EGAP LEARNING DAYS 3:
EXPERIMENTAL DESIGN SESSIONS

ACCRA 2015
20-24 APRIL 2015

In partnership with

CDD	**African School of Economics**	**Njala University**
Ghana	Benin	Sierra Leone

This five-day meeting will consist of a combination of design clinics and teach-ins on topics critical for designing impact evaluations and field experiments intended to measure the effects of policies, interventions, and programs. Teach in topics will include randomization, statistical power, and threats to the estimation of treatment effects. Throughout the week participants will work to develop their own research designs together with peers and more senior researchers.

Venue: Airport West Hotel, near Kotoka International Airport.

Timing: The workshop starts on Monday 20 April at 10AM and closes 24 April at 4PM

Organization. The learning days is being organized by Maarten Voors (Wageningen University, MV) with Macartan Humphreys (Columbia University, MH), Dan Nielson (Brigham Young University, DN) and Rachidi Kotchoni (African School of Economics, RK) with assistance from Jasper Cooper (Columbia University, JC) and Martha Ross (Wageningen University, MR).

Study material.

- Please bring a lap top. Make sure you have MS Office and Rstudio [1] installed.
- We will use material developed by EGAP (http://egap.org/resources/guides/)
- Additional material is drawn from
    - Gertler et al. Gertler, Paul J.; Martinez, Sebastian; Premand, Patrick; Rawlings, Laura B.; Vermeersch, Christel M. J.. 2011. *Impact Evaluation in Practice*. World Bank.[2]
    - Glennerster et al: Glennerster, Rachel; Takavarasha, Kudzai. 2013. *Running Randomized Evaluations: A Practical Guide.* Princeton.[3]

Preparation.

- Please prepare brief (3 minute) statement of your research project where you tell the group who you are, where you work, what your research question and project is that you will work on during the workshop. Every participant must have a research project to work on

[1] Download from http://www.rstudio.com/products/rstudio/download/
[2] Download from https://openknowledge.worldbank.org/handle/10986/2550 License: CC BY 3.0 Unported.
[3] Open Access ancillary materials: http://runningres.com

throughout the week. If you would like to discuss potential research project options with us in advance of the training, please send us an email. We are happy to discuss!

- Please familiarize yourself with R, the statistical program we will be using. Have a look at a free introduction to R from the Code School, which runs entirely through your browser https://www.codeschool.com/courses/try-r. In addition, please complete the first lecture from the online R Programming course organized by Johns Hopkins University: (i) go to coursera.org, (ii) create an account (this is free!), (iii) sign up for R Programming at Johns Hopkins University (instructor: Roger Peng) under the "Courses" tab (iv) read the materials and watch the videos. The videos from the first week are about 2.5 hours long total.

Learning Days Agenda

Monday, 20 April 2015: Getting Started

Morning: Methods presentations on causal inference
10-11AM: Welcome (MH, MV, DN)

- Introductions
- Brief statement of research projects (short introduction to your research project)

11-12AM: Presentation 1 (DN)

- Research questions: what are *X* and *Y?*
- The potential outcomes framework and the fundamental problem of causal inference

12AM-1PM: LUNCH

Afternoon: Research presentation and Design Clinic
1-2PM: Lecture 2 (MH)

- Macartan Humphreys: Experimental evidence on housing discrimination in New York and what can be done about it
- The stages of research design and implementation
- Introducing the research design form

2-3PM: Design clinic: R (MH)

- Make sure you are set up with R
- Simple data analysis in R

3-5PM: Design clinic: your project

- Work on research design form in small groups
- Discussion research ideas: Identification of Xs and Ys and theory of change

Resources

- 10 strategies for figuring out if X causes Y
- 10 things you need to know about causal inference
- R: http://www.r-project.org/
- Research design form (handout)
- R getting started.R, simple.commands.R
- R assignment: simple.session.R

Tuesday, 21 April 2015: Identification and Randomization

Morning: Methods presentations on randomization strategies
9-11AM: Lecture 3 (DN)
- Mechanics of replicable randomization
- Strategies for randomization: simple, clustered, factorial, intertemporal

11-12PM: Methods presentation
- A refresher on key econometric concepts (means, standard deviation, standard error, the CLT, differences in means, and Hypothesis Testing) (MV)

12AM-1PM LUNCH

Afternoon: Design Workshop
1-2PM: Research presentation:
- Maarten Voors: Earned vs Unearned Development Aid in Sierra Leone

2-3PM: Design clinic R
- R code on randomization
- R code on hypothesis testing

2-3PM: Group work
- Assignments on randomization and hypothesis testing
- Work on research design form
  - Focus on strategy for hypothesis testing for each design
  - Focus on randomization strategies for each design

Resources
- 10 things you need to know about randomization
- Problem set on hypothesis testing and randomization (handouts)
- R assignment simple.statistics.R
- R assignment RANDOMIZATION

Wednesday, 22 April 2015: Threats to randomized experimental design

Morning: Methods presentations on threats to inference
9-11AM: Lecture 4 (MH)
- Partial compliance: LATE and ITT
- Spillovers & Attrition

11-12AM: Research presentation
- Dan Nielson: Information and Accountability in Uganda

12AM-1PM: LUNCH

Afternoon: Design based inference and Design Clinic
1-2PM: Lecture 5 (MH)
- Means, variance, adjustment, randomization inference.

2PM-5PM: Group work
- Feedback and questions
- Assignment on hypothesis testing using randomization inference
- Work on research design

Resources
- 10 things you should know about the local average treatment effect
- 10 things you need to know about spillovers in experimental analysis

Thursday, 23 April 2015: Statistical Power and Design Presentations

Morning: Power and Design Clinic
9-10AM: Lecture 6 (RK)
- Power Analysis

10-12AM: Group work
- Feedback and questions
- Problem set on power analysis, R code on power
- Figuring out the power for each study
- Work on research design

12AM-1PM LUNCH

Afternoon: Research presentation and Design Clinic
1-2PM: Lecture 7 (RK)
- Observational data and its discontents

2-4PM: Group Work
- Feedback and questions
- Revise research designs, set up and troubleshoot simulations for tomorrow

4-5PM: Presentations
- Small group presentations of revised designs, addressing sample, randomization approach, power, potential threats.

Resources
- 10 things you need to know about statistical power
- 10 things you need to know about covariate adjustment
- 10 things you need to know about multiple comparisons
- Problem set on power (handout)
- R-code on power (handout)

Friday, 24 April 2015: Mock Implementation: Simulations and redesign

Morning: Topics. Based on demand we will reserve time in the morning for panel discussions on one or more of the following themes.

1. Ethics
2. Partnerships
3. Measurement strategies
4. Transparency in research

Late Morning / Afternoon: We will use the remainder of the last day to go more deeply into designs in parallel sessions. Working in groups of 4 we will collectively simulate the type of data that we might expect to result from your designs, and use this to:

- **Generate Descriptive Statistics**
- **Implement hypothesis tests:** lets check that your hypotheses can indeed be run on your data. What do you find? We will run your analysis many times to figure out your statistical power.
- **Interpret** expected and unexpected findings
- **Troubleshoot:** what happens if you suffer from missing data, non-compliance, or worse?
- Revise design

List of Participants

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