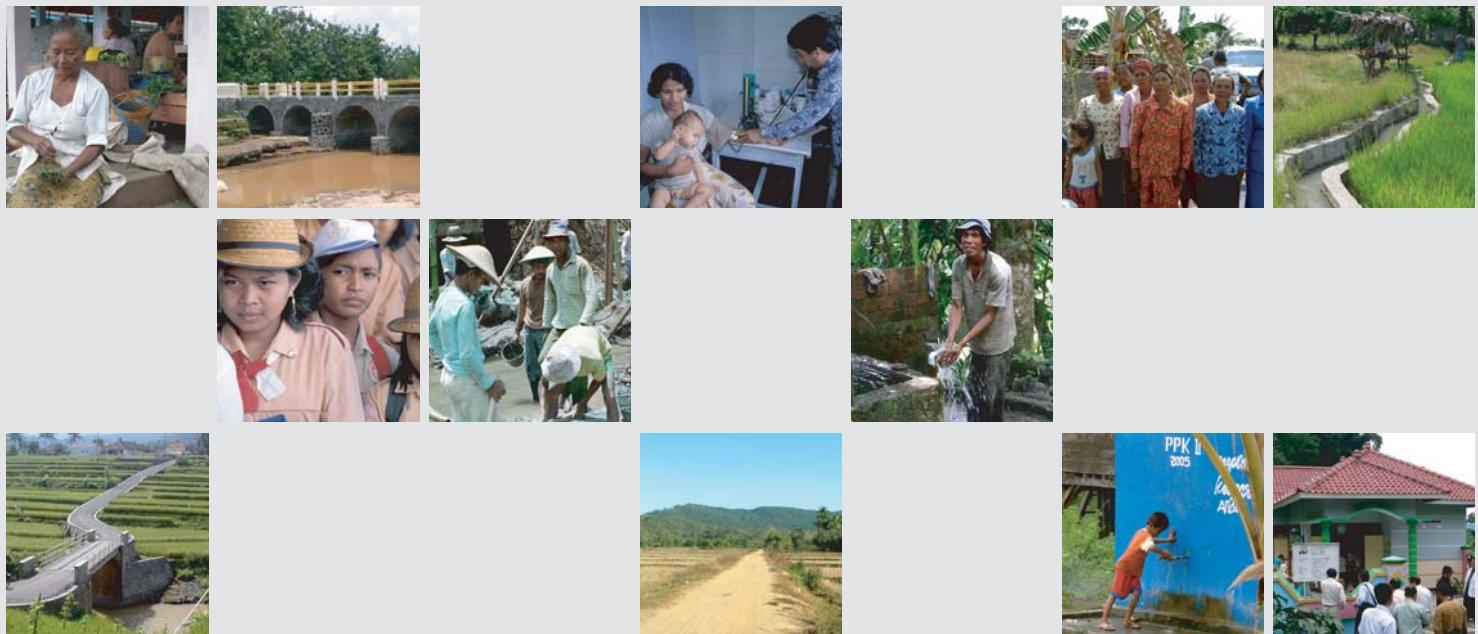


# Impact Evaluation of the Second Phase of the Kecamatan Development Program in Indonesia



John Voss, EASIS, The World Bank Indonesia

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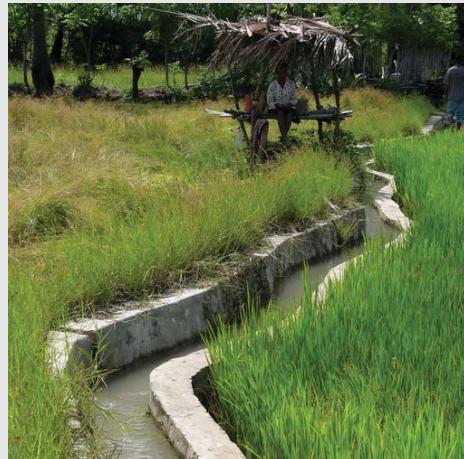
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# **Impact Evaluation of the Second Phase**

## **of the Kecamatan Development Program in Indonesia**



**John Voss, EASIS, The World Bank Indonesia**

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## Executive Summary

Increasingly, Indonesian communities have been able to determine their own local development priorities as the Government of Indonesia and donors implement programs using the community driven development (CDD) approach. One example of this is the Kecamatan Development Program (KDP), a Government of Indonesia program aimed at alleviating poverty, strengthening local government and community institutions, and improving local governance. KDP began in 1998 at a time of tremendous political upheaval and financial crisis. Now in its third phase, KDP is a key component of the Government's national poverty alleviation program, the National Program for Community Empowerment or PNPM-Mandiri. KDP is implemented by the Ministry of Home Affairs, Community Development Office (PMD) and is funded through government budget allocations, donor grants and loans from the World Bank.

KDP focuses on Indonesia's poorest rural communities, providing block grants of approximately Rp. 500 million to Rp. 1 billion (USD 55,000 to USD 110,000) to sub-districts (kecamatan) depending upon population size. Villagers engage in a participatory planning and decision-making process prior to receiving block grants to fund their self-defined development needs and priorities. In Aceh and Nias, KDP has provided additional grants of up to Rp. 7 billion to address the special needs of these post-disaster areas.

Most evaluations of CDD programs have focused on the extent to which activities meet objectives intrinsic to the CDD approach: participation of community members in decision-making, skill and capacity development, and improving the quality of local governance, among others. However, little evidence exists on the impact of CDD approaches on traditional measures of household welfare and access to services. This paper attempts to resolve this problem by evaluating the impact of the second phase of KDP (KDP2). It uses a selected group of indicators for the period 2002-2007 to address the following research questions:

- Does KDP2 increase household welfare (measured as real per capita consumption)?
- Does KDP2 move households out of poverty?
- Do individuals in KDP2 kecamatans experience increased access to education and health care services, and employment opportunities?
- What is the impact for these indicators for poor and disadvantaged groups?

The research methodology was designed to ensure the impacts found can be attributed to the program. A household panel was constructed from households selected from the 2002 SUSENAS national household survey and then re-interviewed in a subsequent survey, the 2007 Survei Evaluasi Dampak PNPM-RURAL. A propensity score matching approach was used to select kecamatans participating in KDP2 and a control kecamatan group that has similar characteristics based on data taken from the 2003 PODES village census. The sample consisted of 6,198 households from 300 kecamatan across 17 provinces. This enabled the evaluation to conduct difference-in-differences estimates of the impact of KDP2 on a set of five indicators:

- Real per capita consumption
- Poverty status
- Use of outpatient health services
- Unemployment rate
- Primary and Secondary enrollment rates

The main results are indicated below:

- As a result of participation in the program, real per capita consumption gains were 11 percentage points higher among poor households in KDP2 areas compared with control areas. The results point to KDP2 being most effective at reaching poor households and households in poor kecamatan. Households in the lowest predicted 2002 consumption quintile participating in KDP2 saw their real per capita consumption increase by 11 percentage points more than in control areas. KDP2 households in

the poorest quintile of kecamatan saw similar positive impacts of 5 percentage points in comparison with control areas.

- **The proportion of households moving out of poverty in poor kecamatan was 9.2 percent higher in KDP2 areas compared with control areas.** At the World Bank \$2-day poverty line, KDP2 households in poor kecamatan were 9.2 percentage points more likely to move out of poverty between 2002 and 2007 than in control areas.
- **Vulnerable households near the poverty line are less at risk of falling into poverty as a result of participation in KDP2.** The proportion of households moving into poverty in poor kecamatan was 4.5 percent less in KDP2 areas in comparison with control areas.
- **Households in less poor kecamatan see either no benefit or negative impacts.** For both real per capita consumption and movement out of poverty, households in higher consumption quintiles or households in less poor kecamatan yielded either insignificant results or negative impacts. For households in the wealthiest kecamatan, consumption gains in control areas were greater than gains in KDP2 areas.
- **Disadvantaged groups, other than the poor, are less likely to benefit from the program.** Disadvantaged groups, such as female-headed households and households with head lacking primary education, see insignificant or lesser impacts for real per capita consumption and movement out of poverty as compared to control areas.
- **The proportion of household heads gaining access to outpatient care was 11.5 percentage points higher in KDP2 areas compared with control areas.** Among those household heads not seeking outpatient care in 2002, KDP2 household heads are 11.5 percentage points more likely to seek outpatient care in 2007 than household heads in the control group. In contrast to the real per capita consumption and poverty status results above, disadvantaged groups also benefit in terms of expansion of access to outpatient care.
- **KDP2 reduces unemployment by 1.5 percent in comparison with control areas.** Although unemployment increased in general over the period of 2002-2007, the increase in the unemployment rate was 1.5 percent lower in KDP2 kecamatan in comparison with control kecamatan.
- **KDP2 has no impact on school enrollment rates.** At the primary school level this is most likely due to the already high levels of enrollment. At the secondary level, the lack of individual panel reduced the ability of the study to detect impacts.

Looking forward to the Program Nasional Pemberdayaan Masyarakat- Rural Component (PNPM-RURAL), which builds and expands upon the KDP program, the results above point toward the following recommendations for the program and future research:

- **The lack of effectiveness in non-poor kecamatan is a concern as PNPM-RURAL expands to cover all of Indonesia.** Given that KDP was targeted toward poor and remote areas, remaining kecamatan that will begin participation in PNPM-RURAL are less likely to have those characteristics. The results suggest that the program needs to adapt its strategies to improve effectiveness in non-poor areas.
- **Greater focus on ensuring that benefits accrue to disadvantaged groups.** When looking at non-economic dimensions of poverty, such as lack of education or gender, KDP2 was less effective. Despite an inclusive approach to community organizing that seeks to bring all community members into the decision-making process, the results indicate that disadvantaged groups are not benefiting from changes in household welfare measures. The project may want to consider new ways to assist households with lower levels of educational attainment, female-headed households, and other characteristics associated with disadvantaged groups, such as ethnic minority status and lack of land ownership.
- **Future surveys need to include instruments that address social dynamics and governance.** The KDP and PNPM-RURAL approach is so closely integrated with changes in social dynamics and local governance that a clearer understanding of the mechanisms involved is crucial for understanding how

downstream welfare impacts emerge. The SEDAP 2007 survey round included a module on social capital and governance; it will be critical for this module to be repeated in 2010. In addition, given the increasing role projects using CDD approaches are playing in the Government's strategy, it would be helpful for future research if similar modules could be included in regular surveys conducted by the Government of Indonesia through BPS.

- **Creation of an individual-level panel is critical for the planned 2009 survey.** A significant limitation on the analysis was the lack of an individual panel which precluded estimating impacts for education and unemployment aside from aggregation at the kecamatan level. It will be critical for the next survey round to commit the resources to track individuals as well as households to ensure panel data on individuals is available.



## Ringkasan Pelaksana

Masyarakat Indonesia telah semakin mampu menentukan sendiri prioritas-prioritas pembangunan setempat mereka sementara Pemerintah Indonesia dan para penyumbang melaksanakan program-program dengan menggunakan pendekatan CDD (*Community Driven Development*-pembangunan yang dipacu oleh masyarakat). Salah satu contohnya adalah Program Pengembangan Kecamatan (PPK), suatu program Pemerintah Indonesia yang bertujuan mengurangi kemiskinan, memperkuat pemerintah daerah maupun institusi masyarakat, serta memperbaiki tata kelola setempat. PPK dimulai pada tahun 1998 pada saat terjadinya pergolakan politik yang dahsyat dan krisis keuangan. Kini dalam tahapnya yang ketiga, PPK merupakan komponen utama dari program pengurangan kemiskinan nasional Pemerintah, yaitu Program Nasional Pemberdayaan Masyarakat atau PNPM-Mandiri. PPK dilaksanakan oleh Kementerian Dalam Negeri, Kantor Pembangunan Masyarakat (PMD) dan didanai melalui alokasi anggaran pemerintah, dana sumbangan serta pinjaman dari Bank Dunia.

PPK memusatkan perhatiannya pada masyarakat Indonesia yang termiskin di pedesaan, memberikan dana sumbangan sejumlah kira-kira Rp. 500 juta hingga Rp. 1 miliar (USD 55,000 hingga USD 110,000) ke kecamatan-kecamatan tergantung dari besarnya jumlah penduduk. Penduduk desa ikut dalam perencanaan partisipatoris dan proses pengambilan keputusan sebelum menerima dana bantuan untuk mendanai kebutuhan dan prioritas pembangunan yang mereka tentukan sendiri. Di Aceh dan Nias, PPK telah menyediakan tambahan dana bantuan hingga sejumlah Rp. 7 miliar untuk memenuhi kebutuhan khusus dari daerah-daerah pasca-bencana ini.

Kebanyakan evaluasi terhadap program-program CDD memusatkan perhatian pada sejauh mana kegiatan-kegiatan memenuhi tujuan yang bersifat intrinsik dalam pendekatan CDD, di antaranya: partisipasi anggota masyarakat dalam pengambilan keputusan, pengembangan keterampilan dan kemampuan, dan peningkatan mutu pemerintahan setempat. Namun, tidak banyak terbukti adanya dampak pendekatan CDD pada standar tradisional dari kesejahteraan rumahtangga ataupun akses ke pelayanan. Tulisan ini mencoba memecahkan masalah ini dengan cara mengevaluasi dampak dari Program Pengembangan Kecamatan tahap 2 (PPK2). Evaluasi ini menggunakan sekelompok indikator pilihan untuk periode 2002-2007 untuk menjawab pertanyaan-pertanyaan penelitian berikut:

- Apakah PPK2 meningkatkan kesejahteraan rumahtangga (diukur sebagai real per capita consumption)?
- Apakah PPK2 mengentaskan rumahtangga-rumahtangga keluar dari kemiskinan?
- Apakah individu-individu di kecamatan-kecamatan PPK2 mengalami peningkatan dalam akses ke pendidikan dan pelayanan kesehatan, serta kesempatan kerja?
- Apa dampak indikator-indikator ini bagi kelompok-kelompok miskin dan terkendala?

Metodologi penelitian dirancang untuk memastikan agar dampak-dampak yang ditemukan dapat dikaitkan dengan programnya. Sebuah panel rumahtangga dibangun dari rumahtangga-rumahtangga yang terpilih dari survei rumahtangga nasional SUSENAS 2002 lalu diwawancara ulang dalam survei berikutnya, yaitu Survei Evaluasi Dampak PNPM-Rural 2007. Pendekatan pencocokan nilai kecenderungan (*propensity score matching*) digunakan untuk memilih kecamatan-kecamatan yang ikut dalam PPK2 dan sebuah kelompok kecamatan kontrol yang memiliki ciri-ciri serupa berdasarkan data yang diambil dari sensus desa PODES2003. Sampelnya terdiri dari 6,198 rumahtangga dari 300 kecamatan di 17 propinsi. Ini memungkinkan evaluasi melakukan perkiraan perbedaan-dalam-perbedaan (*differences-in-differences*) atas dampak PPK2 terhadap sekumpulan lima indikator:

- Konsumsi nyata per kapita (*Real per capita consumption*)
- Status kemiskinan
- Penggunaan pelayanan kesehatan rawat-jalan
- Tingkat pengangguran
- Tingkat pendaftaran ke Sekolah Dasar dan Menengah

Hasil-hasil utamanya diuraikan di bawah ini:

- **Berkat partisipasi dalam program, peningkatan konsumsi nyata per kapita (*real per capita consumption*) 11 persen lebih tinggi di kalangan rumahtangga-rumahtangga miskin di wilayah-wilayah PPK2 dibandingkan dengan mereka yang berada di wilayah-wilayah kontrol.** Hasil-hasil ini menunjukkan bahwasanya PPK2 paling efektif dalam menjangkau rumahtangga-rumahtangga miskin maupun rumahtangga-rumahtangga di kecamatan-kecamatan yang miskin. Rumahtangga-rumahtangga yang berada di peringkat perkiraan konsumsi paling bawah tahun 2002 yang ikut ambil bagian dalam PPK2 mengalami peningkatan konsumsi nyata per kapita sebesar 11 persen lebih tinggi daripada di wilayah-wilayah kontrol. Rumahtangga-rumahtangga PPK2 di peringkat terbawah kecamatan mengalami dampak positif serupa sebesar 5 persen dibandingkan dengan wilayah-wilayah kontrol.
- **Perbandingan rumahtangga yang keluar dari kemiskinan di kecamatan miskin adalah 9.2 persen lebih tinggi di wilayah-wilayah PPK2 dibandingkan dengan wilayah-wilayah kontrol.** Dengan ambang kemiskinan \$2-sehari versi Bank Dunia, rumahtangga-rumahtangga PPK2 di kecamatan-kecamatan miskin 9.2 persen lebih mungkin keluar dari kemiskinan antara tahun 2002 dan 2007 daripada di wilayah-wilayah kontrol.
- **Berkat partisipasi dalam PPK2 rumahtangga-rumahtangga yang rawan kemiskinan (mendekati ambang kemiskinan) lebih rendah risikonya jatuh ke dalam kemiskinan.** Perbandingan rumahtangga-rumahtangga yang jatuh ke dalam kemiskinan di kecamatan-kecamatan miskin adalah 4.5 persen lebih sedikit di wilayah-wilayah PPK2 dibandingkan dengan wilayah-wilayah kontrol.
- **Rumahtangga-rumahtangga di kecamatan-kecamatan yang tidak terlalu miskin tidak merasakan manfaat atau bahkan merasakan dampak negatif.** Dalam hal baik konsumsi nyata per kapita (*real per capita consumption*) maupun pengentasan dari kemiskinan, rumahtangga-rumahtangga di peringkat konsumsi yang lebih tinggi atau rumahtangga-rumahtangga di kecamatan yang tidak terlalu miskin memberikan hasil yang tidak bermakna atau bahkan dampak yang negatif. Pada rumahtangga-rumahtangga di kecamatan-kecamatan yang terkaya, peningkatan konsumsi di wilayah-wilayah kontrol lebih besar daripada peningkatan yang terjadi di wilayah-wilayah PPK2.
- **Kelompok-kelompok terkendala, yang bukan kelompok miskin, lebih kecil kemungkinannya untuk mendapatkan manfaat dari program.** Kelompok-kelompok terkendala, seperti rumahtangga-rumahtangga yang dikepalai oleh perempuan dan rumahtangga-rumahtangga yang kepalanya tidak berpendidikan dasar, menerima dampak yang tak bermakna atau lebih sedikit pada konsumsi nyata per kapita mereka maupun pengentasan (peralihan ke luar) dari kemiskinan dibandingkan dengan wilayah-wilayah kontrol.
- **Perbandingan kepala rumahtangga yang mendapat akses ke pelayanan rawat-jalan adalah 11.5 persen lebih tinggi di wilayah-wilayah PPK2 dibandingkan dengan wilayah-wilayah kontrol.** Di antara kepala-kepala rumahtangga yang tidak meminta pelayanan rawat-jalan di tahun 2002, kepala-kepala rumahtangga di PPK2 11.5 persen lebih mungkin meminta pelayanan rawat jalan di tahun 2007 daripada kepala rumahtangga di wilayah kontrol. Berlawanan dengan hasil konsumsi nyata per kapita maupun status kemiskinan di atas, kelompok-kelompok terkendala juga mendapat manfaat dalam hal perluasan akses ke pelayanan rawat-jalan.
- **PPK2 mengurangi pengangguran sebesar 1.5 persen di wilayah-wilayah program.** Meskipun pengangguran pada umumnya meningkat selama periode 2002-2007, jumlah kenaikan tingkat pengangguran 1.5 persen lebih sedikit di kecamatan-kecamatan PPK2 dibandingkan dengan kecamatan-kecamatan kontrol.
- **PPK2 tidak berdampak pada tingkat pendaftaran sekolah.** Di tingkat Sekolah Dasar, kemungkinan besar ini disebabkan oleh sudah tingginya tingkat pendaftaran sekolah. Di tingkat sekolah menengah, ketidaaan panel individual mengurangi kemampuan studi ini dalam mendeteksi dampak-dampaknya.

Sambil menantikan Program Nasional Pemberdayaan Masyarakat-Komponen Pedesaan (*PNPM-Rural*), yang mengandalkan serta memperluas program PPK, maka hasil-hasil di atas mengarahkan kita kepada rekomendasi-rekomendasi berikut bagi program ini dan penelitian selanjutnya:

- **Tiadanya efektivitas di kecamatan yang tidak miskin menimbulkan keprihatinan karena PNPM-Rural akan berkembang meliputi seluruh Indonesia.** Mengingat PPK diarahkan kepada wilayah-wilayah miskin dan terpencil, maka kecamatan-kecamatan selebihnya yang akan mulai ambil bagian dalam PNPM-Pedesaan kecil kemungkinannya berciri demikian. Hasil-hasil penelitian mengindikasikan bahwasanya program ini perlu menyesuaikan strateginya untuk meningkatkan efektivitasnya di wilayah-wilayah yang tidak miskin.
- **Perhatian yang lebih besar dalam memastikan agar manfaat program terkumpul bagi kelompok-kelompok terkendala.** Bila kita memperhatikan dimensi-dimensi non-ekonomis dari suatu kemiskinan, seperti ketidakterdidikan atau jenis kelamin, PPK2 kurang efektif. Meskipun dalam pengaturan masyarakat telah diambil pendekatan inklusif yang mencoba melibatkan semua anggota masyarakat dalam proses pengambilan keputusan, hasilnya menunjukkan bahwa kelompok-kelompok terkendala tidak memetik manfaat dari perubahan-perubahan dalam standar kesejahteraan rumahtangga. Proyek ini mungkin perlu mempetimbangkan cara-cara baru untuk membantu rumahtangga-rumahtangga yang pencapaian pendidikannya lebih rendah, rumahtangga-rumahtangga yang dikepalai seorang perempuan, serta ciri-ciri lain yang berkaitan dengan kelompok-kelompok terkendala, seperti status minoritas etnis dan ketakpunyaan tanah.
- **Survei-survei mendatang perlu memasukkan perangkat yang dapat mengikuti dinamika sosial dan tata kelola.** Pendekatan PPK dan PNPM-Pedesaan demikian terpadunya dengan perubahan-perubahan dalam dinamika sosial maupun tata kelola setempat sehingga pemahaman yang lebih baik tentang mekanisme yang terkait sangatlah penting dalam usaha memahami bagaimana dampak-dampak kesejahteraan di kalangan bawah dapat muncul. Lingkaran survei SEDAP 2007 mencakup sebuah modul tentang modal sosial dan tata kelola; tidak boleh tidak modul ini harus diulangi pada tahun 2010. Di samping itu, mengingat semakin pentingnya peran proyek-proyek yang menggunakan pendekatan CDD dalam strategi Pemerintah, akan sangat membantu bagi penelitian mendatang apabila modul serupa dapat diikutsertakan dalam survei-survei yang diadakan oleh Pemerintah Indonesia melalui BPS.
- **Diciptakannya panel individual kritis sifatnya bagi rencana survei 2009.** Keterbatasan penting pada analisisnya adalah ketiadaan panel individual yang mendahului perkiraan dampak untuk pendidikan dan pengangguran, di samping pengumpulan data di tingkat kecamatan. Sangat penting kiranya agar lingkaran survei berikutnya memasukkan sumber-daya untuk menelusuri individu-individu maupun rumahtangga-rumahtangga untuk memastikan tersedianya data panel tentang individu.

**PPK II 2005  
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# Chapter 1

## Background

Over the past decade multilateral donors and governments have significantly expanded their engagement with communities in project decision-making and implementation. Among several related objectives, participation by communities is expected to allow local information to impact planning, develop the skills and capacities of communities to further their own development, create a greater sense of ownership on the part of communities to reduce corruption and better maintain project-built infrastructure, and promote better governance by increasing the demand for transparency and accountability in the local government environment. The community driven development (CDD) approach utilized by the Government of Indonesia and the World Bank in Indonesia in the Kecamatan Development Program (KDP) places communities at the head of the development process: community members control the planning, design, implementation and monitoring of project activities conducted in their communities.

CDD approaches also claim to realize development objectives frequently associated with more traditional development approaches, such as increased access to services, poverty alleviation, employment, and consumption. Not surprisingly, the focus of much of the evaluation research on CDD has tended toward evaluations of the participatory nature of the CDD approach. Nevertheless, Alatas (2005), in a study of KDP Phase 1, found that KDP had a significant impact on per capita consumption in comparison with a control group, and that the longer communities participated in the program, the more benefits increased. Voss (2008) also found significant gains in consumption, access to outpatient care, and employment for households participating in KDP phase two (KDP2). However, as Mansuri and Rao (2004) and Wassenrich and Whiteside (2003) note, there is little further reliable evidence that projects using CDD approaches improve traditional measures of household welfare. While it is important to note that there is also a dearth of strong evidence that projects using traditional approaches also meet such objectives, better evidence on the effectiveness of CDD projects for economic welfare measures and other traditional project objectives is needed to evaluate these claims and provide governments and donors with a better understanding of the effectiveness of the CDD approach. This is especially significant given the emphasis on such welfare measures by governments and donors, and the Government of Indonesia's current expansion of KDP to all rural areas by 2009.

A further concern is the distribution of potential impacts at the sub-village level. While communities are in control of the decision-making in the CDD framework, elites within the village may be able to manipulate the process to their advantage and capture project benefits. Even when all members of communities engage fully in project activities and community level decision-making is more in line with community preferences

(LaBonne and Chase, 2007), it is uncertain to which groups in villages benefits accrue. Of particular interest is whether poor and disadvantaged households gain from the project despite their participation in the process.

The lack of reliable evidence is in part attributable to the long time horizon needed for economic welfare and access to services outcomes in the CDD environment. CDD projects expect that new roads and irrigation projects will increase production and market access in the local economy, and that roads and new public service infrastructure such as schools and health clinics will allow greater access to services by reducing transportation time and cost. Moreover, increased community engagement with government, enhancement of community skills and capacity and increased willingness to hold government accountable is expected to result in better local governance, in which local government decision-making produces greater benefits for the community. However, outputs such as new public infrastructure, improved local governance and enhancement of skills and capacity can take time to develop the environment needed to demonstrate impacts, particularly when evaluating entire local administrative regions rather than solely in village locales where project funds are employed. CDD interventions require several months of socialization activities within the village before selection and implementation of village infrastructure sub-projects can begin, and once this process begins, it can take over a year from proposal to completion for a single infrastructure sub-project. Moreover, in a CDD intervention like KDP, not all villages receive funds for infrastructure in every cycle. Although projects last several years and provide multiple opportunities for villages to build infrastructure, the small scale and slow accumulation of infrastructure assets, as well as an expected slow pace of social change in the capacity of communities to engage and impact the quality of local governance, and to further the community's own development requires several years to influence local economic conditions and public service quality and availability.

Such a long time horizon can present significant difficulties for impact evaluation entailing a randomized project intervention or careful baseline data collection years in advance, neither of which is typical of development interventions of any approach. This paper attempts to solve this problem by utilizing a household panel generated from the SUSENAS 2002 national household survey and a separate survey conducted in 2007 (SEDAP07) which re-interviewed a subset of the same households from the 2002 SUSENAS. A set of indicators based on responses to questions from the SUSENAS 2002 survey instrument are constructed to address several key questions:

- Does KDP2 increase household welfare (measured as real per capita consumption)?
- Does KDP2 move households out of poverty?
- Do individuals in KDP2 kecamatan experience increased access to education and health care services, and employment opportunities?
- What is the impact for these indicators for poor and disadvantaged groups?

The evaluation will attempt to answer these questions by estimating impact attributable to the project for the following indicators:<sup>1</sup>

- Real per capita consumption
- Poverty status
- Use of outpatient health services
- Unemployment rate
- Primary and Secondary enrollment rates

The paper is organized as follows:

- Section 2 presents the background on the KDP program, focusing on phase 2 (KDP2) as the subject of the evaluation.
- Section 3 describes the methodology used to identify impacts, the data gathered and the sampling procedures (see Annex 1 for a more detailed and technical discussion).
- Section 4 presents findings addressing the research questions outlined above: consumption, changes in poverty status, access to education, health care and employment.
- Section 5 provides recommendations for the next survey round and for the PNPM-RURAL implementation.

<sup>1</sup> Indicators were selected based on priority areas as identified by the Government of Indonesia: Household Welfare, Poverty, Access to Services and Employment.



## Chapter 2

# The Kecamatan Development Program

The Kecamatan Development Program began in 1998 at a time of tremendous political upheaval and financial crisis. Currently, KDP is in its third phase, and is now a key component of the Government's flagship poverty alleviation program, PNPM-Mandiri, and will be known in the future as PNPM-RURAL. KDP is implemented by the Ministry of Home Affairs, Community Development Office (PMD). The program is funded through government budget allocations, donor grants and loans from the World Bank.

KDP provides block grants of approximately Rp. 500 million to Rp. 1 billion (USD 55,000 to USD 110,000) to sub-districts (kecamatan) depending upon population size. Villagers engage in a participatory planning and decision-making process to define their development needs and priorities. KDP focuses on Indonesia's poorest rural communities. The second phase is the program under evaluation for the purposes of this study.

The program features three primary goals:

- i) Poverty alleviation through increasing rural incomes.
- ii) Strengthening local government and community institutions
- iii) Improving good governance

To achieve these goals, the program distributed US\$281 million in total budget allocations to sub-districts for infrastructure, social organization activities and micro-finance. Participating kecamatans received funds for three years during the 2002-2007 period of KDP2, representing the 4th, 5th and 6th disbursement cycles for the KDP program as a whole.<sup>2</sup>

Targeting poor and remote areas, selection of kecamatan for participation was conducted through a combination of geographical poverty data prepared by the national planning agency, BAPPENAS, and consultation with district and provincial officials. A list of sub-districts not participating in the first phase (KDP1) was ranked according to a poverty score generated using SUSENAS national household survey and PODES village census data. This list was then sent to provincial and district officials for review to determine the accuracy of the ranking and suggest changes. These changes were then incorporated to create the final list of participating kecamatans for KDP2.

<sup>2</sup> See NMC, 2007.

KDP utilizes a Community Driven Development approach by involving all community members in planning, implementing and monitoring of community activities funded by the program, with a special emphasis on marginalized groups (including women and the poor). A set of five principles guides the overall approach:

- **Community participation and empowerment of poor rural communities:** information is disseminated through large village meetings; the community proposes its own ideas for KDP support; women hold their own meetings to decide upon women's proposals.
- **Transparency:** key program information is posted on village announcement boards and project meetings are open to all.
- **Sustainability:** KDP relies on community management and maintenance of all activities.
- **Simplicity:** project rules are simple and the flow of funds is direct to the kecamatan.
- **Competition for funds:** villages compete for funds in an open kecamatan level meeting at which the findings of the verification teams, the merits and the budgets of each proposal are reviewed.

The project cycle generally takes 12-14 months and is described in brief below:<sup>3</sup>

- **Information dissemination and socialization:** Workshops are held at the provincial, district, kecamatan and village level to disseminate information and popularize the program.
- **Participatory planning.** Villagers elect village facilitators (one man and one woman) to assist with the socialization and planning process. The facilitators hold group meetings, including a separate women's meetings, to discuss the needs of the village and their development priorities. Social and technical consultants at the kecamatan and district level assist with socialization, planning, and implementation. Villagers then create proposals and come together in a village-level forum to decide which proposals will be sent to a subsequent kecamatan-level meeting. Each village can submit up to two proposals to this forum with the requirement that the second proposal must come from a women's group.
- **Project selection.** Communities then meet at the village and sub-district levels to decide which proposals should be funded. Meetings are open to all community members. An inter-village forum composed of elected village representatives makes the final decisions on project funding. Project menus are open to all productive investments except for those on a short negative list.
- **Implementation.** KDP community forums select members to be part of an implementation team to manage the projects. Technical facilitators help the village implementation team with infrastructure design, project budgeting, quality verification, and supervision. Workers are hired primarily from the beneficiary village.
- **Accountability and reporting maintenance.** During implementation, the implementation team reports on progress twice at an open village meeting. At the final meeting, the implementation team hands over the project to the village and a designated village operations and maintenance committee.

In total, 1,354 kecamatan and 22,010 villages were reached through KDP2.<sup>4</sup> For KDP2, 74 percent of disbursed funds went to infrastructure activities, including tertiary roads, markets, irrigation systems and other infrastructure projects; 2.4 percent went to health clinics and health related activities and 8.2 percent to education. The remaining 15.9 percent of funds were distributed for microfinance activities, including mixed and women's credit group activities.<sup>5</sup>

<sup>3</sup> Taken from the KDP project website. For a more detailed description see: [www.ppk.or.id](http://www.ppk.or.id).

<sup>4</sup> See NMC, 2007.

<sup>5</sup> Ibid

# Chapter 3

## Methodology



In this section we develop the methods used in sampling, identification of impacts, estimation and data issues. See Annex 1 for a more detailed description.

### 3.1. Identification

The approach of the research design for the evaluation is to use the most rigorous viable methodology to attribute impacts to KDP. The primary problem in program evaluation is that we wish to compare the experience of those participating in the project with the counterfactual, or experience without the project. Unfortunately, it is not possible to observe the counterfactual outcome of no project in KDP2 areas. To solve this problem, the research design attempts to create a control group which due to measurable similarities across a range of observable characteristics establishes a baseline for changes in outcomes that would have occurred had the project not taken place. The analysis then looks at how the experience of areas which participated in the program differs from changes observed in the control group. The difference between the magnitude of the respective changes in the treatment (KDP2 kecamatan) and control groups for outcome indicators is the impact attributable to the program.

A propensity score matching methodology was used to construct the counterfactual. The ideal method for generating the counterfactual is a randomized selection of kecamatan for participation in the program. As long as the number of program locations was of sufficient size, such an approach would ensure that areas not selected for participation would be a valid control group. A second approach is to use a set of explicit criteria for selecting kecamatan into the program. A valid control group could then be constructed by using the same criteria to select other kecamatan not participating in the program. To some extent, this approach was followed using a poverty ranking constructed by the national development planning ministry, BAPPENAS. Ultimately for KDP2 selection, other considerations that were taken into account in assigning participation render the use of poverty mapping and other objective criteria problematic. Lacking randomization or clearly specified selection criteria, the evaluation used a propensity score matching technique in which a set of variables or covariates are selected based on their availability and likely correlation with both KDP2 participation and outcome indicators.

These covariates are then regressed on a binary variable indicating KDP2 participation using a logit model. From this regression, a set of predictions of the probability (or propensity score) of each kecamatan being selected for KDP2 is generated. Pairs of kecamatan (KDP2 and control) are then matched their similarity of predicted probability of participation.<sup>6</sup> From this process, a set of 150 pairs of matched treatment and control kecamatan were selected for the sample. Tests to compare the effectiveness of the propensity score matching procedure demonstrate that for all of the observed covariates there is no significant difference based on participation in KDP2.<sup>7</sup> Thus the covariates are “well-balanced” between treatment and control groups.

**While the methodology represents the best opportunity given the data available to properly identify impacts, there are some caveats.** As noted above, a randomized or clearly specified selection criteria would have ensured a lack of potential bias in the results due to a poorly constructed control group in which the underlying statistical properties of covariates impacting outcome indicators is not identical between treatment and control. The propensity score matching process ensures that the distributions of covariates or “observed” factors are not significantly different. In contrast to observed factors, unobserved factors correlated with the outcome indicators are not taken into account using propensity score matching and can potentially bias results. We can break down this potential bias into two components: (1) unbalanced, unobserved factors that are fixed across time and (2) unbalanced, unobserved factors that are not fixed across time. To address these sources of potential bias, the evaluation uses a differences-in-differences matching estimator (DIDME) in conjunction with regression adjustment to address potential bias. As Smith and Todd (2005) demonstrate, the DIDME is the least biased estimator in studies comparing the effectiveness of different estimators at replicating randomized results. Due to the panel nature of the data, the DIDME corrects for factors that do not vary over time in including unbalanced observables in component (1) above. Unobserved factors that vary over time are the most difficult to resolve as they cannot be addressed directly. However, the literature comparing experimental and non-experimental evaluations emphasizes that non-experiments using approaches such as propensity score matching perform better when three criteria are met:<sup>8</sup>

- There is a rich set of data available from which to choose observed covariates.
- The treatment and comparison groups are sampled using the same instruments.
- The treatment and comparison groups come from similar geographic areas.

The design will meet two of these criteria: both treatment and comparison groups will be sampled with the same instruments, and these instruments, the PODES census of villages and the SUSENAS household survey, provide a rich set of variables on which to condition. Geographic proximity is a criteria unlikely to be met by the research design, but it is expected that this will be mitigated to some extent through the use of the DIDME to correct for any unobservable factors that are time-invariant.

## 3.2. Data

**Primary data sources include the 2002 SUSENAS, the 2003 PODES village census and the recently conducted Survei Evaluasi Dampak PNPM-RURAL (SEDAP) 2007 survey.** The evaluation utilizes a household panel with data gathered from the 2002 SUSENAS national household survey conducted by the Badan Pusat Statistik (BPS) in January of 2002 and the SEDAP 2007 survey conducted from August to September 2007. A third survey of the same households is planned for 2009 (SEDAP 2009) to create a three year panel. The overall sample for the KDP2 evaluation includes 6,198 households selected from KDP2 and control kecamatan with 26,535 individuals in the 2007 round, as compared with 26,723 individuals for the same 6,198 households in the 2002 SUSENAS. It is important to note that due to resource and data limitations, at the individual level the survey is a panel of household heads only and not a complete panel of individuals, as household composition can change significantly given the relatively long five year gap between survey rounds. Data used for the kecamatan level propensity score matching were taken from the 2003 PODES census of villages conducted by BPS. A range of variables (see Annex 1) describing the infrastructure, economic and demographic conditions of all kecamatan in the sampling frame were taken from the 2003 PODES census. Demographic variables were derived via

<sup>6</sup> See Annex 1, Section A.1.2 for a detailed discussion.

<sup>7</sup> See Annex 1, Section A.1.2 for a detailed description and results of balancing tests.

<sup>8</sup> See Smith and Todd, 2003.

aggregation from the 2002 SUSENAS. In addition, poverty score, and education and health score composite indicators developed by BAPPENAS in 2002 and used in the process of selecting kecamatan for participation in KDP2 were included. The kecamatan poverty score is also used to stratify the data set for estimates by kecamatan poverty quintile.

#### **Box 1: Data Sources**

The SUSENAS is an annual household survey administered by the Badan Pusat Statistik (BPS) designed to assess household welfare conditions on a national scale. Currently interviewing over 200,000 households in every district in Indonesia, the survey covers such topics as household consumption, housing conditions, health care, pre natal care, education, employment and income. Specialized modules dealing with specific topics such as housing, health, culture and education are administered to a subset on a rotating basis. The data is representative not only at a national level but also at the district level.

The PODES is a national village census, also administered by BPS, and conducted three times per decade in all villages across Indonesia. The data are a complete enumeration of every village in Indonesia, recording information on characteristics (such as land size, population, water supply) and available infrastructure (number of schools, hospitals, doctors, markets, transportation and financial institutions). The survey used in this study is the 2003 version which includes data on 68,819 villages.

**The survey instrument is comprised of questions from the 2002 SUSENAS national household survey.** Due to the demands of the research design, sections of the instrument available for analysis are limited to a subset of questions taken from the 2002 SUSENAS core instrument.<sup>9</sup> Specifically, the data include from the 2002 SUSENAS core instrument: sections VI (dwelling characteristics) and VII (consumption) at the household level, and sections IV (household member characteristics), Va (health), Vc (education) and Vd (employment) at the individual level. In general, respondents are household heads for all questions. For the consumption sections, and for individuals sections, interviewers accepted answers from other household members above the age of 18 with the household head present ("best able to answer").<sup>10</sup>

**Consumption is measured as the change in the logged real per capita consumption in 2002 and 2007.** Measures for consumption per capita in 2002 are taken directly from the 2002 SUSENAS national household survey using standard BPS aggregation of categories.<sup>11</sup> Consumption in 2007 was measured in the August/September SEDAP survey using the same 2002 SUSENAS instrument.<sup>12</sup> The 2007 data are then adjusted using a set of regional BPS CPI price deflators to arrive a constant 2002 Rupiah measure for 2007 consumption per capita. The totals for each year were then logged and differenced. The advantage of using logs in this fashion is that it allows for an interpretation of the difference as a log growth rate as the difference in logged real per capita consumption is equivalent to the log of the ratio of 2007 consumption to 2002 consumption. This is equivalent to calculating the compounded growth rate over the period between 2002 and 2007. Estimates can be interpreted as the percentage point difference in log growth rates between treatment and control groups.

**Poverty status is assigned based on the 2002 and 2007 BPS poverty lines.** Households are assigned as "poor" or "non-poor" using their 2002 and 2007 real per capita consumption measures and the 2002 and 2007 BPS Rural poverty line and the 2020 and 2007 World Bank US\$2-a-day lines. Households are then placed into one of four Poverty Status categories: 1) Stayed Poor, 2) Never Poor, 3) Out of Poverty, 4) Into Poverty.

**Access to health indicators are also constructed using a "change in status" categorical variable.** Due to the

9 A module focusing on social capital and demand for good governance was also implemented in SEDAP 2007 and will be used in conjunction with the planned 2009 survey. The current evaluation will compare differences in observed changes in project and comparison areas and thus is limited to questions included in the 2002 SUSENAS instrument.

10 Given time constraints, occasionally spouses at not household heads were the primary respondents for household sections.

11 Food expenditure is defined as the sum of all weekly food categories multiplied by 30/7. Non-food is the sum of yearly expenditure divided by 12. The total expenditure is calculated as the sum of food and non-food totals.

12 The fact that the 2007 survey was conducted in August/September and not in January may have impacted the data collection for the consumption measure. Because this time period was heading into the fasting month, we might expect estimates to be slightly higher than normal. Seasonal differences may also impact estimates.

lack of a panel for individuals except household heads, the sample for access to health indicators consists of household heads that were sick in both 2002 and 2007. For incidence of outpatient care conditional on being sick, household heads are assigned into one of four categories: 1) Always sought outpatient care, 2) Never sought outpatient care, 3) Newly seeking outpatient care in 2007, 4) Previously sought outpatient care and not seeking in 2007.

**Unemployment rates are calculated via two methods.** Following Suyadarma, Suryahadi and Sumarto (2005), we construct two different measures for unemployment. The first measure excludes discouraged workers and includes an active labor force populations of adults aged 18-55 consisting of employed (both at work and not at work but still employed), self-employed and unemployed. The second measures adds discouraged workers to the labor force population and considers both declared unemployed and discouraged workers as unemployed. Discouraged workers are defined as those not working or declared unemployed that either indicate difficulty in finding a job or have no other valid reason (school attendance, retirement, household duties).

**School enrollment rates are simple net primary and secondary enrollment rates.** Net school enrollment rates are defined as the number of children enrolled in the appropriate age group divided by the number of children in the appropriate age group in the population. Age groups are defined as 7-12 years for primary school, and 13-18 years for secondary school.

### 3.3. Sampling

**Sample size was determined using power calculations.<sup>13</sup>** The sample size was calculated taking into account the multi-stage sampling design. The required sample size is 2,250 households and 150 kecamatan (fifteen households per kecamatan) for both the treatment and control groups based on an estimated treatment effect size of .14. An additional 50 percent was added to the sample to account for expected attrition between 2002 and the final round survey in 2009.

**The sampling frame is constructed from households included in the 2002 SUSENAS.** As discussed above, the need for baseline data gathered before KDP2 began implementation necessitated the use of an existing dataset. It is important to note that the sample selection is taken from that dataset and not from all kecamatan and households in Indonesia. The sampling frame from which sample kecamatan and households were selected consists only of kecamatans and households which were surveyed in the 2002 SUSENAS. In addition, some kecamatan from the 2002 SUSENAS are excluded from the sampling frame due to participation in similar CDD programs, location in conflict or tsunami affect areas, or due to limited coverage in the 2002 SUSENAS. The evaluation identified five programs using similar approaches in terms of implementation and per village disbursement levels as KDP2.<sup>14</sup> Kecamatan that participated in these programs during the period of evaluation were not included in the sampling frame. In addition, areas which were under sampled in the 2002 SUSENAS including Aceh, Maluku, North Maluku and Papua are not included in the sampling frame. The remaining kecamatan from the 2002 SUSENAS not excluded by previous participation in similar CDD programs or under sampled in the 2002 SUSENAS were then pooled and matched using the methods described above. The sampling was not stratified by region in order to ensure the largest pool of control kecamatan available for matching to each treatment kecamatan. For the geographical distribution of kecamatan by province, see Table A1.1.

**For each selected kecamatan, twenty-two households are sampled from the 2002 SUSENAS.** From each kecamatan, two enumeration areas (EA's), a sampling unit of sixteen households defined by geographic proximity and used by the BPS for SUSENAS sampling procedures, were selected. At the household level, eleven of the sixteen households were sampled in the 2007 survey. Selection was based on the order of households listed in the 2002 SUSENAS with replacements (households numbered 12-16) used when it was found that members of the first eleven on the list were no longer in the village where the EA was located. The survey did not follow households who migrated outside the village.<sup>15</sup>

<sup>13</sup> See Annex 2.

<sup>14</sup> See Annex 1, Section A.1.1 for list of programs.

<sup>15</sup> Migration out of the village was not seen to be significantly different between treatment and control groups.

### 3.4. Estimation

**Estimation for real per capita consumption was conducted using comparison of means tests with bias adjustment.** As demonstrated in Annex 1, the matching procedures resulted in good balance for all covariates used, both in terms of comparison of means and tests for similarity of distributions. In this situation, simple comparison of means tests using a difference-in-differences approach on outcome variables groups is appropriate. In order to enhance the effectiveness of the matching process, we follow the bias correction methods using covariates from the matching process outlined in Rubin (2000) and Abadie and Imbens (2002), and utilized in several studies featuring propensity score matching including Jalan and Ravallion (2001).<sup>16</sup> Similar comparison of means tests are conducted on stratified subsets of the dataset for real per capita consumption in 2002, and kecamatan poverty score quintiles, household head education levels, female headed households and households below the BPS poverty line in 2002.

**Categorical outcome variables for change in poverty status and use of outpatient care are estimated using a multinomial logit model.** As discussed above, households are placed in one of four categories based on change in poverty status or use of outpatient services between 2002 and 2007. A multinomial logit model is then used to estimate the effect of KDP2 on the probability of being assigned to each category.<sup>17</sup>

**Analysis of Individual Level data is conducted using a cohort panel.** Due to the lack of a panel at the individual level, a cohort panel of aggregated individual data by kecamatan was constructed and then estimated using a similar comparison of means on differences in school enrollment and unemployment outcomes.

<sup>16</sup> As Rubin (2000) demonstrates, use of such techniques significantly reduces bias in matching estimates compared with uncorrected comparison of means estimates. See Annex 1, Section A.1.3 for a detailed description.

<sup>17</sup> For a detailed discussion of estimation methods, see Annex 1, Section A.1.3.





# Chapter 4 Results

This section discusses the main results from the analysis. Section 4.1 addresses household welfare as measured by real per capita consumption. Section 4.2 considers the impact of changes in household welfare on changes in poverty status. Section 4.3 presents evidence on expanding access to health care. Finally, Section 4.4 takes a brief look at unemployment and school enrollment. Only results significant to at least the 10 percent level are discussed, unless otherwise noted.

## 4.1. Household Welfare

As described in Section 3.2, the measure of the change in household welfare is the difference in logged real per capita consumption between 2002 and 2007. We then compare the changes in consumption between treatment and control households with comparison of means estimates using the full sample, and a sample matched at the household level again via propensity score matching. Effects are presented for the full sample and samples stratified by 2002 consumption quintile, predicted 2002 consumption quintile, 2002 kecamatan poverty score quintile, education of the household head, gender of the household head and location on and off Java. The results are shown in Table 1.

**KDP2 has a significant impact on poor households but does not have an overall impact on consumption in comparison with control groups.** The results in Table 1 suggest that KDP2 has no overall impact on changes in logged real per capita consumption. In contrast, for households which were poor in 2002, significant impacts emerge. Looking at the full sample, for the first quintile of households ordered by 2002 per capita consumption, there is a 10.5 percentage point difference in the logged growth rate of real per capita consumption between KDP2 and control households. Similarly, households under the 2002 BPS poverty line in 2002 demonstrate a difference of 10.2 percentage points. For households in relatively wealthier quintiles, KDP2 appears to be less effective: for the 2<sup>nd</sup> and 3<sup>rd</sup> quintiles of 2002 per capita consumption we find significant negative impacts of -7.6 and -7.8 percentage points, respectively.

**The results are robust to corrections for potential problems with measurement error.** A primary concern for the validity of the results demonstrated in Table 1 is the potential for bias due to measurement error. Households which were measured too low or too high in 2002 and then properly measured in 2007 (or vice versa), will see large changes which do not represent the true change in consumption. This effect has a tendency of convergence within the consumption distribution: poorer households see large gains relative to richer households.<sup>18</sup> Moreover, using the 2002 real per capita consumption measures to generate quintiles could lead to biased and inconsistent results as mismeasured households are not assigned to their true quintiles. For example, non-poor households that were under measured relative to their true consumption would populate the sample for the first quintile rendering it a poor representation of true first quintile households measured without error. To test this concern we consider two approaches to generating a proxy measure of household welfare which are independent of measured 2002 real per capita consumption and its potential associated measurement error but correlated with the true real per capita consumption. First, we consider the impact of KDP2 on households stratified by inclusion in quintiles of kecamatan ordered by the 2002 BAPPENAS poverty score. The poverty score is based on a range of factors including education, health, demographic and poverty data. The results are similar with a positive 20.0 percentage point impact in the log growth rate of real per capita consumption on KDP2 households in the first (poorest) quintile and a -23.0 percentage point impact for KDP2 households in the 5<sup>th</sup> quintile for the full sample. Next, we construct a predicted consumption estimate using household level asset and demographic variables from the 2002 SUSENAS.<sup>19</sup> As shown in Table 1 and looking at the full sample, the results are consistent with the results noted above using 2002 measured consumption quintiles: we still find a significant positive impact of 11.0 percentage points for KDP2 in the first quintile of predicted consumption and negative impact of 9.7 percentage points for households at higher ends of the consumption distribution, although in this case the fourth quintile.

**Estimates from matched households demonstrate consistent results.** A further concern for the validity of the results presented above is heterogeneity at the household level. Although matching at the kecamatan level ensured that households from the same kecamatan experience the same kecamatan-level conditions in terms of the economic, social and other environments, significant household level heterogeneity for variables that could impact consumption (and the indicators considered below) could remain. Such heterogeneity could introduce bias if correlated with KDP treatment. To correct for this problem we conduct a second household level matching using household level variables from the 2002 SUSENAS and generate the same estimates as above using the matched household sample.<sup>20</sup> Looking at the column "Household-level matched sample", the results shown in Table 1 show a similar pattern to those observed with the comparison of means tests above. Positive impacts for the 1<sup>st</sup> quintiles of 2002 per capita consumption, predicted 2002 per capita consumption, 2002 kecamatan poverty score and households below the 2002 BPS poverty line are significant, the latter at the 10 percent level. Also significant at the 10 percent level is a negative impact for the full sample of -2.4 percentage points. This appears to be driven by households in higher consumption quintiles which show negative impacts in the log growth rate of real per capita consumption using the 2002 consumption quintiles and the predicted 2002 consumption quintiles. Consistent with results above, we see a negative impact for households in the top quintile of kecamatan poverty score.

**KDP2 is most effective at reaching poor households.** The results discussed above for household welfare point to KDP2 being most effective at reaching poor households and households in poor kecamatan. Previous studies on KDP support this conclusion by demonstrating the advantages of the KDP approach in poor and remote areas. Torrens (2005) and Dent (2001) in analyses of the return to subproject investments showed that the largest gains for KDP2 participants were in areas where potential production was suppressed due to barriers to market access. New roads, irrigation infrastructure and water projects created access to markets that were previously inaccessible or not viable due to high transportation costs, allowed more than one crop planting per year, or greatly reduced the time devoted to water collection. One of the primary reasons for the lack of proper infrastructure is the high cost of construction in poor and remote areas. Given that as Alatas (2005) demonstrated, KDP2 was targeted toward these areas, roads or other irrigation infrastructure that has been constructed in difficult to access locations due to KDP might be too costly for local government. Torrens (2005) finds that KDP is able to build local infrastructure at a lower cost than comparison estimates for standard

18 As Fields et al (2001) show, this pattern has been observed in Indonesia.

19 Variables include ownership of durable assets, housing conditions and demographic characteristics of the household head. See Annex 1.

20 Variables include ownership of durable assets, housing conditions and demographic characteristics of the household head. See Annex 1.

government contractors due to locally sourced materials and community contributions; this would be even more advantageous from a cost perspective in remote areas where the potential for consumption gains are large.

A second factor is the potential that the capability of local communities to set priorities for sub-project investment under KDP2 might lead to decisions for new infrastructure in the village which 1) would not have been undertaken by local government and 2) are more pro-poor oriented. KDP procedures place emphasis on extending benefits to the poor. In project selection, one of the criteria used in proposal evaluation is the extent to which the poor benefit. Moreover, through the extensive community facilitation and organization activities that are conducted at the beginning of the program and through participation in KDP project implementation, poor community members may be more active in community forums and more able to influence decision-making. Previous evidence supports this view. The 2005 KDP annual report notes that the percentage of poor community members in village meetings increased from 53percent to 61percent between the first phase of KDP and KDP2. The recently conducted PNPM-RURAL Qualitative Baseline Report supports this view finding that in comparison with non-KDP2 villages, community members in KDP2 villages were more likely to access to policy and development information, be active in KDP and other public forums, leading to elites being less dominant in decision-making.<sup>21</sup>

**Households at higher consumption levels and households in less poor kecamatan do not benefit from KDP2.** Conversely, consumption gains for wealthier households and households in wealthier kecamatan were not as large in KDP2 areas in comparison with control areas. If elites and wealthier households are less able to control decision-making in KDP2 communities, their potential for gains in consumption may be more limited compared with control kecamatan where elites may be more likely to influence infrastructure and other development project to their benefit.

**For real per capita consumption, the distribution of KDP2 benefits does not extend to traditionally disadvantaged groups.** The impacts attributed to KDP2 for poor households are not realized by female headed or households with heads lacking primary education despite both groups showing a higher poverty incidence than the overall sample.<sup>22</sup> Given the results for real per capita consumption above, we might expect similar results for these groups traditionally associated with lower consumption levels. However, looking at impacts on female headed households and households stratified by education of the household head, the same pattern does not emerge as we find no significant positive impacts for KDP2, and several negative impacts. For the matched household estimate, the results indicate a lesser impact for female headed households of -3.4 percentage points. This is perhaps somewhat surprising given the emphasis KDP places on incorporating women into the project process. Separate women's meetings are conducted as part of facilitation activities and one of the proposals from each village must come from women's groups. In addition, there is a specific microfinance component which funds women-only credit groups. Households with heads with no primary education show similar results with a negative impact of -6.4 percentage points for the full sample, though only at the 10 percent level.

Some qualitative evidence supports these findings. Based upon field supervision missions and the KDP qualitative impact evaluation (McLaughlin, Satu, and Hoppe, 2007), the program still has difficulty reaching various pockets of highly vulnerable groups, including female-headed households and household heads with no primary education. These are marginalized groups who generally do not attend project meetings, are not invited to meetings, or for whom the costs in time and lost income of meeting attendance is high. In addition, the practice of majority voting within the village sometimes has the effect of discouraging smaller, often outlying groups from participating, or if these groups are far from the village center, they may not necessarily benefit from a project centered in more populated parts of the village. Program managers also cite that from the KDP project facilitators' point of view, more attention has been focused upon the "other end of the spectrum" e.g., reducing elite capture vis-a-vis the majority in the village. Less attention and effort have been paid to include the hard-to-reach population segments.

21 See Institute for Social and Economic Research, Education and Information, 2008.

22 Poverty rates for 2002 female-headed households and households with heads lacking primary education were 17.2 percent and 20 percent, respectively, compared with 16.6 percent for the sample as a whole. These differences were significant at the 5 percent level.

## 4.2. Poverty Status

In this section, we employ two models to obtain estimates on changes in poverty status. We use a multinomial logit model on the full household sample and then a conditional comparison of means test using the matched household sample constructed for the per capita consumption analysis above. Households are placed into four categories based on poverty status in 2002 and 2007: 1) Stayed Poor; 2) Never Poor; 3) Out of Poverty; 4) Into Poverty using the following per capita poverty lines (in current Rupiah value):

BPS-Rural

- 2002- Rp. 96,512
- 2007- Rp. 146,837

World Bank US\$2 per day

- 2002- Rp. 165,853
- 2007- Rp. 242,704

The multinomial logit model for the full sample allows us to consider the probability of inclusion into the four categories simultaneously, whereas the conditional comparison of means model on the match-household sample considers only households which (1) were poor in 2002 and moved out of poverty; and (2) not poor in 2002 and moved into poverty.<sup>23</sup>

Given comparable 2002 poverty rates for treatment and control households<sup>24</sup>, the categories of greatest interest are 3) and 4): households moving out of poverty and households falling into poverty for both the BPS and World Bank US\$2-a-day (WB\$2) poverty lines. In the conditional comparison of means model, we restrict the sample to those households which were poor in 2002 for category 3) and to those not poor in 2002 for category 4. Coefficients indicate the percentage point difference in households moving out of or into poverty in treatment households relative to control households. Results refer to Tables 2-5.

**There is some evidence that poor households in general and households in poor kecamatan move out of poverty at a higher rate due to KDP2.** Similar to the results obtained for real per capita consumption above, we do not see impacts for both the BPS and WB \$2-a-day poverty lines when looking at the full sample results from the multinomial logit model. For the matched household model, we do find a 4.5 percentage point positive difference in the percentage of households moving out of poverty at the BPS poverty line, but only at a 10 percent level of significance. However, as shown in Tables 2 and 3, for the BPS poverty line the percentage of KDP2 households in the poorest kecamatan (1<sup>st</sup> quintile) moving out of poverty was 14.4 and 9.8 percentage points higher than for control households for the multinomial logit and conditional comparison of means models, respectively (the latter at only the 10 percent level); looking at the WB\$2 poverty line, in the same quintile we also see a positive significant impact from KDP2: 11.7 and 9.2 percentage point differences. This finding provides support for the view discussed above that KDP2 is effective in areas where eliminating barriers to market access can have large impacts. Households in poor kecamatan are also less likely to move into poverty as a result of KDP2. Results from Table 4 indicates that KDP2 households in the first quintile of kecamatan poverty score are 4.5 and 3.5 percentage point less likely in comparison with control households to fall into poverty at the BPS poverty line for the full sample and matched household samples, respectively, indicating that households with potential vulnerability to poverty are less at risk of becoming poor due to the program.

**KDP2 households in wealthier kecamatans are more likely to move into poverty and less likely to move out of poverty.** Also consistent with the findings for real per capita consumption, KDP2 households in the top quintile of kecamatan poverty score show an increased incidence of moving into poverty and a decreased incidence of moving out of poverty. The results in Tables 2 and 4 for the multinomial logit model indicate that

23 For a detailed discussion see Annex 1, Section A.1.3.

24 Poverty Rates in 2002: BPS- KDP2 16.0 percent; Control 16.2 percent. WB\$2- KDP2 55.64 percent; Control 56.81 percent. These differences are not statistically significant.

the percentage of KDP2 households moving out of poverty is 4.6 percentage points less and the percentage of KDP2 households moving into poverty is 5.3 percentage points higher compared with control households for the BPS poverty line (the former only at the 10 percent level). Looking at Tables 3 and 5 and considering the WB\$2-a-day poverty line, the same pattern emerges: KDP2 households are 14.7 percentage points less likely to move out of poverty and 14.3 percentage points more likely to move into poverty. The conditional comparison of means model also shows a negative impact on households moving into poverty for the same quintile at the BPS poverty line.

**Female-headed households and households with heads lacking primary education do not see positive changes in poverty status due to KDP2.** Not surprisingly, the lack of consumption gains due to KDP2 is not creating positive changes in poverty status for other disadvantaged groups. Female-headed households and households with low household head education follow a similar pattern to consumption with primarily insignificant or negative impacts from the program. Again looking at Tables 2-5, households with heads with no primary education participating in KDP2 are 2.7 and 2.6 percentage points more likely to fall into poverty at the BPS poverty line. For the same group of households above the WB\$2-a-day poverty line in 2002, KDP2 households are 3.3 percentage points more likely to fall into poverty based on the multinomial logit model (though only significant at the 10 percent level). Households with heads lacking primary education are 6.2 percentage points less likely to move out of poverty at the WB\$2-a-day line according to the multinomial logit model. For female headed households participating in KDP2, the percentage moving out of poverty is 8.6 percentage points less than for control households for the multinomial logit model at the WB\$2-a-day poverty line. The location of households on or off-Java did not have a significant impact on household consumption in Section 4.1.<sup>25</sup> Considering changes in poverty status however we find households located off-Java are 5.7 percentage points more likely to move out of poverty and 2.5 percentage point less likely to move into poverty than control households according to the conditional comparison of means model at the BPS poverty line. Conversely, KDP2 households on Java are more likely to fall into poverty at the WB\$2-a-day poverty line by 3.1 percentage points for the same model (significant at the 10 percent level).

**Impacts on poverty status are largest for the poor in poor areas.** The findings for changes in poverty status are generally consistent with the results for per capita consumption. One significant difference is the relatively weaker effect on poor households in general, indicating that consumption benefits seen above do not have as strong an effect in pulling households above the poverty threshold. This result reinforces the view that KDP2 is more beneficial in poor and remote areas: poor in relatively poor kecamatan shows significant gains while the poor in general and in wealthier kecamatan see no impacts on poverty status as a result of the program.

### 4.3. Access to Health Care

This section utilizes a similar approach to section 4.2 by considering changes in usage of outpatient facilities by household heads using a multilevel logit model on the full sample of household heads and a conditional comparison of means model on the matched household sample.<sup>26</sup> As described in Section 3.2, household heads that were sick in 2002 and 2007 were divided into 4 categories based on 2002 and 2007 usage of outpatient services. Here we focus on household heads that changed their status with respect to use of outpatient services by moving into outpatient care in 2007 after not seeking it in 2002. Estimates represent the percentage point difference between treatment and control household heads that were sick and did not seek outpatient care in 2002, but were sick and accessed outpatient care in 2007.<sup>27</sup> The results are shown in Table 6.

**KDP2 household heads are more likely to access outpatient care as a result of the program.** As shown in Table 6, the results from the multinomial logit and the matched household conditional models demonstrate that KDP2 expands access to outpatient care. Among household heads which did not seek outpatient care in 2002, KDP2 households were 9.7 and 11.5 percentage more likely to use outpatient services than control households

<sup>25</sup> It is important to note that kecamatan selection was not stratified according to region and thus the results for On and Off-Java have a much greater potential to be biased due to selection effects.

<sup>26</sup> The lack of a full individual level panel precludes considering the entire sample.

<sup>27</sup> The sample size was not adequate to compare household heads that sought care in 2002 but did not seek care in 2007.

in 2007 for the multinomial logit and conditional comparison of means models, respectively. There is also some evidence of similar impacts among poor households. For the first quintile of 2002 per capita consumption the likelihood of moving into outpatient care was 1.9 and 12 percentage points higher for KDP2 households but only at a 10 percent level of significance. As we would expect given the 1<sup>st</sup> consumption quintile results above, poor households from 2002 using the BPS poverty line show a 1.2 and 17.2 percentage point difference compared with control households, the former at only at a 10percent level of significance. In contrast to consumption and changes in poverty status, positive impacts are seen for households in less poor kecamatan. For the multinomial logit model, we see significant positive impacts for the 4<sup>th</sup> and 5<sup>th</sup> quintiles of kecamatan poverty score and for the conditional comparison of means model, a strong positive impact for the 3<sup>rd</sup> quintile where KDP2 household heads are 23.8 percentage points more likely to seek outpatient care.

**Household heads with relatively less education see large gains in access to outpatient services due to KDP2.** In contrast to the consumption and poverty results above, household heads with no primary and just primary education benefit significantly in terms of expanding access to outpatient services. Considering both models, we see a 13.9 and 10.8 percentage point difference for KDP2 household heads with no primary education and 10.0 and 13.7 percentage points difference for household heads with primary education for the multinomial logit and conditional comparison of means models, respectively. Household heads living off-Java see large gains as well, a difference of 10.1 and 12.4 percentage points.<sup>28</sup> Female household heads do not see the same benefits.

**The distribution of benefits is more favorable to disadvantaged groups and less concentrated in poor kecamatans.** Aside from female headed household, the poor, less educated and off-Java household heads show consistent benefits from the program. This is despite infrastructure activities for health comprising just 2.4percent of all funds disbursement.<sup>29</sup> The fact that impacts are widespread but not found in poor kecamatans may indicate a preference in poor kecamatans in favor of roads, irrigation or other projects which have a more direct impact on production, but which given their more remote status, may not reduce the transportation and time costs enough to see increased access to health care. In other kecamatans, communities may find it easier to prioritize improving health facilities. Moreover, given the small percentage of funds used for construction of health facilities, the biggest factors may come from new roads reducing transportation and time costs and consumption gains noted above which allow for greater spending on health care, rather than new health infrastructure.

#### 4.4. Access to Education and Employment

The lack of an individual-level panel in the data limits the scope of the analysis for access to education and employment. Without the capability to use a sample of individuals, we instead use a matched kecamatan cohort panel in which individuals' unemployment and enrollment status are aggregated at the kecamatan level to compare mean changes in school enrollment and unemployment rates. Given the relatively small number of kecamatan, only the full sample can be considered. The results are shown in Table 7.

**KDP2 reduces the unemployment rate in participating kecamatan.** One of the key features of the KDP approach is the employment of community members in the construction of village projects. Given that this employment is temporary for the purpose of project construction, it might be expected that such employment gains would disappear once the project reached completion. However, as Papanek (2007) argues, the majority of employment gains due to PNPM-RURAL are likely to result from indirect sources due to increased economic activity rather than direct employment through the program. The results shown in Table 7 support the view that KDP2 had a lasting benefit on employment: the mean change in the unemployment rate for KDP2 kecamatan was -1.5 percent lower than control kecamatan. When discouraged workers are added to the labor force, these impacts disappear, indicating KDP2 is less effective in assisting individuals who have stopped looking to work due to difficulties with finding employment.

<sup>28</sup> Once again, it is important to note that the results for Java and Off-Java are less reliable as the kecamatan sample was not stratified by region.

<sup>29</sup> NMC, 2007.

**There is no impact on primary or secondary enrollment rates from the program.** No significant differences emerge in primary and secondary enrollment rates. The lack of significant results are likely to be two-fold. First, in the case of primary enrollment, enrollments, rates are already high: approximately 95 percent for both 2002 and 2007 in the sample indicating that there is likely to be relatively less demand for new education infrastructure at the primary level. For secondary enrollment, the problem is the lack of an individual panel necessitating using a cohort panel aggregated at the kecamatan level. Aggregation reduces the amount of information available and the sample size, which in turn decreases the power available to detect significant impacts. As with other indicators above, stratifying the sample by consumption or kecamatan quintiles, or other factors as above might yield more interesting results, but the kecamatan level sample size is not large enough to consider these estimates. The evaluation planned for 2009 of the successor to KDP, PNPM-RURAL, will be able to make use of an individual level panel which will allow for a more detailed analysis.





# Chapter 5

## Conclusions and Recommendations



This paper has examined the impact of KDP2 on a set of household welfare indicators for which scarce evidence exists in the CDD context. Using data from a previous national household survey, the 2002 SUSENAS, and a recently conducted re-sampling of 2002 SUSENAS households in the SEDAP 2007 survey, we constructed household level panel data which allowed for a difference-in-difference comparison of the impact of KDP2 on real per capita consumption, change in poverty status, access to health care, access to education and unemployment. In addition to looking at overall impacts, we also considered how impacts are distributed among groups within the community to determine the extent to which disadvantaged groups are benefiting from the program.

Overall, for measures of economic welfare including real per capita consumption and changes in poverty status, the evidence indicates that KDP2 has a significant impact on poor households and households living in poor kecamatan. Less poor households and households living in less poor kecamatan see insignificant or negative impacts. This finding supports previous evidence that KDP2 is most effective in poor and remote areas where costs of infrastructure prohibit local government investment or where government investment is not a priority.

On the question of distribution of impacts within communities, KDP2 demonstrates positive impacts for poor households, but mixed to negative results for other groups. Traditionally disadvantaged groups including female-headed households and households with heads lacking primary education do not see the same benefits for measures of economic welfare as the results indicate insignificant or negative effects attributable to the program. The program has gone about addressing these issues in two ways. First, recognizing that female heads of households represent a particularly vulnerable group, a separate program for female heads of households (PEKKA) was started in 2001 to address issues of economic welfare, access to financial resources, social and political participation, and leadership development. The program has been working in eight provinces covering some 8,000 members, and is looking towards expanding their coverage in the next several years. Second, PNPM-RURAL will be launching a special study in 2008 on highly vulnerable and marginalized groups. Using qualitative ethnographic research techniques, the study will examine whether such groups

participate in project activities, are active-decision-makers in the project framework, and benefit from project investments, and the factors that contribute to failures or successes involving these groups. Project locations will be chosen across geographically diverse areas selecting sites from Sumatra, Java and eastern Indonesia. In these places, the study will also examine how ethnic minority groups are involved in PNPM-RURAL planning.

Significant effects expanding access to outpatient care were found among less poor kecamatan and disadvantaged groups, including poor households and households with heads lacking primary education. Through limited to considering the full sample aggregated at the kecamatan level, the results indicate a significant reduction in the unemployment rate attributable to KDP2.

These findings to some extent reflect the limited variety of data available in the 2002 SUSENAS instrument and provide opportunities for future research. There are several areas in which a richer set of data could shed more light on the mechanisms that are operating behind the presented results, particularly the intersection of outcomes related to other KDP objectives, including improving local governance, community participation in decision-making and community capacity-building. For example, one of the factors in the pro-poor orientation of benefits could be the focus of KDP methods and procedures on increasing the participation of the poor in village meetings, and consideration of pro-poor impact in KDP project selection meetings. Qualitative data supports this view but it would be useful to explore quantitatively the linkages between meeting attendance and gains in measures of economic welfare. Second, the lack of an individual panel precludes deeper analysis of several measures of access to services and employment. As shown above, the distribution of benefits in terms of access to health was much broader and it would be useful to determine whether the evidence that KDP2 reduces unemployment similarly impacts a broad range of intra-community groups, including the disadvantaged.

These issues will be resolved to some extent through the study mentioned above and a planned evaluation of the successor of KDP, the Program Nasional Pemberdayaan Masyarakat (PNPN-RURAL). Building on the recently conducted SEDAP 2007 survey, the evaluation will resample households in 2009 or 2010 and includes a separate module of social capital and governance that should allow for research into the issues presented above. In addition, a qualitative component will also consider similar issues in baseline and follow up studies conducted during the same time periods as the quantitative survey.

The results highlight some considerations going forward for the PNPM-RURAL program and future evaluations:

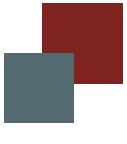
- **The lack of effectiveness of KDP2 in non-poor kecamatan is a concern as PNPM-RURAL expands to cover all of Indonesia.** Given that KDP was targeted toward poor and remote areas, remaining kecamatan that will begin participation in PNPM-RURAL are less likely to have those characteristics. The results suggest that the program needs to adapt its strategies to improve effectiveness in non-poor areas.
- **Greater focus on ensuring benefits accrue to disadvantaged groups.** When looking at non-economic dimensions of poverty, such as lack of education or gender KDP2 was less effective. The results indicate that for changes in household welfare measures, despite an inclusive approach to community organization that seeks to bring all community members into the decision-making process, such groups are not benefiting. The project may want to consider new ways to assist households with less education, female heads, and other characteristics associated with disadvantaged groups, such as ethnic minority status and lack of land ownership.
- **Future surveys need to include instruments which address social dynamics and governance.** The KDP and PNPM-RURAL approach is so closely integrated with changes in social dynamics and local governance that a clearer understanding of the mechanisms involved is crucial in shedding light on how downstream welfare impacts emerge. The SEDAP 2007 survey round included a module on social capital and governance and it will be critical for this module to be repeated in the next round in 2010. In addition, given the increasing role projects using CDD approaches are playing in the Government's strategy, it would be helpful for future research if similar modules could be included in regular surveys conducted by the Government of Indonesia through BPS.

- **An individual level panel is critical for the planned 2009 survey in order to make full use of the data on access to education, health care and employment.** A significant limitation on the analysis was the lack of an individual panel which precluded estimating impacts for education and unemployment aside from aggregation at the kecamatan level. It will be critical for the next survey round to commit the resources to track individuals as well as households to ensure panel data on individuals is available.





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## Complete Tables

Table 1: Change in Logged Real Per Capita Consumption

	Full sample			Household-level matched sample		
	Estimate	Standard Error	T-stat	Estimate	Standard Error	T-stat
Full Sample	-0.038	(0.032)	-1.17	-0.024*	(0.014)	-1.69
1 <sup>st</sup> Quintile Kecamatan Pov Score	0.200**	(0.087)	2.29	0.050**	(0.025)	-1.99
2nd Quintile Kecamatan Pov Score	-0.006	(0.073)	-0.09	0.019	(0.039)	-0.49
3rd Quintile Kecamatan Pov Score	-0.022	(0.103)	-0.21	-0.059	(0.037)	1.58
4th Quintile Kecamatan Pov Score	-0.010	(0.115)	-0.08	-0.026	(0.032)	0.81
5th Quintile Kecamatan Pov Score	-0.230**	(0.077)	-2.98	-0.084**	(0.035)	2.39
1st Quintile Per Capita Consumption	0.105**	(0.042)	2.46	0.054**	(0.027)	-1.97
2nd Quintile Per Capita Consumption	-0.076**	(0.036)	-2.1	-0.039	(0.027)	1.43
3rd Quintile Per Capita Consumption	-0.079**	(0.038)	-2.07	-0.059**	(0.029)	1.99
4th Quintile Per Capita Consumption	-0.013	(0.047)	-0.27	-0.019	(0.028)	0.70
5th Quintile Per Capita Consumption	-0.039	(0.054)	-0.73	-0.040*	(0.023)	1.72
1st Quintile Predicted Per Capita Consumption	0.110**	(0.056)	1.97	0.077*	(0.042)	1.84
2nd Quintile Predicted Per Capita Consumption	-0.029	(0.049)	-0.60	-0.002	(0.034)	-0.05
3rd Quintile Predicted Per Capita Consumption	-0.046	(0.047)	-0.98	-0.105**	(0.032)	-3.25
4th Quintile Predicted Per Capita Consumption	-0.097**	(0.045)	-2.13	-0.072**	(0.036)	-2.02
5th Quintile Predicted Per Capita Consumption	-0.038	(0.057)	-0.67	-0.096**	(0.042)	-2.27
Jawa	-0.067	(0.059)	-1.14	-0.041	(0.033)	1.22
Off Jawa	-0.015	(0.039)	-0.39	-0.017	(0.022)	-0.80
Female Head	-0.038	(0.054)	-0.69	-0.034**	(0.015)	-2.21
Head No Primary Education	-0.064*	(0.039)	-1.64	-0.026	(0.022)	1.21
Head Primary Education	-0.025	(0.037)	-0.68	0.000	(0.021)	-0.01
Head Secondary Education	-0.044	(0.045)	-0.99	-0.050**	(0.025)	2.04
Poor 2002- BPS Poverty Line	0.102**	(0.046)	2.2	0.054*	(0.030)	-1.80

Note: \* denotes significance at the 10 percent level, \*\* at the 5 percent level. Coefficients represent the percentage point difference in the log growth rate of real per capita consumption between KDP2 and control households. The first set of estimates are comparison of means test estimates on the full sample including regression adjustment. The second set of estimates uses an Epanechnikov kernel to create a sample matched at the household level and conduct comparison of means tests.

**Table 2: Households Moving Out of Poverty BPS Poverty Line**

	Multinomial Logit- Full Sample			Household-level matched Sample		
	Marginal Effect Estimate	Standard Error	T-stat	Comparison of means estimate	Standard Error	T-stat
Full Sample	-0.010	(0.017)	-0.59	0.045*	(0.027)	1.66
1st Quintile Kecamatan Pov Score	0.144**	(0.039)	3.68	0.098*	(0.054)	1.82
2nd Quintile Kecamatan Pov Score	0.010	(0.029)	0.35	0.023	(0.063)	0.36
3rd Quintile Kecamatan Pov Score	0.134*	(0.075)	1.79	0.156**	(0.050)	3.12
4th Quintile Kecamatan Pov Score	-0.003	(0.027)	-0.12	-0.031	(0.066)	-0.47
5th Quintile Kecamatan Pov Score	-0.046*	(0.024)	-1.92	-0.015	(0.073)	-0.20
Jawa	0.025	(0.025)	1.01	0.013	(0.056)	0.24
Off Jawa	-0.002	(0.019)	-0.12	0.057**	(0.026)	2.21
Female Head	-0.024	(0.051)	-0.48	0.107	(0.101)	1.06
Head- No Primary Education	-0.011	(0.023)	-0.49	0.066	(0.044)	1.50
Head Primary Education	-0.014	(0.019)	-0.75	0.039	(0.043)	0.91
Head Secondary Education	-0.011	(0.018)	-0.6	-0.018	(0.054)	-0.33

Note: \* denotes significance at the 10 percent level, \*\* at the 5 percent level. Coefficients represent the percentage point difference in the percentage of households moving out of poverty between KDP2 and control households. The first set of estimates are marginal effects calculated at the mean derived via a multinomial logit model on the full sample. The second set of estimates uses an Epanechnikov kernel to create a sample matched at the household level and conduct conditional comparison of means tests.

**Table 3: Households Moving Out of Poverty World Bank \$2-a-day Poverty Line**

	Multinomial Logit- Full Sample			Household-level matched Sample		
	Marginal Effect Estimate	Standard Error	T-stat	Comparison of means estimate	Standard Error	T-stat
Full Sample	-0.028	(0.020)	-1.38	-0.005	(0.020)	-0.26
1st Quintile Kecamatan Pov Score	0.117**	(0.058)	2.01	0.092**	(0.038)	2.39
2nd Quintile Kecamatan Pov Score	-0.042	(0.055)	-0.76	0.037	(0.041)	0.90
3rd Quintile Kecamatan Pov Score	-0.077	(0.072)	-1.07	0.030	(0.045)	0.68
4th Quintile Kecamatan Pov Score	-0.137	(0.089)	-1.54	0.045	(0.046)	0.99
5th Quintile Kecamatan Pov Score	-0.147**	(0.047)	-3.15	-0.123	(0.077)	-1.59
Jawa	0.014	(0.042)	0.33	0.010	(0.022)	0.44
Off Jawa	-0.036	(0.024)	-1.53	-0.014	(0.012)	-1.22
Female Head	-0.086**	(0.039)	-2.19	-0.080*	(0.049)	-1.64
Head- No Primary Education	-0.062**	(0.027)	-2.35	-0.027	(0.030)	-0.89
Head Primary Education	-0.012	(0.026)	-0.46	0.028	(0.031)	0.91
Head Secondary Education	-0.044	(0.034)	-1.28	-0.013	(0.038)	-0.33

Note: \* denotes significance at the 10 percent level, \*\* at the 5 percent level. Coefficients represent the percentage point difference in the percentage of households moving out of poverty between KDP2 and control households. The first set of estimates are marginal effects calculated at the mean derived via a multinomial logit model on the full sample. The second set of estimates uses an Epanechnikov kernel to create a sample matched at the household level and conduct conditional comparison of means tests.

**Table 4: Households Moving Into of Poverty BPS Poverty Line**

	Multinomial Logit- Full Sample			Household-level matched Sample		
	Marginal Effect Estimate	Standard Error	T-stat	Comparison of means estimate	Standard Error	T-stat
<b>BPS Poverty Line</b>						
Full Sample	0.011	(0.008)	1.36	0.011	(0.008)	1.35
1st Quintile Kecamatan Pov Score	-0.045**	(0.016)	-2.87	-0.035*	(0.019)	-1.82
2nd Quintile Kecamatan Pov Score	-0.008	(0.020)	-0.41	0.023	(0.024)	0.97
3rd Quintile Kecamatan Pov Score	0.073*	(0.041)	1.76	0.003	(0.019)	0.17
4th Quintile Kecamatan Pov Score	-0.011	(0.021)	-0.55	-0.017	(0.025)	-0.67
5th Quintile Kecamatan Pov Score	0.053**	(0.018)	2.85	0.073**	(0.019)	3.93
Jawa	0.031*	(0.017)	1.81	0.015	(0.015)	-1.03
Off Jawa	0.012	(0.010)	1.25	0.025**	(0.008)	-2.99
Female Head	Small	Sample		0.007	(0.024)	0.31
Head- No Primary Education	0.027**	(0.012)	2.14	0.026*	(0.014)	1.81
Head Primary Education	-0.001	(0.010)	-0.06	-0.009	(0.016)	-0.59

Note: \* denotes significance at the 10 percent level, \*\* at the 5 percent level. Coefficients represent the percentage point difference in the percentage of households moving into poverty between KDP2 and control households. The first set of estimates are marginal effects calculated at the mean derived via a multinomial logit model on the full sample. The second set of estimates uses an Epanechnikov kernel to create a sample matched at the household level and conduct conditional comparison of means tests.

**Table 5: Households Moving Into of Poverty World Bank \$2-a-day Poverty Line**

	Multinomial Logit- Full Sample			Household-level matched Sample		
	Marginal Effect Estimate	Standard Error	T-stat	Comparison of means estimate	Standard Error	T-stat
<b>Full Sample</b>						
Full Sample	0.014	(0.012)	1.14	0.024	(0.022)	1.12
1st Quintile Kecamatan Pov Score	-0.029	(0.027)	-1.08	-0.009	(0.053)	-0.16
2nd Quintile Kecamatan Pov Score	0.006	(0.022)	0.26	0.068	(0.042)	1.62
3rd Quintile Kecamatan Pov Score	-0.028	(0.036)	-0.78	0.049	(0.053)	0.92
4th Quintile Kecamatan Pov Score	0.082**	(0.035)	2.33	-0.048	(0.052)	-0.92
5th Quintile Kecamatan Pov Score	0.143**	(0.023)	6.21	0.078	(0.057)	1.37
Jawa	0.026	(0.022)	1.18	0.044**	(0.014)	-3.13
Off Jawa	0.009	(0.015)	0.6	0.010	(0.009)	-1.13
Female Head	0.020	(0.021)	0.96	0.028	(0.046)	0.62
Head- No Primary Education	0.033*	(0.019)	1.77	0.038	(0.041)	0.93
Head Primary Education	0.005	(0.014)	0.36	0.020	(0.052)	0.39
Head Secondary Education	0.009	(0.015)	0.58	0.025	(0.026)	0.96

Note: \* denotes significance at the 10 percent level, \*\* at the 5 percent level. Coefficients represent the percentage point difference in the percentage of households moving into poverty between KDP2 and control households. The first set of estimates are marginal effects calculated at the mean derived via a multinomial logit model on the full sample. The second set of estimates uses an Epanechnikov kernel to create a sample matched at the household level and conduct conditional comparison of means tests.

**Table 6: Change in Household Access to Outpatient Care**

	Multinomial Logit- Full Sample			Household-level matched Sample		
	Marginal Effects Estimate	Standard Error	T-stat	Comparison of means estimate	Standard Error	T-stat
Full Sample	0.097**	(0.045)	2.16	0.115**	(0.035)	3.30
1st Quintile Kecamatan Pov Score	0.155	(0.125)	1.23	0.069	(0.067)	1.03
2nd Quintile Kecamatan Pov Score	0.004	(0.004)	0.94	0.168*	(0.091)	1.86
3rd Quintile Kecamatan Pov Score	0.003	(0.003)	0.81	0.238**	(0.071)	3.33
4th Quintile Kecamatan Pov Score	0.070*	(0.036)	1.98	0.073	(0.078)	0.93
5th Quintile Kecamatan Pov Score	0.100*	(0.060)	1.67	0.052	(0.153)	0.34
1st Quintile Per Capita Consumption	0.019*	(0.011)	1.72	0.144*	(0.076)	1.90
2nd Quintile Per Capita Consumption	0.002	(0.002)	0.75	-0.005	(0.077)	
3rd Quintile Per Capita Consumption	0.008**	(0.002)	3.49	0.034	(0.082)	0.42
4th Quintile Per Capita Consumption	0.027	(0.027)	1.00	0.137*	(0.081)	1.69
5th Quintile Per Capita Consumption	0.082	(0.234)	0.35	0.108	(0.091)	1.19
Jawa	-0.055	(0.094)		0.101	(0.070)	1.44
Off Jawa	0.101**	(0.050)	2.02	0.124**	(0.043)	2.85
Female Head	0.023	(0.065)	0.35	0.106	(0.095)	1.12
Head No Primary Education	0.139**	(0.065)	2.14	0.108**	(0.047)	2.29
Head Primary Education	0.100*	0.052	1.92	0.137**	(0.059)	2.32
Head Secondary Education	0.005	(0.004)	1.25	0.066	(0.102)	0.65
Poor- BPS Poverty Line	0.012*	(0.007)	1.89	0.171**	(0.087)	1.96

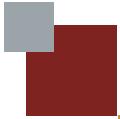
Note: \* denotes significance at the 10 percent level, \*\* at the 5 percent level. Coefficients represent the percentage point difference in the percentage of households newly seeking outpatient care in 2007 (after not seeking outpatient care in 2002) between KDP2 and control households. The first set of estimates are marginal effects calculated at the mean derived via a multinomial logit model on the full sample. The second set of estimates uses an Epanechnikov kernel to create a sample matched at the household level and conduct conditional comparison of means tests.

**Table 7: Kecamatan Level Estimates for School Enrollment and Unemployment**

	Comparison of Means Estimate	Bootstrapped Standard Error Estimate	T-Stat
Unemployment Rate	-0.015**	0.008	-1.98
Unemployment Rate with Discouraged Workers	-0.005	0.010	-0.51
Primary Enrollment Rate	-0.018	0.011	-1.57
Secondary Enrollment Rate	0.002	0.031	0.05

Note: \* denotes significance at the 10 percent level, \*\* at the 5 percent level. Coefficients represent the percentage point difference in the change in the unemployment and school enrollment rates between KDP2 and control kecamatan and are derived via comparison of means tests.





# Annexes



## Annex 1: Methodology

### A.1.1 Sampling

**Kecamatan Level.** The kecamatan sampling frame is comprised all rural kecamatan participating in KDP2 as candidates for the treatment group and all kecamatan not participating in KDP and KDP-like programs during the period 2002-2007 for the control group. The KDP-like programs were identified based on their similarity in approach with regard to community organization, community-led decision-making and amount disbursed per village or kecamatan. Five programs met the criteria:

- Community Empowerment for Rural Development (Asian Development Bank)
- Community and Local Governance Support Project (Asian Development Bank)
- Urban Poverty Project (World Bank)
- Program Pengembangan Prasarana Desa (Japan Bank for International Cooperation)
- Australian Community Development and Civil Society Strengthening Scheme (AusAID)

In addition, provinces under sampled or not sampled in the 2002 SUSENAS survey were not included in the kecamatan sampling frame, including Maluku, North Maluku, Papua and Aceh. Due to resource constraints, some provinces with kecamatan in remote areas such as West Kalimantan were excluded when it was determined that only a small number of kecamatan had the chance to be included in the final sample.

Selection was conducted using the propensity score matching methodology described below resulting in 300 total kecamatans comprised of 150 pairs of matched treatment and control kecamatans. In order to ensure the best possible results for the matching procedure, the sample was not stratified by region; matched pairs were selected from the entire pool of kecamatan in the sampling frame.<sup>30</sup> Ultimately, 17 provinces were included in the sample:

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<sup>30</sup> Stratifying the matching of kecamatan by region or province would have severely impacted the quality of matching.

**Table A1.1: Distribution of Matched Kecamatan by Province**

BALI	10
BANTEN	14
DI YOGYAKARTA	2
JAMBI	10
JAWA BARAT	23
JAWA TENGAH	19
JAWA TIMUR	14
KALIMANTAN SELATAN	18
LAMPUNG	21
NUSA TENGGARA BARAT	3
RIAU	17
SULAWESI SELATAN	47
SULAWESI TENGGARA	8
SULAWESI UTARA	9
SUMATERA BARAT	20
SUMATERA SELATAN	16
SUMATERA UTARA	49

**Household Level.** Within each kecamatan, two enumeration areas (EA) were selected randomly for the household level sample from a sampling frame comprised of households surveyed in the 2002 SUSENAS core module. EA's are a sampling unit of sixteen households used by BPS in selecting the sample for SUSENAS and other surveys. Because EA's are selected directly from the kabupaten level, kecamatan can differ in the number of households sampled in SUSENAS surveys although there is a minimum of two for the 2002 SUSENAS. In cases where there were more than EA's sampled, two EA's were selected randomly. In some cases, due to problems of remoteness or difficulty in access, EA's were replaced with the approval of the World Bank evaluation team.

Within each EA, eleven households from the sixteen were sampled based on their household identifying number in the 2002 SUSENAS. The first eleven were initially targeted and surveyed unless the household head in 2002 had left the village, could not be located or refused to be interviewed, in which case the survey teams would target the next household from the list of sixteen. In cases of households splitting or moving within the village, the household of the household head from the 2002 SUSENAS was considered to be the 2007 location. Since the EA is a geographical designation, it is not expected that ordering of the households by household identifier number is correlated with outcome variables. Therefore, the sampling process at the EA level is not likely to bias results. A further source of potential bias is rates of attrition being correlated with the treatment variable: only households not migrating were included in the sample as resource constraints limited following households outside the village. However, comparison of means tests demonstrate no significant differences in attrition rates between treatment and control households.<sup>31</sup> Within households, no attempt was made to establish an individual panel as no names for household members other than the household head are included in the 2002 SUSENAS, making subsequent identification of household members in 2007 problematic.

Sampling weights are composite two-stage weights calculated using PWIGLS in STATA and take into account sampling at both the kecamatan and EA level.

<sup>31</sup> Results available upon request.

## A.1.2 Identification

**The identification problem in program evaluation.** The evaluation seeks to identify the impact of KDP2 on the changes in a set of outcome indicators. Let  $y_{ij}$  be the change in the outcome indicator of interest for household  $i$  in kecamatan  $j$ . If we could observe changes in the treated and untreated states we could simply compare the difference in the mean change for both states to estimate the impact of the program:

$$(1) E(y_{ij} / D=1) = E(y_{ij} / D=1) - E(y_{ij} / D=0)$$

where  $D = 1$  if the treatment is received and  $D=0$  if the treatment is not received. The standard evaluation problem is that  $E(y_{ij} / D=0)$  is not observed. Instead, we seek to construct the counterfactual state of what would have happened in KDP2 locations had the project not occurred. If we can find a control group of kecamatan  $y_{ij}^c$  with identical characteristics to our treatment group  $y_{ij}$ , where  $c$  indicates the control group, we can replicate the unobserved state  $E(y_{ij} / D=0)$  by substituting  $E(y_{ij}^c / D=0)$  so that

$$(2) E(y_{ij} / D=0) = E(y_{ij}^c / D=0).$$

In practice, finding a control group with identical properties is impossible. A standard solution would be to randomize assignment of  $D$ , which would ensure that (2) is satisfied given adequate sample size.

Lacking randomization for KDP2 participation, a common approach is to estimate the probability of  $D$  using a propensity score matching approach to choose a comparable control group by conditioning selection on a set of observable characteristics. A set of observable covariates  $X$  are selected such that the distribution of all covariates in  $X$  is the same between selected treatment and control groups, satisfying the condition that conditional on  $X$ , outcomes measures for the treatment and control groups are independent of the treatment assignment  $D$ :

$$(3) Pr(D=1/X, y_{ij}^c) = Pr(D=1/X)$$

As Rosenbaum and Rubin (2003) show, if the true propensity score  $Pr(D=1/X)$  is known for each observation, the condition in (3) is satisfied. In practice, we must estimate  $Pr(D=1/X)$ . The standard method is to regress the selected covariates on the treatment indicator variable using a standard probit or logit model and then use a matching process to select observations for the treatment and control groups that best satisfy the condition in (3).

**Kecamatan level matching.** Since the treatment for KDP2 was assigned at the kecamatan level and the sampling strategy dictated choosing households within kecamatan, we first conducted propensity score matching at the kecamatan to level to select the overall sample. A group of sixty observable covariates were selected from the 2003 PODES census of villages and 2002 SUSENAS conducted by BPS. The covariates consist of kecamatan level indicators on infrastructure, demography, economic and geographic conditions, and poverty and education and health index variables constructed from a poverty mapping exercise by BAPPENAS in 2002 as part KDP2 kecamatan selection. A potential concern in the use of covariates taken from 2003 data is the potential for changes between the baseline data survey, the 2002 SUSENAS, and 2003 when the PODES was conducted. Ideally, the covariates would also have been measured in 2002. However, the PODES census is only conducted every three years leaving the options of 2000 and 2003. Given these constraints a shorter time gap of one year is preferred, particularly since for the period between 2000 and 2002 local government authority was decentralized to the district level. It is also important to note that KDP project activities for the 2<sup>nd</sup> phase although beginning in 2002 did not begin to build sub-project infrastructure construction until after the 2003 PODES data was collected and thus would not also contaminate the covariate data. For the sample of remaining

kecamatans surveyed in the 2002 SUSENAS (see Section A.1 above), we then regress the covariates on the treatment indicator using a logit model. From this regression, we then predict the probability of participation in KDP2, an estimate of  $\text{Pr}(D=1|X)$ . Due to the limited number of kecamatan available for the control group and the need to meet sample size requirements, we conducted the matching using the nearest neighbor without replacement method to select 150 pairs of matched treatment and control kecamatan. Use of this method can be problematic in that poor matches can result. However, as Rubin (2000) notes, this is not a problem as long as matched covariates have equivalent or balanced distribution between treatment and control groups. We tested all covariates using simple comparison means tests and Kolmogorov-Smirnov and Hotelling tests of equality of distributions and found no significant differences for all tests among all covariates indicating that the kecamatan sample is well-balanced and satisfies the condition in (3) that treatment assignment is independent of outcomes conditioned on selected covariates. The results of these tests are shown in Table A1.2 below. In addition, we also conduct comparison of means tests on the 2002 values of the indicator variables used in the analysis with results shown in Table A1.3 below. Similar to our results for covariates, we find no significant differences at the 5% for all indicators aside from secondary enrollment rate.

Satisfying the condition in (3) indicates that our matching was successful for the covariates selected but unfortunately it is unlikely that the covariates we selected are the only factors that are correlated with both outcome indicators and treatment assignment. There are likely unobserved factors that are not balanced between our selected treatment and control kecamatan that could bias results. These can be classified into two categories. The first are time invariant. Because we are using panel data, these fixed factors will be eliminated using the difference-in-differences approach for estimation. The second category, unobserved factors that vary over time are the most difficult to resolve as they cannot be addressed directly. However, the literature comparing experimental and non-experimental evaluations emphasizes that non-experiments using approaches such as propensity score matching perform better when three criteria are met<sup>32</sup>:

- There is a rich set of data available from which to choose observed covariates.
- The treatment and comparison groups are sampled using the same instruments.
- The treatment and comparison groups come from similar geographic areas.

The design will meet two of these criteria: both treatment and comparison groups will be sampled with the same instruments, and these instruments, the PODES census of villages and the SUSENAS household survey, provide a rich set of variables on which to condition. Geographic proximity is a criteria unlikely to be met by the research design, but it is expected that this will be mitigated to some extent through the use of the difference-in-differences matching estimator to correct for any unobservable factors that are time-invariant. As Smith and Todd (2005) demonstrate, this difference-in-differences matching estimator is the least biased estimator in studies comparing the effectiveness of different estimators at replicating randomized results.

**Household level matching.** The sampling strategy necessitates that we select households from within each selected kecamatan for the final household level sample. Despite households from the same kecamatan experiencing the same kecamatan level conditions in terms of the economic, social and other environments, significant heterogeneity can still exist across households within kecamatan. To correct for this problem we conduct a second household level matching process using the full sample of households and a propensity score matching approach. In choosing covariates, we select household and individual characteristics from the 2002 SUSENAS.<sup>33</sup> We then estimate the propensity scores using a logit model. Balancing tests confirm that balance was achieved for all covariates with a large range of common support necessitating the dropping of only 47 households and producing a Household-level matched sample of 6151 households.<sup>34</sup>

<sup>32</sup> Smith and Todd (2003), Diamond and Sekhon (2005) and others.

<sup>33</sup> Covariates include: housing conditions, access to electricity, ownership of durable goods, age of the household head, gender of the household head, agricultural occupation of household head, ownership of farmland, household size and province dummies.

<sup>34</sup> Results of the logit regression and balancing tests are available upon request.

**Table A1.2: Balancing Tests For Covariates**

<b>Variable name</b>	<b>Comparison of Means Tests</b>	<b>Kolmogorov-Smirnov test for equality of distribution</b>
	<b>p-value</b>	<b>p-value</b>
Poverty score (BAPPENAS 2002 Index)	0.160	0.120
Education and health score (BAPPENAS 2002 Index)	0.291	0.181
Number of villages	0.692	0.513
Total number of households	0.958	0.583
Total surface area	0.608	0.029
Share of villages with swasembada	0.454	0.446
Share of coastal Area	0.835	0.942
Share of hill or mountain area	0.647	0.653
Share of poor households	0.158	0.787
Share of income from agriculture	0.174	0.993
Share of income from manufacturing	0.748	0.993
Share of income from services	0.079	0.583
Share of households with electricity	0.146	0.146
Share of households using firewood	0.707	0.974
Share of households with clean drinking water	0.859	0.583
Share of households with clean washing water	0.440	0.583
Share of villages with PDAM	0.484	0.383
Share of villages with Pramuka	0.552	0.787
Share of villages with youth clubs	0.104	0.974
Share of elderly households	0.915	0.974
Share of land with access to a main road	0.500	0.653
Share of villages with motorcycles	0.497	0.942
Share of villages with bus terminal	0.985	0.899
Share of villages with shopping cluster	0.713	0.787
Share of villages with permanent market	0.872	0.324
Share of villages with access to small business loans	0.882	0.583
Share of villages with access to credit facilities	0.421	0.899
Share of villages with farming credits	0.252	0.942
Share of villages with village head university-educated	0.724	0.271
Share of households with fixed phone line	0.246	0.383
Share of land available for agriculture in Kecamatan	0.321	0.324
Number of primary schools per household	0.974	0.053
Number of middle schools per household	0.147	0.021
Number of high schools per household	0.572	0.324
Number of doctors per capita	0.528	0.324
Number of commercial banks per capita	0.537	0.181
Number of BPR banks per capita	0.999	0.583
Number of savings cooperative per capita	0.957	0.053
Number of hospitals per capita	0.448	0.446
Number of puskesmas per capita	0.696	0.383

Variable name	Comparison of Means Tests	Kolmogorov-Smirnov test for equality of distribution
	p-value	p-value
Number of pustus per capita	0.863	0.271
Number of private doctors per capita	0.267	0.115
Number of pharmacies per capita	0.792	0.583
Number of midwives per capita	0.877	0.899
Amount of expenditure on development per capita	0.834	0.223
Amount of village government income per capita	0.887	0.446
Average number of years of education household head	0.675	0.653
Average number of years of education spouse	0.535	0.446
Percent of adult males with no schooling	0.898	0.721
Percent of adult females with no schooling	0.761	0.653
Percent of adult males with primary education	0.377	0.942
Percent of adult females with primary education	0.472	0.446
Percent of adult males with secondary education	0.395	0.115
Percent of adult females with secondary education	0.896	0.223
Percent of adult males with university education	0.367	0.513
Percent of adult females with university education	0.769	0.446
Percent children	0.453	0.271
Percent adults	0.491	0.383
Percent elderly	0.776	0.383

Note: Results show p-values for comparison of means tests and Kolmogorov-Smirnov tests for equality of distribution between treatment and control groups on the 2003 PODES and 2002 SUSENAS covariates. For all covariates, there are no significant differences between treatment and control kecamatan at the 10% level or less.

**Table A1.3: Table of Means and Balancing Tests For Indicators**

Variable Name	Mean in 2002		Balancing Test
	Treatment	Control	P-value
Per Capita Consumption (IDR)	161,902	161,409	0.832
Poverty Rate- BPS	15.90%	16.20%	0.799
Poverty Rate WB\$2	64.80%	65.00%	0.836
Access to Outpatient Care	34.20%	34.10%	0.906
Enrollment Rate- Primary	96.40%	95.20%	0.052
Enrollment Rate- Secondary	53.00%	56.80%	0.022
Unemployment Rate	3.70%	3.90%	0.074
Unemployment Rate with Discouraged Workers	5.90%	5.70%	0.685

Note: Results show 2002 means for indicators for both treatment and control groups. P-values are derived via comparison of means tests. Poverty rates (derived using the poverty lines listed in Table A1.4 below) and mean per capita consumption are calculated at the household level. Access to outpatient services refers to the percentage of all individuals in the sample accessing outpatient care conditional on being sick. Enrollment rates are calculated for all individuals in the proper age cohorts. Unemployment rates are calculated for adults aged 18-55 participating in the labor force. Unemployment rate with discouraged workers includes discouraged workers in the labor force.

### A.1.3 Estimation

The analysis utilizes several different models to conduct comparison of means tests on samples and samples stratified by 2002 per capita consumption quintiles and 2002 kecamatan poverty score quintiles, household head education and household head gender. All estimates use standard errors that take into account clustering

at the kecamatan level and sample weights constructed as described in section A.1.1 except when otherwise noted. The following section describes the models used for each indicator.

**Real Per Capita Consumption.** Comparison of means tests are used to produce estimates for the full and matched household samples. The first is a simple comparison of means tests on the full sample using regression adjustment following Rubin (2000) and Heckman (1998). Covariates from the kecamatan level matching process are simply included with the treatment indicator variable in an OLS regression on the outcome indicator in the following specification:

$$(1) \Delta y_{ij} = \alpha C + \delta T_{ij} + \beta X_j + u_{ij}$$

Where  $\Delta Y$  is the change in real per capita consumption for household i in kecamatan j,  $\delta$  and  $\beta$  are coefficients to be estimated, C is a constant, T is the treatment effect, X contains the covariates used in the kecamatan level matching and u is the usual error term. As Rubin (2000) shows, regression adjustment using this method can lead to significant bias reduction in comparison with un-adjusted models.

Second, to address bias generated through heterogeneity of factors at the household level, we also provide a treatment effect via comparison of means estimates using an Epanechnikov kernel matching procedure on the propensity scores generated in the household level matching process to estimate treatment effects. In kernel matching, for each treatment household the control is constructed from a weighted sample of control households so that control households with the closest propensity score to the treatment household are given greatest weight. Bootstrapped standard errors are calculated for all estimates using a set of 100 replications. The matched panel sample is also used to generate estimates for the indicators discussed below again using simple comparison of means tests.

**Measurement Error in Real Per Capita Consumption.** Measurement error is a concern when using consumption as a measure of household welfare, even more so given the two-period panel. Since consumption is a dependent variable for the analysis, the impact of measurement error is to decrease the precision of estimates but does not bias results, assuming the measurement error is not systematically correlated with the treatment effect. Given both BPS (in 2002) and SEDAP (in 2007) survey methodology, this is not likely to be case. However, a problem arises when attempting to measure effects by quintiles using 2002 per capita consumption as the baseline. Since mismeasurement of consumption can place households in quintiles that do not represent their true consumption, the resulting samples for each quintile can generate biased estimates of the true population quintiles. This problem is particularly acute in the first and fifth quintiles as under or over measured households whose true consumption might place them in the middle of the consumption distribution populate the tails and push truly poor or truly wealthy households out of the sample 1<sup>st</sup> and 5<sup>th</sup> quintiles. In this situation, the literature on income and consumption mobility has shown a tendency of convergence toward the mean with households in low quintiles demonstrating large gains with small or negative gains for wealth households (see Dragoset and Fields (2006) and Fields et. al. (2001) for a thorough review).

To avoid this problem we construct measures of household welfare that are not directly correlated with the baseline 2002 real per capita consumption and but generally correlated with household welfare. The first measure is the 2002 BAPPENAS kecamatan poverty score that utilizes a range of demographic, education, health care and poverty indicators to construct a poverty score index at the kecamatan level. Second, we construct a predicted consumption measure using household level variables from the SUSENAS with the following specification using OLS:

$$(2) y_{ij} = \alpha C + \delta HH_{ij} + \beta X_{ij} + \gamma PR_{ij} + u_{ij}$$

Where y is 2002 per capita consumption for household i in kecamatan j;  $\delta$ ,  $\alpha$ ,  $\gamma$  and  $\beta$  are coefficients to be estimated; C is a constant; HH is a matrix of household level variables; X is a matrix of kecamatan covariates;

PR is a vector of province level dummies and u is the usual error term.<sup>35</sup> Consumption is then predicted using the estimated coefficients for each household and then used to create a set of 2002 predicted per capita consumption quintiles. The threat of bias in measuring effects by quintile is avoided because both predicted consumption and kecamatan poverty index are not systematically correlated with the measurement error from the baseline 2002 per capita consumption.

**Change in poverty status:** In addition to estimating impact on continuous changes in economic welfare discussed above, we also consider discrete changes for households with regard to poverty lines using a multinomial logit on the full sample and a conditional comparison of means model using the household-level matched sample.

**Table A1.4: Poverty Lines Used to Assign Poverty Status**

	Rural-BPS	World Bank \$2-a-day
2002	96,512	165,854
2007	146,837	242,704

Note: All figures are in current Rupiah. Source: World Bank, BPS.

We begin by assigning households into poverty status categories of “poor” or “not poor” for both 2002 and 2007 using the BPS Rural and World Bank \$2-a-day poverty lines for the respective years. Table A1.1 shows the poverty lines used in current Rupiah. Next, household are placed into one of four categories based on their poverty status

- Stayed poor
- Never poor
- Moving out of poverty (Poor in 2002, Not Poor in 2007)
- Moving into poverty (Not Poor in 2002, Poor in 2007)

We then use a multinomial logit model to measure treatment impact on the full household sample. The multinomial logit model has the advantage of being able to consider multiple cases for a single categorical variable when there is no logical or meaningful ordering of the categories. Previous attempts such as McCulloch and Baluch (1999) have argued an ordered logit approach using three categories where the moving into and out of cases listed above are combined into one “transitory” cases: poor, transitory, not poor. However, given that as a result of the intent of the matching process poverty rates are nearly identical in 2002, breaking down the transitory group into movement into and out of poverty is of greater interest. In this case, Lawson, McKay and Okidi (2003) in a study on changes in poverty status in Uganda argue that a multinomial logit approach is more appropriate when considering components of poverty transition. We follow that approach and generate treatment effects for the probability of moving out and moving into poverty using the following specification:

$$(3) \Delta PS_{ij} = \alpha C + \delta T_{ij} + \beta X_{ij} + \gamma PR_{ij} + u_{ij}$$

Where  $\Delta PS$  is the change in poverty status according to the four categories listed above for household i in kecamatan j,  $\delta$ ,  $\alpha$ ,  $\gamma$  and  $\beta$  are coefficients to be estimated; C is a constant; T is the treatment effect; X is a list of household level control variables;<sup>36</sup> PR is a vector of province level dummies and u is the usual error term. Marginal effects at the mean are used to calculate the treatment effect as the change in probability of being included in a particular category due to participation in the program.

The multinomial logit model can be quite restrictive as it makes the somewhat strong “independence of

<sup>35</sup> Regression results are available on request. Household level variables include: housing conditions, access to electricity, ownership of durable goods, age of the household head, gender of the household head, agricultural occupation of household head, ownership of farmland, household size and province dummies

<sup>36</sup> Variables include: age, gender and years of education of the household head, access to electricity, housing conditions, land ownership, ownership of durable assets.

irrelevant alternatives" assumption. This implies that introducing other alternative categories or reducing the number of categories would not change estimated probabilities due to a lack of correlation in the error term across categories. To mitigate potential problems with this approach and test robustness, we also employ a conditional comparison of means model using the matched household sample. To estimate the treatment effect for moving out of poverty, we consider households that were poor in 2002 and then compare the probability of escaping poverty between KDP2 and control households using the Household-level matched sample. Similarly, for moving into poverty, we restrict the sample to households not poor in 2002 and estimate the probability of becoming poor for KDP2 and control households.

**Changes in Use of Outpatient Services.** Similar to the approach used for changes in poverty status above, we consider the impact of KDP2 on household heads that did not seek outpatient care in 2002. The sample is restricted to household heads sick in both 2002 and 2007 which are then assigned to categories based on upon the pattern of use of outpatient care.

- No use of outpatient services in either year
- Use of outpatient services in both years
- No use of outpatient services in 2002; use of outpatient services in 2007
- Use of outpatient services in 2002; no use of outpatient services in 2007

Treatment effects are estimated as with change in poverty status using both multinomial logit and conditional comparison of means models. Given the small numbers of household heads in the 4<sup>th</sup> category, we restrict the analysis to category 3: household heads moving from no use of outpatient care to use of outpatient care between 2002 and 2007. The specification is similar to (3) with the dependent variable the change in use outpatient care using the four categories listed above. We also estimate a conditional comparison of means model using the household matched sample as discussed for Changes in Poverty Status above.

**Unemployment and school enrollment rates.** The lack of an individual panel precludes using the approach described for changes in poverty status discussed above. Instead we aggregate the individual data at the kecamatan level to create a cohort panel. Each cohort contains the mean incidence of being unemployed, or in primary or secondary school for all members in the labor force in both 2002 and 2007. Treatment effects are estimated using comparison of means with regression bias adjustment and are interpreted as the difference in the change in unemployment and school enrollment rates between KDP2 and control kecamatan with the following specification, estimated using OLS:

$$(4) \Delta_{ij} = \alpha C + \delta T_j + \beta X_j + u_j$$

where  $\Delta y$  is the change in the unemployment or school enrollment rates in kecamatan  $j$ ,  $\delta$  and  $\beta$  are coefficients to be estimated,  $C$  is a constant,  $T$  is the treatment effect,  $X$  contains the covariates used in the kecamatan level matching and  $u$  is the usual error term. As Deaton (1985) notes, estimates using cohort panels have the potential to be biased due to measurement error arising from using sample means of individuals in each cohort. The sample means may not be representative of the true population means. This would be a serious problem if there were individual level variation for independent variables in the analysis. Fortunately, the treatment variable does not vary at the individual level in either the sample or the population avoiding problems of bias. Variation below the kecamatan level is limited to the dependent outcome indicators, which reduces the precision of estimates, but does not bias results.

## Annex 2: A Note on Power Calculations

This note outlines the procedures used for power calculations for the This note outlines the procedures used for power calculations for the KDP Impact Evaluation.

### Non-experimental Research Design

The project will utilize a difference-in-differences matching estimator to determine program impact. The 2002 SUSENAS, approximately 200,000 observations, will be used as the sampling frame to select treatment and comparison groups from KDP and Non-KDP households using matching techniques. These same households will be surveyed again in 2007 to create a panel. The primary indicator variable will be total monthly household expenditure per capita, calculated from total monthly household expenditure (SUSENAS survey Instrument: Section VII, Q29), divided by the number of household members.

The sampling methodology will consider two treatments defined by their history of participation in Community Driven Development (CDD) projects between 1998 and 2007:

- Treatment 1: Households located in kecamatan participating in KDP2
- Treatment 2: Households located in kecamatan participating in PNPM-RURAL 2007

As KDP treatment was assigned at the kecamatan level, with all households located in the kecamatan participating in the project, households located in a kecamatan participating in KDP2 will be considered the treatment group listed above. Households not located within a kecamatan participating in a CDD project are considered candidates for the comparison group.

### Power Calculations for Clustered Sample Repeated Measures

Standard power calculations will estimate three statistical properties for each indicator: mean, variance, and within-cluster correlation, and then calculate the sample size required to detect a pre-determined treatment effect for a given statistical size and statistical power. Usually the treatment effect size is based on previous studies or the expectations of those involved in implementing the program. For the PNPM-RURAL case, we take a slightly different approach. The effect size is based on a minimum amount of change in per capita expenditure that the study would deem worthwhile to detect, in this case 1-1.5 percent per annum increase in rural per capita monthly expenditure. Power calculations are conducted using this effect size in order to estimate the required sample size of households and kecamatan. Smaller effect sizes would correlate to change in per capita expenditure that are so small as to be somewhat negligible, and would require a far greater number of kecamatan to be sampled in the survey.

Unlike a typical single-outcome measurement study, the research design employs a panel dataset with sampling at baseline (2002 SUSENAS) and follow up (2007 WB implemented survey). Introducing repeated measures of the same household necessitates accounting for correlation over time in the calculations. Simply using the difference in household expenditure per capita as an indicator and conducting the power calculations using the standard approach noted above would lead to a biased estimation of the required sample size. As a result, additional parameters must be estimated that correct for time sensitivity: the within-person variance<sup>37</sup>, and variance in growth rates at the individual and cluster level<sup>38</sup>. In addition, frequency, duration, and number of measures, and the functional form of the expected growth path must be specified.<sup>39</sup>

37 The variance of measurements of an indicator for the same household across time.

38 This is essentially the variance in the change in income between the two time periods surveyed. The overall variance in growth rates is represented by tau, which can be broken down into the sum of the between person variance in growth rates and the between cluster variance in growth rates.

39 See Raudenbush, et. al. (2006), Sections 10-11 for background on all additional parameters needed for power calculations using a panel.

### List of Parameters for Cluster Assigned Treatment with Repeated Measures

Parameter	Symbol	Value	Source
Cluster Size	n		Determined w/Calculations
# of Clusters	J		Determined w/Calculations
Intra-class correlation	p	.15	SUSENAS Panel
Type I Error	A	5 percent	Standard
Power		80 percent	Standard
Effect Size	d	.14	Determined w/Calculations
Variance within person	Sigma	1.0	SUSENAS Panel
Variance in growth rates	Tau	1.0	SUSENAS Panel
Frequency	F	.20	.4 per year
Duration	D	5	5 years
Measurements	M	2	2 at baseline, 1followup
Function form of growth path	c	Linear	SUSENAS Panel

The statistical size and power are standardized for empirical work at 5 percent and 80 percent, respectively, and the cluster size and number of clusters will be determined through the power calculations. In addition, the frequency, duration and number of measurements are easily defined.

However, the remaining parameters concerning intra-class correlation, within person variance, between person and cluster growth rate variance and the effect size must be estimated.

- Treatment effect (d): the study will be able to detect a treatment effect size of .14, determined from a minimum benchmark increase in rural per capita monthly expenditure.
- Intra-class correlation (p): is estimated from the 2002-2004 SUSENAS Panel. Clustering will be done at the Kecamatan level, as that was the unit of treatment assignment for the program.
- Within-person variance (sigma) and Variance in growth rates (tau): the SUSENAS panel of household sampled annually will be used to estimate the variance for the indicator across a single household.<sup>40</sup>
- The study will assume a linear growth path for the indicator variable.

### Statistical Properties of Target Indicators

As noted above, we first estimate the statistical properties of the target indicators – in particular, the mean, standard deviation, and within-cluster correlation (p), within-person variance (sigma) and variance in growth rates (tau) where a cluster is defined as a kecamatan, the unit of treatment. The 2002-2004 SUSENAS Panel is used to estimate these parameters for the rural households.<sup>41</sup>

Indicator	Rural Households		
	Mean	S.d. ( $\sigma$ )	p
Monthly Expenditure per capita	165287	87408	0.14

40 Note that the SUSENAS Panel while providing parameter estimates for the study, is too small to consider as the primary data source.

41 Note we likely overestimate p from the SUSENAS. SUSENAS does not conduct a random sample from each kecamatan. Instead, it samples several census blocks within kecamatan. If there is geographic clustering within the kecamatan, the within-cluster correlation estimated from the SUSENAS may be higher than the true within-cluster correlation. See also Olken (2006).

## Power Calculations Strategy

Initial calculations demonstrate that sample size is not sensitive to changes in the parameters for variance over time or the functional form of the expected growth path. The primary tool of analysis is the “Optimal Design” software, developed and described in Raudenbush et al. (2006).

### Calculations based on repeated measures:

Parameter	Symbol	Value	Source
Cluster Size	n	15	Determined w/Calculations
# of Clusters	J	150	Determined w/Calculations
Intra-class correlation	p	.14	SUSENAS 2002
Type I Error	A	5 percent	Standard
Power		80 percent	Standard
Effect Size	d	.14	Determined w/Calculations
Variance within person	Sigma	1.0	SUSENAS Panel
Variance in growth rates	Tau	1.0	SUSENAS Panel
Frequency	F	.20	.4 per year
Duration	D	5	5 years
Measurements	M	2	2 at baseline, 1 followup
Function form of growth path	c	Linear	SUSENAS Panel

The results imply a kecamatan sample size of 450, 150 for each treatment and 150 for the comparison group. Within each kecamatan, fifteen households will be randomly sampled from the 2002 SUSENAS for kecamatan participating in KDP2. The total number of respondents per treatment is thus estimated to be 2,250. Because it is expected that approximately 20 percent of households will be lost due to attrition, the project will oversample by 20 percent in each kecamatan, increasing the required sample size by 450 households. In addition, 675 households will be added to each treatment group to assure an equivalent large sample size of poor households. The total households to be sampled for each treatment group is 3,375.



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