PNPM-KDP Impact Evaluation Research Design

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Evaluation Objectives

- Quantitative impact studies for PNPM and KDP
- GOI Priority areas
  - Poverty
  - Employment
  - Governance and Social Capital
- Attribute changes in outcome indicators to PNPM-KDP
- Results will represent the impact of PNPM-KDP compared with control areas which have not participated in a PNPM-like CDD program
Research Questions

- **Poverty**
  - Have PNPM households experienced an increase in expenditure between 2002-2007 compared with comparison households?
  - Have PNPM households moved out of poverty as a result of the program?
  - Do the poorest households participating in PNPM see impacts comparable to PNPM communities as a whole?

- **Access to Services**
  - Do PNPM communities have greater access to education, health care, sanitation, water supply as a result of the program?

- **Social Capital and Governance**
  - What is the impact on indicators of social capital and demand for good governance on PNPM households?
Analytical Objectives: Maximize effectiveness of non-experimental evaluation

- Conduct rigorous assessment of PNPM-KDP using treatment and control groups, with baseline and follow-up surveys to establish causal effect
- Attempt to replicate, as closely as possible, conditions of a randomized experiment
  - Panel data through fielded surveys
  - Meet criteria where non-experiments have been shown to be effective at replicating randomized experiments
  - New matching techniques
PNPM-KDP Monitoring and Evaluation

Context

- Scaling up of KDP-UPP program nationwide into PNPM by 2009
- No baseline data available
- Non-random assignment of participation for PNPM-KDP
- Many CDD programs of similar scale and approach
Kecamatan Geographical Information System (GIS)

- Mapping of kecamatans where programs using CDD approaches have been active
- 5 programs: ACCESS, CERD, CLGS, P2D, UPP2 operating in Indonesia between 2002-2007 with similar approach to PNPM-KDP
- Knowledge Management: incorporate additional data, keep data updated
- Potentially useful for future evaluations, operational work
Why a new survey?

- GOI priority: impact on poverty
  - SUSENAS not representative at kecamatan level
  - Panel data allows study to determine extent of poverty relief attributable to the project

- Panel data provides a more rigorous assessment of causal effect

- SUSENAS instrument does not include modules on social capital or governance
Harmonization with UPP

- UPP is currently engaged in a contract for impact evaluation surveys through 2007
- UPP and PNPM-KDP will have the opportunity to jointly conduct the planned 2009 survey
KDP Baseline: 2002 SUSENAS used as baseline and sampling frame to select treatment and control groups

KDP Follow up/PNPM baseline: 2007 survey

PNPM Follow up: 2009 survey

Difference-in-differences matching estimator using panel data
# Potential Evaluations

<table>
<thead>
<tr>
<th>KDP 1</th>
<th>KDP 2</th>
<th>PNPM 2007*</th>
<th>PNPM 2009*</th>
<th>Potential Evaluation Period</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Additional Kecamatan</strong></td>
<td>2002</td>
<td>2007</td>
<td>2008</td>
<td>2009</td>
</tr>
<tr>
<td>KDP 1</td>
<td>1000</td>
<td>T</td>
<td>T</td>
<td>T</td>
</tr>
<tr>
<td>KDP 2</td>
<td>500</td>
<td>T</td>
<td>T</td>
<td>T</td>
</tr>
<tr>
<td>PNPM 2007*</td>
<td>500</td>
<td>C</td>
<td>C</td>
<td>T</td>
</tr>
<tr>
<td>PNPM 2009*</td>
<td>1200</td>
<td>C</td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td>PNPM 2009*</td>
<td>1400</td>
<td>C</td>
<td>C</td>
<td>C</td>
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</tbody>
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**KDP 2**
- **Impact:** 2002-2007
- **Treatment:** KDP 2
- **Comparison:** Non-CDD Participating Kecamatan

**PNPM**
- **Impact:** 2007-2009
- **Treatment:** KDP 2, PNPM 2007
- **Comparison:** PNPM 2009

**Yearly monitoring of changes in PNPM outcomes:** 2010
KDP Evaluation Overview

- Baseline: 2002 SUSENAS
- Follow up: baseline households resampled in 2007
- Treatment
  - KDP2
- Control
  - non-KDP, non-CDD kecamatan
- Outcome Variable Categories
  - Employment
  - Access to Services
  - Expenditure
- Instrument: SUSENAS Core
PNPM Evaluation Overview

- Baseline: 2007 survey
- Follow up: 2009 survey
- Control:
  - Non-KDP kecamatan beginning participation in 2009
- Treatment:
  - KDP2
  - Non-KDP kecamatan in 2007

- Outcome Variables Categories
  - Expenditure
  - Access to Services
  - Employment
  - Social Capital
  - Governance
  - Participatory Poverty Indicators

- Instrument: SUSENAS Core

- Social Capital and Governance Modules
Instrument (1): SUSENAS Core

- Expenditure
- Access to Services: education, health care, water, sanitation
- Employment
Instrument (2): Additional Modules for PNPM Evaluation

- **Social Capital**
  - Group participation and social networks
  - Communal trust
  - Social cohesion and inclusion
  - Capacity for collective action
  - Access to information
  - Empowerment

- **Governance**
  - Assessment of government effectiveness
  - Demand for good governance
  - Capacity for political action
Data

- SUSENAS 2002
- PODES 2003/2006
- Kecamatan GIS
- 2002 Poverty Ranking of kecamatan
- New fielded surveys in 2007/2009
Sampling Frame

- Households sampled in the 2002 SUSENAS
- Limited to rural households
- Control group excludes kecamatan participating in other CDD programs identified in kecamatan GIS
Sampling (1)

- Matching of treatment and control conducted at the kecamatan level
- Conditioning variables selected from 2002 poverty ranking and PODES 2003/2005
- New matching methodology “genetic matching”
- Households randomly selected from 2002 SUSENAS sampling frame from each matched kecamatan
Potential problem of “lack of common support”
Poverty ranking from 2002 mapping data demonstrates overlap between distribution of KDP/non-KDP kecamatan by poverty quintile

<table>
<thead>
<tr>
<th>Poverty Quintile</th>
<th>KDP Non-participating</th>
<th>KDP Participating</th>
<th>Six Major CDD programs Non-participating</th>
<th>Six Major CDD programs Participating</th>
</tr>
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<tbody>
<tr>
<td>1st</td>
<td>10.93</td>
<td>28.48</td>
<td>12.21</td>
<td>22.27</td>
</tr>
<tr>
<td>2nd</td>
<td>16.18</td>
<td>20.33</td>
<td>13.81</td>
<td>21.85</td>
</tr>
<tr>
<td>3rd</td>
<td>20.7</td>
<td>17.69</td>
<td>19.29</td>
<td>20.18</td>
</tr>
<tr>
<td>5th</td>
<td>31.05</td>
<td>14.43</td>
<td>33.81</td>
<td>15.94</td>
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Power Calculations

- Over sample by 20% for data attrition
- Clustered at the Kecamatan level
- Sample size for poor households needs to meet sample size requirements

<table>
<thead>
<tr>
<th>Sample Size Per Treatment Group</th>
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<tbody>
<tr>
<td>Kecamatans per group</td>
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<tr>
<td>Households per group</td>
</tr>
<tr>
<td>Total Additional Households per Group Needed to Account for Impact on Poor Households</td>
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<tr>
<td>Total Households per Group</td>
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<tr>
<td>Households per Kecamatan</td>
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<tr>
<td>Total Number of Treatment Groups</td>
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<td>Total Households in Sample</td>
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Estimation

- Difference-in-differences between treatment and control groups for outcome indicators
Adaptability of methodology

- Methodology is effective due to the large scale of both the SUSENAS survey and PNPM-KDP
- Potentially useful for other programs with a large enough scale
- Kecamatan GIS allows quick identification of treatment and potential control groups for future evaluations
- Data from the proposed surveys can be used to look at changes in outcome variables for other programs
Annex

Mitigating the Problems of Non-experimental Design
Mitigating the Problems of Non-experimental Design

- Three sources of bias:
  - Unobserved factors fixed over time
  - Unobserved factors not fixed over time
  - Observed factors misspecified
Misspecification

- How is relationship of factors to outcome variable modeled?
- Traditional methods tend to use simple first-order logits or probits
- Genetic matching non-parametrically assigns a “weight” to each factor to minimize error and maximize balance.
- Studies comparing observational results with randomized experiments have shown “genetic matching” improves results versus other methods
Unobserved Factors- Fixed

- Panel data eliminates bias
- Removes any latent fixed effects at individual level and kecamatan level
Unobserved Factors- Not Fixed

- We cannot assume that all factors affecting the outcome and treatment assignment are accounted for.
- How can we minimize their impact on the reliability of results?
Unobserved Factors- Not Fixed

- Three Conditions for Good Non-experiments:
  - Same instrument used in treatment and comparison groups
  - Rich set of variables to capture observed factors
  - Geographic proximity
    - This condition will not be satisfied
    - Panel data will hopefully account for a portion of this
- Some proxies for critical unobserved factors in PODES data: infrastructure etc.