Donor-Assisted Land-use Planning in the Philippines: Insights from a Multi-Level Survey

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DONOR-ASSISTED LAND-USE PLANNING IN THE PHILIPPINES: INSIGHTS FROM A MULTI-LEVEL SURVEY

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Land requires fair and transparent management to allow for equal participation and for its sustainable use among rivaling stakeholders. Land use planning is the mechanism to allow for this kind of resource management and the reconciliation of diverging interests. It is thus not surprising that the governance of land resources has become a prominent topic among donors and development practitioners in the last decade. It is theorized that good administration and management of land is crucial to poverty reduction, conflict transformation, disaster risk management, improvement in the quality of local governance and ultimately sustainable economic growth.

The report at hand presents first results derived from a quantitative impact evaluation of an intervention for enhanced land use planning in the Philippines. The SIMPLE (Sustainable Integrated Management and Planning for Local Government Ecosystems) approach embedded in the Philippine-German cooperation's "Environment and Rural Development (EnRD)" program was implemented between 2006 and 2015, managed by the Gesellschaft für internationale Zusammenarbeit (GIZ). The report draws upon quantitative cross-sectional data collected in 2012 on household, village and municipal level. It provides first insights into program outcomes and impacts. A follow-up impact evaluation of the intervention, based on a rigorous before-after design, will be published in 2017.

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About this report

This study provides a preliminary view on the emerging impacts of a donor-assisted program supporting participatory land-use planning in the Philippines. The study is relevant beyond this individual case as the design, methods, and questionnaires are applicable to other countries and thus provide the groundwork for a potential broader roll-out. The survey and implementation have been part of a more comprehensive research project financed by the German Federal Ministry for Economic Cooperation and Development (BMZ) at the German Development Institute (DIE) in 2012, which was then transferred to DEval after the Institute was founded. The study was then finalized in collaboration with DEval in 2016 within the scope of the impact assessment currently being implemented by DEval.

The whole research project was made possible owing to the close collaboration between the staff of German Development Institute (DIE) and Deu*tsche Gesellschaft für Internationale Zusammenarbeit* (GIZ) Philippines in 2012, and the BMZ financial support. The project was exploratory in nature. At inception, it was not intended as an evaluation but rather as a baseline study to pave the way for future evaluations.

However, given the comprehensiveness of the data collection and rigor with which different information was collected, some insights on the emerging impacts can already be captured.

Prior reports that were written and co-authored by the main author served as basis for this report (Garcia et al., 2013; Garcia and Lange, 2013).[1] This report should therefore be seen as complementary rather than as a substitute of previous papers.

The participatory and land-use planning tool employed in this study is part of the Environment and Rural Development Program (EnRD) of the Philippine-German Cooperation, managed by the GIZ in the Philippines. The land-use planning intervention and the EnRD Program were largely funded by the German Ministry for Economic Cooperation and Development (BMZ). The tool aims to integrate the planning and management of various ecosystems, from ridge-to-reef, so that local governments can manage their territory in a coherent manner and improve disaster risk management as well as public service delivery.

[1] *This report differs from Garcia et al. (2013) in that additional rigor is introduced by minimizing selection bias by conducting a propensity score matching technique at the household level, and by bringing together descriptive information obtained from the barangay and municipal surveys, including administrative data. The World Bank conference paper of Garcia and Lange (2013) goes into this direction but is not as comprehensive as this report.*

EXECUTIVE SUMMARY

This study presents the preliminary results of a quantitative impact assessment of a comprehensive and participatory land-use and planning approach in the Philippines called "SIMPLE". The approach SIMPLE (Sustainable Integrated Management and Planning for Local Government Ecosystems) was developed and implemented in the domain of the Environment and Rural Development (EnRD) programme of the Philippine-German cooperation, managed by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ). The present study builds upon cross-sectional data. An impact assessment with a more rigorous methodological approach and a more comprehensive set of evaluation objectives is currently ongoing (2016), building upon the baseline information. This ongoing assessment will allow for a more precise estimation of results given that the assessments will be conducted using two points in time.

The current report is based on a multi-level survey as well as on secondary data collected in the Philippines in 2012/2013 before the typhoon Haiyan struck the country. It utilized a dataset gathered from 3,000 households in 100 municipalities with and without GIZ assistance across 11 provinces in Eastern and Western Visayas. The objectives of the study are to assess to what extent SIMPLE functioned as a tool for facilitating the approval of comprehensive land-use plans (CLUPs), and contributed to disaster risk management (DRM) and welfare improvement.

The comprehensive and participatory land-use planning approach, SIMPLE, consists of many interventions comprising training components, technical assistance, and elaboration of processes and instruments for the management of land use. Implementation started in 2006 and continued until end of 2015 in close cooperation with Philippine authorities and stakeholders. This approach did not, however, touch the interlinked issues of land titles and unequal distribution of land ownership.

The study uses a quasi-experimental approach, drawing on a propensity score matching based on secondary statistics conducted to choose control municipalities and an additional propensity score matching at household level for analysis, making use of the collected survey data. The study provides results on household, barangay, and municipal level.

Overall, the **preliminary results** suggest that SIMPLE, in combination with other GIZ programs, (SIMPLE/GIZ sites) made important contributions to land-use planning, land zoning, disaster awareness, and disaster preparedness. The present study did not, however, find any indication of impacts regarding the long-term effects on disaster risk reduction and household well-being.

With regard to **zoning and CLUP implementation**, SIMPLE sites consistently show better performance in terms of formulating their CLUP compared to the control sites. Intervention municipalities have zoning ordinance more often enacted by the local parliament (89 %), approved CLUP (58 %), conducted participatory formulation of CLUP (90 %), and reported the use of geographic information systems (GIS) (81 %).

Disaster awareness: The reported likelihood of living in hazard areas in the control sites is lower than in the SIMPLE sites by 7.3 percentage points. Although it appears counterintuitive, a possible explanation is that respondents in SIMPLE sites are more informed and aware that they are living in hazard zones than their matched counterparts. This result was confirmed by further investigation: respondents in the SIMPLE sites have a higher chance of being aware of disaster risks (15.1 percentage points) compared to control sites. And despite living in more disaster-prone areas than the respondents in the control sites, nevertheless they reported a lower likelihood of being a victim of disaster between 2006 and 2012 (by 7.9 percentage points). If respondents are more aware, they can act using simple mitigation measures by building their house or planting crops on higher grounds should their location be susceptible to, for example, flooding. In extreme cases, loss of life can be avoided if they know when to evacuate the area on time.

Disaster preparedness: There is an indication that SIMPLE sites are more prepared when a disaster occurs, an assessment that the municipal officers share. Yet according to the barangay captains there is no difference, which they explain with the existence of DRM components at both intervention and control sites. In terms of some objective measures used by the national

government, we find that, although there is no difference in the existence of the Local Disaster Coordinating Council (LDCC) in municipalities, there is, however, a significant difference in terms of quality of its organization. SIMPLE sites are more likely to integrate DRM in the Comprehensive Development Plan, Local Development Investment Plan, and Annual Investment Plan. Control sites, however, tend to have higher incidence of formulating an operations manual, where the communication strategy and monitoring and evaluation were incorporated (by 14 percentage points). We find no significant difference between the two sites in terms of availability of community-based early warning systems and quality of DRM plans. Self-reported preparedness based on the availability of evacuation centres, equipment, relief goods, as well as medical and counselling services are higher in the SIMPLE sites, except for equipment availability, where we find no difference. Overall SIMPLE sites tend to be more aware of the disaster zones – both households and municipalities. SIMPLE sites also tend to comply with what is mandated by the national government; for example they are more likely to organize support groups in the formulation of an LDCC (by 15 percentage points).

Regarding **disaster risk reduction** and environmental conservation, we find some differences from the household point of view between intervention sites and control sites. Households in SIMPLE sites are significantly more aware of initiatives such as tree nurseries, tree planting, and seedling provision than the inhabitants of the control sites. Municipal officials also report having more initiatives such as tree nurseries, tree planting, mangrove nurseries (but not mangrove planting), and seedling provisions in the program areas. Hence, based on municipal officers' and (partially) household reports (but not of barangay captains) we find some evidence in support of greater reduction of disaster risk.

We find no evidence to suggest that SIMPLE has an impact on **household well-being.** Given the long-term nature of this indicator, this is an expected result. The timing of the survey was also conducted at the time when the intervention had not been fully completed.

In sum, we observe a higher presence of zoning officers and zoning ordinances among SIMPLE municipalities. The preliminary results also suggest that the SIMPLE program contributed positively to improving household awareness about disaster-relevant issues such as reported hazard zones, the risks involved in living in hazard areas, and disaster preparedness; although we found no impacts related to welfare improvements. This indicates that the donor-assisted intervention process has contributed to some of the crucial land-related issues in the selected rural municipalities and cities. More importantly, however, is the point that the program's potential long-term impact will remain limited as long as the two core issues of unequal landownership and land rights are not resolved.

Some caveats should be noted, however: it is possible that the impacts are confounded by factors that are difficult to measure. The success of SIMPLE can also be affected by the mayor's all-out support to the program, external resources and other donor funding, as well as frequency of disasters in the areas.

ZUSAMMENFASSUNG

Die vorliegende Studie stellt erste Ergebnisse einer quantitativen Wirkungsevaluierung eines Ansatzes zur Landnutzungsplanung auf den Philippinen vor. Der Ansatz mit dem Titel SIMPLE (Sustainable Integrated Management and Planning for Local Government Ecosystems) wurde im Rahmen der philippinisch-deutschen Zusammenarbeit innerhalb des Programms „Environment and Rural Development" (EnRD) durchgeführt und durch die Gesellschaft für internationale Zusammenarbeit (GIZ) umgesetzt. Die vorliegende Studie nutzt Querschnittsdaten. Eine Wirkungsevaluierung mit einem rigoroseren methodischen Ansatz und einem erweiterten Katalog an Evaluierungsfragen wird zurzeit durchgeführt (2016/2017). Die laufende Evaluierung wird die vorliegenden Ausgangsdaten sowie Daten eines weiteren Zeitpunkts nutzen, was eine präzisere Messung der Wirkungen erlaubt.

Der vorliegende Bericht basiert auf einer Mehrebenen-Befragung, die 2012/2013, vor dem Taifun Haiyan, auf den Philippinen durchgeführt wurde, sowie auf Sekundärdaten. Es wurden Daten von 3.000 Haushalten in 100 Gemeinden und 11 Provinzen der Regionen *Östliche Visayas* und *Westliche Visayas* berücksichtigt. Nur ein Teil der untersuchten Gemeinden erhielt Unterstützung durch die GIZ. Die Ziele der Studie sind es abzuschätzen, inwieweit SIMPLE als Ansatz (a) die Erstellung und offizielle behördliche Genehmigung der kommunalen Landnutzungspläne verbessert, und (b) zum Risikomanagement von Naturkatastrophen sowie (c) zur Verbesserung des Wohlergehens beiträgt.

Der umfassende und partizipative Ansatz zur Landnutzungsplanung SIMPLE umfasst eine große Anzahl an Interventionen, u. a. in Form von Trainings und Trainingsdokumentation, technischen Hilfestellungen sowie der Entwicklung von Prozessen und Instrumenten für die Verwaltung der Landnutzung. Der Ansatz wurde im Zeitraum von 2006 bis 2015 in enger Zusammenarbeit mit philippinischen Behörden und Interessengruppen umgesetzt. Der Ansatz klammert dabei die Bereiche Landrechte, Landtitel und ungleiche Verteilung von Landbesitz explizit aus.

Die Studie basiert auf einem quasi-experimentellen Untersuchungsdesign. Dabei wurden – mittels eines propensity score matching Verfahrens – auf Basis sekundärer administrativer Daten Kontrollgemeinden identifiziert. Ein weiteres propensity score matching Verfahren wurde auf Haushaltsebene durchgeführt, bei der auf die gesammelten Umfragedaten zurückgegriffen werden konnte. Die Studie liefert Ergebnisse auf Haushalts-, Dorf- und Gemeindeebene.

Insgesamt deuten die **vorläufigen Ergebnisse** darauf hin, dass SIMPLE in Kombination mit anderen GIZ-Programmen wichtige Beiträge zur Landnutzungsplanung, Zonierung sowie hinsichtlich des Katastrophenbewusstseins und der Katastrophenvorsorge liefern kann. Die vorliegende Studie kann jedoch noch keine langfristigen Wirkungen auf den Wohlstand von Haushalten nachweisen.

In Bezug auf **Zonierung und Erstellung des Landnutzungsplans** zeigen SIMPLE-Gemeinden konsistent eine bessere Leistung bezüglich der Formulierung ihres Landnutzungsplans im Vergleich zu den Kontrollgemeinden. In Interventionsgemeinden wurden öfter Zonierungen durch das lokale Parlament verabschiedet sowie Landnutzungspläne genehmigt (58 %), Landnutzungspläne partizipativ erarbeitet (90 %) und bei der Erstellung geographische Informationssysteme (GIS) genutzt (81 %).

Bewusstsein für Katastrophenrisiken: Die berichtete Wahrscheinlichkeit in einer Gefahrenzone zu leben war in den Kontrollgemeinden um 7,3 Prozentpunkte geringer als in SIMPLE-Gemeinden. Obwohl dies kontraintuitiv erscheint, könnte eine mögliche Erklärung sein, dass die Befragten in SIMPLE-Gemeinden besser informiert waren und somit ein höheres Bewusstsein für Gefahrenzonen hatten als Befragte in Kontrollgemeinden. Diese Vermutung wurde durch weitere Ergebnisse bestätigt: Die Befragten in SIMPLE-Gemeinden waren sich im Vergleich zu Befragten in Kontrollgemeinden öfter (15,1 Prozentpunkte) des Risikos von Naturkatastrophen bewusst. Obwohl in SIMPLE-Gemeinden mehr Menschen angaben in Gefahrenzonen zu leben als in den Kontrollgemeinden, berichteten sie seltener (7,9 Prozentpunkte) zwischen den Jahren 2006 und 2012 ein Opfer von Naturkatastrophen geworden zu sein. Denn sobald Haushalte ein stärkeres Bewusstsein gegenüber Naturkatastrophen haben, können sie ihr individuelles Risiko durch einfache Maßnahmen, z. B. beim Bau ihres Hauses außerhalb von Überschwemmungsgebieten oder der Bewirtschaftung von Feldern auf höherem Grund, verringern. In Extremfällen können

Todesfälle vermieden werden, wenn bewusst ist, wann und wie ein gefährdeter Bereich evakuiert werden muss.

Katastrophenvorsorge: Es gibt Hinweise dafür, dass SIMPLE-Gemeinden besser auf den Eintritt einer Katastrophe vorbereitet sind. Dies ist ein Standpunkt, den die befragten Mitarbeiter kommunaler Planungsbehörden teilten, jedoch nicht die Dorfvorsteher. Zieht man eine Analyse von national verbindlichen Maßnahmen für das Risikomanagement zu Rate, fand sich zwar kein signifikanter Unterschied bezüglich der Existenz von lokalen Katastrophen-Koordinierungsräten; diese wiesen jedoch signifikante Unterschiede in Bezug auf die Qualität der Organisation auf. SIMPLE-Gemeinden integrierten häufiger Naturrisikomanagement in den kommunalen Entwicklungsplan, in lokale (dörfliche) Entwicklungs- sowie Investitionspläne und jährliche kommunale Investitionspläne. Gemeinden in Kontrollgebieten dagegen nutzten öfter (14 Prozentpunkte) Betriebshandbücher, in denen die Kommunikationsstrategie sowie Maßnahmen zur Überwachung und Bewertung bei Naturkatastrophen beschrieben sind. Es wurde kein signifikanter Unterschied zwischen der Interventions- und Kontrollgruppe in Bezug auf die Verfügbarkeit von kommunalen Frühwarnsystemen und der Qualität von Risikomanagementsplänen bei Katastrophen gefunden. Die Befragten schätzten die Gemeinden in SIMPLE-Gebieten als besser auf Naturkatastrophen vorbereitet ein, im Vergleich zu Gemeinden in Kontrollgebieten. Diese Einschätzung bezog sich auf Evakuierungszentren, Ausrüstung, Hilfsgüter sowie medizinischen und beratenden Dienstleistungen, deren Verfügbarkeit in SIMPLE-Gemeinden höher war. Insgesamt zeigte sich in SIMPLE-Gemeinden ein höheres Bewusstsein für Gefahrenzonen, sowohl bei Haushalten als auch bei den kommunalen Planungsmitarbeitern. SIMPLE-Gemeinden erfüllten zudem öfter die Richtlinien der nationalen Regierung, so wurden dort öfter (15 Prozentpunkte) Arbeitsgruppen für den Aufbau eines lokalen Koordinierungsrates für Katastrophen gebildet.

In Bezug auf die **Reduzierung des Katastrophenrisikos** und des Umweltschutzes wurden einige Unterschiede zwischen den Interventions- und Kontrollgemeinden gefunden. Haushalte in SIMPLE-Gemeinden berichteten signifikant öfter von Initiativen wie Baumschulen, Baumpflanzungen und Bereitstellung von Setzlingen als Bewohner der Kontrollgemeinden. Mitarbeiter von Planungsbehörden in SIMPLE-Gemeinden berichteten ebenfalls öfter von solchen Initiativen. Basierend auf den Berichten der Mitarbeiter der Planungsbehörden – teilweise auch von Haushalten (jedoch nicht von Dorfvorstehern) – konnten daher Wirkungen des Ansatzes auf eine verstärkte Katastrophenvorsorge gefunden werden.

Es konnten keine Wirkungen von SIMPLE auf den **Wohlstand der Haushalte** nachgewiesen werden. Angesichts des längerfristigen Charakters dieses Indikators ist dies jedoch auch ein zu erwartendes Ergebnis. Zudem wurde die Befragung zu einem Zeitpunkt durchgeführt, an dem die Interventionen noch nicht vollständig abgeschlossen waren.

Zusammenfassend kann festgehalten werden, dass eine höhere Präsenz von Fachpersonal für Zonierung und Zonierungsverordnungen innerhalb von SIMPLE-Gebieten beobachtet werden konnte. Die vorläufigen Ergebnisse zeigten auch, dass das SIMPLE-Programm positiv zur Verbesserung des Bewusstseins der Haushalte gegenüber katastrophenrelevanten Themen wie Gefahrenzonen, Risiken die mit dem Leben in einer Gefahrenzone verbunden sind, und Katastrophenvorsorge beigetragen hat. In Bezug auf die Verbesserung des Wohlstandes wurden keine Auswirkungen gefunden. Dies zeigt, dass die Implementierung des SIMPLE Ansatzes zur Landnutzungsplanung keine positiven Auswirkungen in den ausgewählten ländlichen Gemeinden und Städten aufweisen konnte. Bei dieser Einschätzung muss jedoch betont werden, dass mögliche langfriste Auswirkungen des Programms begrenzt sind, solange die beiden Kernthemen des ungleichen Landbesitzes und Landrechtes nicht gelöst sind.

Bei der Interpretation der Ergebnisse sollte auch beachtet werden, dass bei der Wirkungsmessung von SIMPLE eine Vermischung mit Wirkungen anderer schwer messbarer Faktoren möglich ist. So kann die gemessene Wirkung von SIMPLE auch durch eine gute Unterstützung der Landnutzungsplanung durch die Bürgermeister, zusätzliche externe Ressourcen ebenso wie durch die Häufigkeit des Auftretens von Naturkatastrophen beeinflusst gewesen sein.

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ABBREVIATIONS

AFMP
Agri-Fishery Modernization Program

ATT
Average Treatment Effect on the Treated

BDP
Barangay Development Plan

BMZ
German Federal Ministry for Economic Cooperation and Development

CARP
Comprehensive Agrarian Reform Program

CBFM
Community-based Forest Management

CCA
Climate Change Adaptation

CLUP
Comprehensive Land-use plan

DAR
Department for Agrarian Reform of the Philippines

DENR
Department for the Environment and Natural Resources

DEval
German Institute for Development Evaluation

DIE
German Development Institute

DILG
Department for the Interior and Local Government

DRM
Disaster Risk Management

EFOS
Enhancement of Food Security

EnRD
Environment and Rural Development (Program)

FLUP
Forest Land-use Plans

GIS
Geographic Information System

GIZ
Deutsche Gesellschaft für Internationale Zusammenarbeit (German Corporation for International Cooperation)

HLURB
Housing and Land-use Regulatory Board (Philippines)

ICM
Integrated Coastal Management

KALAHI-CIDDS
Kapit Bisig Laban sa Kahirapan – Comprehensive and Integrated Delivery of Social Services

LDCC
Local Disaster Coordinating Council

LGPMS
Local Government Performance Measurement System

LGU
Local Government Unit

LUBBDP
Land-use Based Barangay Development Planning

MPDC
Municipal Planning and Development Coordinators

NCI
National Conversion Initiative

NEDA
National Economic Development Authority

NRG
Natural Resource Governance

PDSS
Policy Dialogue and Strategic Steering

PHP
Philippine Peso

PLUDP
Participatory Land-use Development Planning

PLUP
Participatory Land-use Planning

PSM
Propensity Score Matching

REDD
Reducing Emission from Deforestation and Degradation

SIMPLE
Sustainable Integrated Management and Planning for Local Government Ecosystems

ToC
Theory of Change

UPV
University of the Philippines Visayas

ZO
Zoning Ordinance

1.

INTRODUCTION

1.1 Participatory land-use planning – practice and donor efforts

Land governance has become a prominent topic among donors and development practitioners in the last decade. It is theorized that good administration and management of land is crucial to poverty reduction, conflict transformation, disaster risk management, improvement in the quality of local governance, gender equality, and ultimately sustainable economic growth. Land-use planning and land administration (in the form of land rights) are closely linked: the uses of land can imply different owners and/or users (GIZ, 2012). Poor enforcement and recognition of land rights can lead to various groups or individuals laying claim to the same piece of land. Land-use planning ensures that there is joint acceptance as this will determine who will eventually use the land, especially if there are competing land uses.

Donor interventions on land governance are wide ranging. Frequent interventions include (a) securing land rights and land titling, (b) reforming institutions to address urban and rural needs, (c) developing capacity of decentralized structures, and (d) providing innovative tools to enable land administration and management. A coherent integration of these measures is commonly a prerequisite for effective land-use planning measures. Functioning institutions and clear mandates between stakeholders involved in land-use management serve as the foundation for land-use planning by responsible authorities.

This study concentrates on intervention (d) – the participatory land-use planning tool. This tool helps map out boundaries and identify territories and ecosystems through a participatory process, thereby helping governments and stakeholders to coherently manage their land.

The *participatory* component of land-use planning is a revised version of the top-down approach. Land-use plans in this approach are developed by technical experts with no or very limited communication from relevant stakeholders and land users. In the past, these plans were often highly scientific, complex, and not wholly integrated into the wider legal and institutional framework, consequently limiting their applicability and flexibility on the ground. Because interests and needs of the land users were not adequately reflected in the plans, it resulted in less effective conservation and management of resources. The inclusion of the participatory aspect means that the land users and stakeholders are involved in the decision-making process and are fairly represented. Furthermore, the participatory component also implies creation of a venue for land users and political decision makers to communicate their concerns.

Bilateral donors have embraced the concept of participatory land-use planning (PLUP) and have applied it to a number of developing countries. The Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) alone, on behalf of the German Development Cooperation, has applied such a tool in Ethiopia, China, Lao People's Democratic Republic, and the Philippines among others. Parallel to the process at the GIZ, PLUP has also been implemented by UN organizations – specifically by FAO and United Nations Environment Program (UNEP). It has become one of the popular prescriptions to land governance and has been applied to reach varying objectives: economic activity, resolution and prevention of land-use conflicts, natural resource protection, climate change adaptation (CCA) and mitigation, including many others.

1.2 Literature review – results of previous research and evaluations

While the role and relevance of PLUP is widely accepted in theory, evidence of its impact remains limited. This is in contrast to the increasing number of conducted evaluations and research programs regarding the impact of land titling and land rights, including a couple of randomized control trials in Tanzania, Uganda, Liberia, and Mozambique (Ayalew et al., 2014; Knight et al., 2012) as well as a natural experiment in Buenos Aires (Galiani and Schargrodsky, 2010).

Land-use planning is usually adapted to fit the needs, demands, existing rules, and capacities of a specific governing body. It may be that the land-use planning conceptualized for a specific locality (or country) may not be appropriate to

another context. For instance, where resources and institutional capacities are missing, a more practical approach could be used, such as sketching out the spatial features of a development plan rather than making a very detailed plan. There is no specific prescription on what the best approach should be. However, much land-use planning implemented worldwide has included local participation as one of the key factors.[2]

The evidence about the effectiveness of PLUP based from the few existing research papers and evaluations is mixed. Kaswamila and Songorwa (2009) investigate the impact of PLUPs on land-use conflict mitigation and land productivity enhancement in three villages in Tanzania. Based on a combination of quantitative and qualitative data, the authors find that land-use plans failed to achieve their set objectives for a number of shortcomings during PLUP implementation: low participation by stakeholders, especially the local community; lack of participatory skills among facilitators; insufficient time spent in communities to facilitate meaningful consultations; absence and little attention to implementation strategies; inadequacy of qualified staff; and lack of "holistic approach" to the planning process. The presented evidence shows that PLUP is not a "panacea to mitigate land-use conflicts and enhance land productivity" if only "coined as 'participatory planning'", but not participatory in practice.

In the same vein, Reyes-García et al. (2012) conducted a participatory mapping randomized evaluation, a component of participatory land-use planning, on land-use conflicts in ancestral/indigenous lands in Bolivia. The authors cannot find any impact of participatory mapping on conflicts, but note that the "participatory mapping intervention might have been too light to impact" or that the people participated in the mapping, but subsequently failed to adopt and use the maps. The authors suggested that the villagers' low levels of awareness about the potential threat to their territory could explain why they never reached the stage of owning the maps and using them to defend their lands.

In contrast, Hessel et al. (2009) tested the PLUP approach in Burkina Faso by investigating land-use problems, their causes, effects, and possible solutions. The approach's impact was evaluated based on stakeholder interviews and focus group discussions conducted during a follow-up 2 years after the intervention. The authors conclude that the approach proved successful as solutions proposed during the PLUP were (at least partially) adopted, there was increased understanding of problems and possible solutions, and increased collaboration. But the authors acknowledge that attribution of these changes to PLUP is difficult. Furthermore Hessel et al. argue that solutions need to be customized and fit local realities and the only way that this "can be realized is when local knowledge is integrated with scientific knowledge through participatory land-use planning approaches".

Similar to Hessel et al. (2009), the International Institute for Environmental Development (IIED, 2010) evaluates the experience of a long-established PLUP process in Tanzania based on case studies. PLUP in Tanzania is applied in villages facing competition over land use, especially between use for farming and livestock herding; traditional and new land users; and competition with land use by indigenous inhabitants, for wildlife protection, and commercial interests such as tourism. The report shows how a PLUP with villagers "fully involved in facilitating their own planning processes" can successfully conserve valuable ecosystems, support local livelihoods, and prevent competing land-use conflicts, increase local governance and accountability. Furthermore, the authors emphasize that land and resource-use plans need to be linked to policy at higher administrative levels in order to be effective.

Lestrelin et al. (2011) confirm the importance of the actual implementation of PLUP in the field. Based on household surveys the authors evaluate the presence, the actual participation, and the understanding of participants. The authors find that the presence of community members increased compared to an earlier land-use planning approach adopted in Lao, but that the level remained low nonetheless, especially among non-elites. The authors see the "implementers' limited experience and technical capacity led to confusion during on-the-ground implementation of PLUP" as the main reason for this finding and conclude that "without proper methodological training and technical support of implementing agencies, the risk remains that [...] the beneficial principles of PLUP will be lost during application in the field".

[2] *The modified theory of change used by GIZ for the Philippine context is presented in Chapter 4.*

In response to such observations, Lestrelin et al. (2011), Bourgoin et al. (2011), and Bourgoin and Castella (2012) propose approaches to increase the number and quality of participation in PLUP. Bourgoin et al. (2011) developed a participatory landscape simulation board game ("PLUP Fiction") as part of a stepwise process of participatory land-use planning. They also used it to evaluate its application in six pilot barangays in Lao PDR based on observations and participants' feedback. The case study emphasizes the importance of innovative ways of community participation in order to have meaningful impact on the PLUP process. The authors claim that the villagers gained an increased understanding and awareness of the impacts of land zoning on local livelihoods and the environment. Bourgoin and Castella (2012) evaluate an integrated PLUP approach, based on a combination of role-playing games ("PLUP Fiction"), participatory 3D modelling, GIS, and socioeconomic and environmental impact assessment to achieve "genuine involvement of local communities" in the PLUP process. Based on observations during the pilot-testing of the approach in six barangays in Lao PDR, the authors conclude that "visualization and learning boundary tools can help translate participatory principles into reality [...] by improving effective participation".

In sum, the existing studies show large discrepancies between the expected benefits based on theory and intended goals and actual socioeconomic outcomes in practice. While PLUP has the potential to meet its goals (Hessel et al., 2009; IIED, 2010), the theoretical appeal of participation often faces significant difficulties in its application in practice and in achieving its ambitious goals (Kaswamila and Songorwa, 2009; Lestrelin et al., 2011; Reyes-García et al., 2012). Limited facilitation skills, tight schedules and time constraints preventing a meaningful participatory approach, insufficient implementation capacities, and follow-up activities impose considerable constraints to the potential positive impact of PLUP. Furthermore, it becomes evident that existing studies on PLUP largely focus on procedural aspects of plan development such as participatory aspects while somewhat little attention is paid to the "hard" impacts of land-use planning. In addition, basically no evidence exists regarding long-term impacts of land-use planning on the affected population. This study is taking an innovative approach by focusing on these (until now) neglected aspects in planning studies in a development context.

1.3 Purpose of the study

The purpose of this research study is to present the emerging impacts of the participatory land-use planning intervention, "SIMPLE", on outcomes relating to disaster awareness, disaster preparedness, disaster reduction and, ultimately, on household perceived welfare. It will employ multi-level survey data in two Philippine regions (6 and 8), as well as administrative data.

Rather than focusing solely on the participatory aspect of the tool, which various researchers have previously done, we are concentrating our study on the intervention package, that is, the tool as a whole (which will be discussed in the next chapter) and its impact on the constituency. Three main themes will be covered in the empirical section of this report, which, to the authors' knowledge, have not yet been investigated in a low-income country context:

- **Enabling institutional environment:**
  - Output: To what extent does the intervention facilitate the progress of CLUP?
  - Does the intervention help in any way to improve awareness on zoning ordinances and establishment of zoning officers? Why/why not?

- **Disaster risk management:**
  - To what extent does the intervention lead to increased disaster awareness, disaster preparedness and disaster risk reduction?

- **Welfare**
  - To what extent does the intervention lead to local welfare impacts?

The specific research questions, indicators and data sources used in the analysis are presented in Table 1. The findings will be based on the combination of descriptive analysis and quantitative evaluation method (to be discussed in the next chapters).

1.4 Structure of the report

After introducing the country context in chapter 2, chapter 3 discusses the program background and the SIMPLE implementation in detail. Subsequently, chapter 4 describes the data, the study design and methodology applied. The findings of analysis are extensively presented and discussed in chapter 5, as well as alternative explanations of impact. Chapter 6 explains the challenges in evaluating land-use planning such as SIMPLE. Chapter 7 concludes and discusses future work.

Table 1. Specific research questions

Specific research questions	Indicators	Source
1. Land-use plans and their implementation		
1.1. Status of CLUPs To what extent do intervention municipalities have valid land-use plans more often than control municipalities? Why or why not?	**Average difference between intervention and control groups based on:** • Share of municipalities with valid CLUPs	Municipal survey
1.2. Zoning To what extent do intervention municipalities have zoning officers and zoning ordinances more often than control municipalities? Why or why not?	**Average difference between intervention and control groups based on:** • Households awareness of zoning officer and zoning ordinances • Existence of zoning officer and zoning ordinances reported by municipal officials	Household survey, municipal survey, and DILG LGPMS
2. Disaster risk management		
2.1. Disaster awareness To what extent is the reported likelihood of living in hazard areas lower in intervention municipalities in comparison to control sites? Why or why not? To what extent are households in intervention municipalities more aware of hazard areas than households in control municipalities? Why or why not?	**Average difference between intervention and control households based on:** • Households' reported likelihood of living in hazard areas • Likelihood that households are informed about hazard areas and associated risks • Likelihood that the households received information from the local government about the hazard zones in the barangay • Likelihood that households were advised by the local government to move or relocate to safer areas • Likelihood that the respondents had been a victim of disaster between 2006 and 2012, and were aware of the risks	Household survey

Specific research questions	Indicators	Source
2.2. Disaster preparedness To what extent do households in the intervention municipalities feel better prepared in case a disaster occurs today compared to control municipalities? Why or why not? To what extent do intervention municipalities usually take into account the disaster needs of barangays more often than control municipalities? Why or why not? To what extent are intervention municipalities better equipped for disasters? Why or why not?	**Average difference between intervention and control groups based on:** • Households' perception of preparedness in case a disaster occurs today (yes/no) • Barangay captains' subjective ranking of the barangays' preparedness in case a disaster occurs today • Municipal officers' ranking of municipality's preparedness in case a disaster occurs today • Number of barangay development plans (BDPs) and disaster risk management (DRM) in BDPs • Number of municipal officers who reported that: a **Local Development Council (LDCC**) was organized, their CLUP complies with DRM regulations, their CLUP includes support groups and volunteers, and combination of compliance and support groups in CLUP • **Existence of management tools** where LDCC is integrated in the important plans, has an operations manual, has operational community-based early warning systems, and quality of DRM plan • **Existence of infrastructure and services including** evacuation centres, equipment, relief goods, medical, and counselling services	Household survey, barangay captain survey, municipal officer survey DILG LGPMS survey
2.3. Disaster risk reduction To what extent do treatment municipalities tend to have more conservation and livelihood initiatives than the control municipalities? Why or why not?	**Number of intervention and control municipalities that recognize the need for protected areas** **Average difference between intervention and control groups based on:** • Households' awareness on barangay conservation and livelihood initiatives • Local officials' (barangay and municipality) response regarding barangay conservation and livelihood initiatives	Household survey, municipal survey
3. Welfare Do households in the treatment municipalities report improved well-being more often than in the control municipalities? Why or why not?	**Average difference between intervention and control groups based on:** • Self-reported household well-being • Improvement in household well-being today compared to 5 years ago • Households' perception that the government has helped to improve their well-being	Household survey

2.

COUNTRY CONTEXT[3]

[3] *Excerpts borrowed from Garcia and Lange (2013).*

As for many low or middle-income countries, the Philippines suffer from scarce land resources, continuing resource degradation because of increasing population pressure, natural hazards due to climate change, and a lack of integrated planning and management of public, private, and ancestral lands. Although economic growth remains solid, poverty levels among the rural population, as well as unequal income distribution, continue to rise. Very often, the poor are the ones living in hazardous environments unsuitable for habitation, which present an extreme risk on lives, livelihood, and properties. Management of land will play a crucial role for the anti-poverty strategy of the Philippines in the future, not only as space for food production but also for urban growth, nature conservation, and industrial development.

There are several challenges to sound land governance facing the country:

1 According to the Housing and Land-use Regulatory Board (HLURB) estimates in 2012, 70 per cent of all municipalities and cities in the Philippines had outdated or no land-use plan at all. The land-use plans of 947 municipalities and cities had expired in 2002, out of which 31 per cent had no approved CLUP since 1994. Hence, there were only 484 municipal governments that had an updated CLUP approved after 2003 (GIZ, 2012).
2 Local governments often lack the capacity and expertise to formulate land-use plans, and those that have them do not necessarily use them for decision making – either because they do not understand how external consultants prepared them or the plans were of low quality.
3 The number of required planning documents by different government agencies leads to inefficiencies and conflicting land uses and discourages integrated planning. The multitude of plans and conflicting tenure rights also leads to inefficient planning processes and unsolved land conflicts. For example, large portions of municipal territory are commonly classified as forest land and managed by forest land-use plans (FLUP) under the mandate of the Department for the Environment and Natural Resources (DENR). This territory cannot be integrated into the process of land-use planning on account of municipal planning authorities' lack of mandates over this land. Furthermore, tenure conflicts exist between ancestral domain (land attributed the indigenous population) and forest land and their subsequent management plans.
4 The segmentation into forest, lowland, and coastal areas means that different sector plans are formulated without linking them to a holistic area plan at the municipal or city level.
5 Disaster risk reduction and climate change adaptation are not integrated in these plans although the topic is high on the agenda of policymakers.

Contested land rights, between privately owned and government-administered land, continue to be unresolved and largely beyond the remit of local land-use planning. The sheer numbers of different land titles as well as formal and informal land-use permits remain an obstacle to providing local land owners or dwellers with a sound legal foundation for their actual land-use practices. The SIMPLE intervention did not address the issues of land rights and land titling. SIMPLE does, however, acknowledge the competing uses of land, and incorporates this as part of the training and spatial analysis.

3.

PROGRAM BACKGROUND

3.1 About SIMPLE

In response to the current challenges in the Philippines, the GIZ-managed Environment and Rural Development Program (EnRD) developed SIMPLE, a participatory land-use and development planning tool that aims at integrating various ecosystems (from ridge-to-reef). This will ensure that local governments can plan and manage their entire territory in a coherent manner. SIMPLE builds on a participatory land-use and development planning process starting at the lowest administrative level, the barangay (village). The planning and management process consists of five phases and involves stakeholders at three political levels: the province, municipalities and cities, as well as barangays.

To ensure the program's sustainability, the tool involves the establishment of a pool of trained experts at the provincial level to serve as trainers and service providers to municipal governments (Phase 1). The trainers are trained in the different modules of SIMPLE, local planning and management, and GIS. These experts support municipalities and barangays in the implementation of SIMPLE. Following the establishment of the trainer pool, the approach aims to link provincial with the municipal or city development strategies in order to prevent conflicting plans (Phase 2). Phase 3 involves the barangay and municipal level and involves the participatory development of the barangay development plan (BDP) containing all crucial information on the barangay and the subsequent integration of the BDPs into the Comprehensive Land-use plan (CLUP) and corresponding zoning ordinances at the municipal level. Phase 4 translates the CLUP long-term perspective into shorter-term comprehensive development and annual investment plans. The final phase of SIMPLE links the plans and budgets with expenditures and focus on the zoning ordinance, implementation, enforcement, and the monitoring of the plans in place (Phase 5). (See the logic framework in Table 2.)

The implementation costs of SIMPLE, which amounts to about PHP 2 million for the province and PHP 2 million for every implementing municipality, are borne by the local governments themselves (roughly USD 92,500 in total).

Table 2. Logic framework

Input	Output	Intermediate outcome	Long-term outcome
Provincial level			
Capacity building of trainer pool (training of trainers) barangay level	Trainer pool trained	• Trainer pool will provide services to local government units (LGUs) (part of assumption and success factor)	
Mentoring of municipal implementing team on barangay facilitation	BDPs and maps produced	• Access to outside funds with BDPs • Linking and consolidating maps • Changes in budget process and spending at barangay level • Improved service delivery	• Community empowerment increased social cohesion
Municipal level			
Mentoring of municipal implementing teams for CLUP and zoning ordinance (ZO) writing	CLUP/ZO written and submitted for approval	• Enforcement of ZO (approval of CLUP and ZO) and enforcement of prescribed land uses • CCA/DRM (building code, adaptation measures) • Other component outcomes • Changes in budget process and spending at municipal level • Improved decision making • Improved service delivery	• Reduced illegal use of land • Reduced land conversions and destruction • Conflict reduction • Disaster damage reduction • More investment flow in municipality
Mentoring on GIS	Maps analysed and produced		
Capacity building of municipal facilitators (gender, conflict, CCA, DRM, budgeting, barangay facilitation, linking plans with budgets)	Municipal implementing teams formed and trained	• Reduced costs for plan formulation (no outsourcing) • Empowerment (skill acquisition) for repetitive planning	
GIS capacity building	GIS at provincial and municipal experts trained Maps produced	• Reduced costs for plan formulation (no outsourcing) • Empowerment (skill acquisition) for repetitive planning • Document and transform barangay boundary conflicts • Document municipal land-use and border conflicts	• National Mapping and Resource Information Authority (NAMRIA) to correct boundaries → conflict resolved
Integration			
Linking CLUP with other interventions (forest, coast, CCA, DRM, food security)	Coast: identification and mapping of marine protected areas Forest: identification and mapping forest zones DRM: identification and mapping of hazard zones Food security: identification and mapping of agricultural land	• Food security: prevent conversion of agricultural land through zone enforcement	

Source: GIZ Program staff (2012).

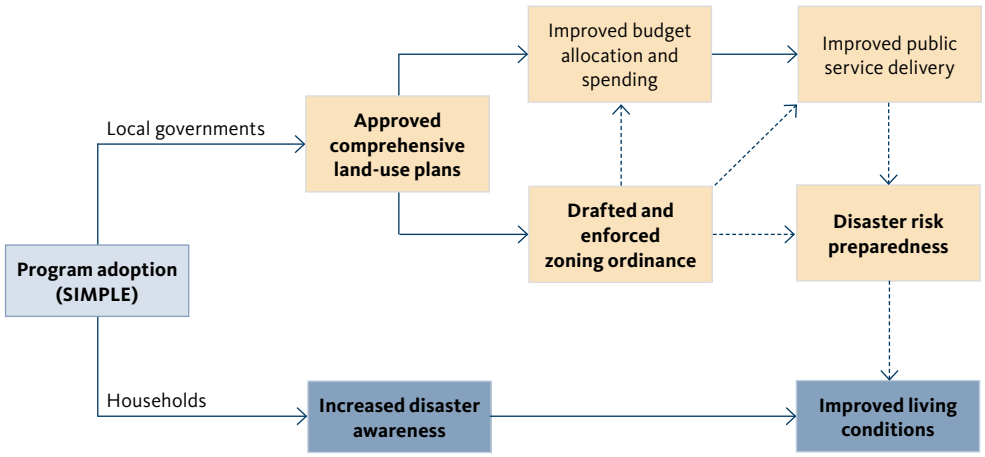
Table 3. Theory of change

Problem	Degradation of natural resources and increasing resource scarcity due to the country's lack of integrated planning and management of private, public, and ancestral lands
Explanation	**1.** Fragmented planning and management from national to local governments **2.** Lack of capacities and weak support from the national government **3.** Overlapping mandates and conflicts in the legal framework
Solution (intervention)	Bottom-up, integrated, and participatory approach to land-use and development planning (SIMPLE)
Outputs	• Formulation of Barangay Development Plans • Comprehensive Land-use and Development Plan at the municipal level • Zoning ordinances • Development of investment programs and implementation of interventions agreed with population
Outcomes (direct and indirect)	• Environmental protection, optimized land use for sustainable resource management • Reduced illegal use of land in forest, coastal, and agriculture areas • Controlled conversion and destruction of public lands and agriculture areas • Improved local governance and compliance by government and citizens (better functioning of local institutions), increased participation and inclusive decision making) • Improved revenue generation, and conflict transformation • Reduced disaster vulnerability and increased resiliency to disasters and climate change effects • Welfare improvement, better livelihood and public services
Impact measurement	Positive, negative, or no impact of the intervention and its outputs on direct and indirect outcomes
Underlying assumptions	• Mayors, barangay captains, and staff are proactive and show ownership • Smooth integration process of the development plans from barangay to municipalities • The barangay council is functional • Trainers performed the training well • The land-use and development plans are used and followed by the local government officials and citizens • Benefits from this process trickles to the local population • Significant participation of the stakeholders in the trainings

Source: Authors' interpretation in consultation with EnRD/GIZ staff.

In consultation with GIZ staff, we have translated the logic framework into a theory of change that elaborates some of the key elements (see Table 3). The theory of change provided an overview of possible outcomes but not necessarily the sequencing of each of these outcomes. This is also due to the fact that the whole initiative on participatory land-use planning is never a linear process – it is an iterative and dynamic process, where some of the activities and outputs need to be repeated for consultation, before it leads to the desired outcomes. Even the outcomes themselves are a result of long-term processes for which the sequencing is very challenging to point out.

Figure 1. Simplified theory of change



Source: authors' own figure

The study research design is based on a simplified theory of change (Figure 1) that the tool is expected to induce.

Table 3 provides an overview of possible outcomes but not necessarily the sequencing of each of these outcomes. In consultation with GIZ staff, the simplified theory of change was developed to outline the possible impact of the tool and to define the sequencing of outcomes.

Referring to Figure 1, the SIMPLE intervention is a participatory approach, designed to help poor rural local governments draft sound and viable land-use plans, and to implement them according to available local and national agencies' budgets This should lead to the CLUPs' adoption – at the municipal/ city level – with zoning ordinances that describe allowed land uses (output). Such plans would integrate all ecosystems, be based on a sound data basis collected from BDPs, and lead to the formulation of sectoral intervention strategies with corresponding budgets. At the outcome level, this would optimize land use through zoning ordinances, improve budgeting and revenue management, reduce disaster vulnerability through disaster risk awareness and preparedness, increase revenues from real property taxes, and last, fuel economic development at the local level. Other potential long-term governance effects could improve public service delivery, empower communities, and transform conflicts.

Figure 1 will be used as a guide in this research study to assess the emerging impacts of the approach. More specifically, this study will focus on those boxes written in bold given its relevance to the overall objective of the program.

Approved comprehensive land-use plans/drafted and enforced zoning ordinances: SIMPLE aims to improve local administrative capabilities to engage in comprehensive land-use planning. This improvement in administrative capabilities is reflected in the degree to which local government units (LGUs) are equipped with sufficient personnel to engage in land-use planning and zoning (i.e. does a municipality have zoning officers?) as well as in the existence of the required planning documents with land-use planning administrations (i. e. does a municipality have zoning ordinance and land-use plans?).

Increased disaster awareness/preparedness: a significant part of the simple implementation is related to the field of disaster risk management. The challenging geographical and geophysical situation of the Philippines and the high frequency and intensity of natural disasters affecting the country highlight the significance of this administrative task. In this regard, SIMPLE did have the function to increase local awareness for disasters – for instance by providing information about hazard zones in relation to household location. Besides awareness building, SIMPLE also aims to increase administrative capacities to engage in disaster risk management – for example, by means of suitable management tools such as DRM councils as well as the provision of evacuation infrastructure, early warning systems and evacuation planning, and post-disaster relief. Furthermore, mitigation measures such as the development of protected areas and natural conservation, as well as livelihood activities, should be taken to increase community resilience and disaster preparedness.

Improved living conditions: SIMPLE aims to increase local welfare and the livelihoods of the affected population. This goal will be achieved as a result of the above-mentioned improved governance and DRM activities. Better and more coherent land-use planning together with more effective DRM are expected to contribute to a greater sense of security and stability. This in turn should increase the population's potentials to engage in more sustainable and long-term-oriented economic activities.

3.2 Program assignment to municipalities

Until the end of 2012, the tool has been adopted by 37 LGUs in four provinces – in Leyte (14), Southern Leyte (7), Negros Occidental (9), Antique (7). Implementation progress of SIMPLE's participatory component at barangay level (Phase 3 of logic framework) is monitored closely against a number of detailed milestones.

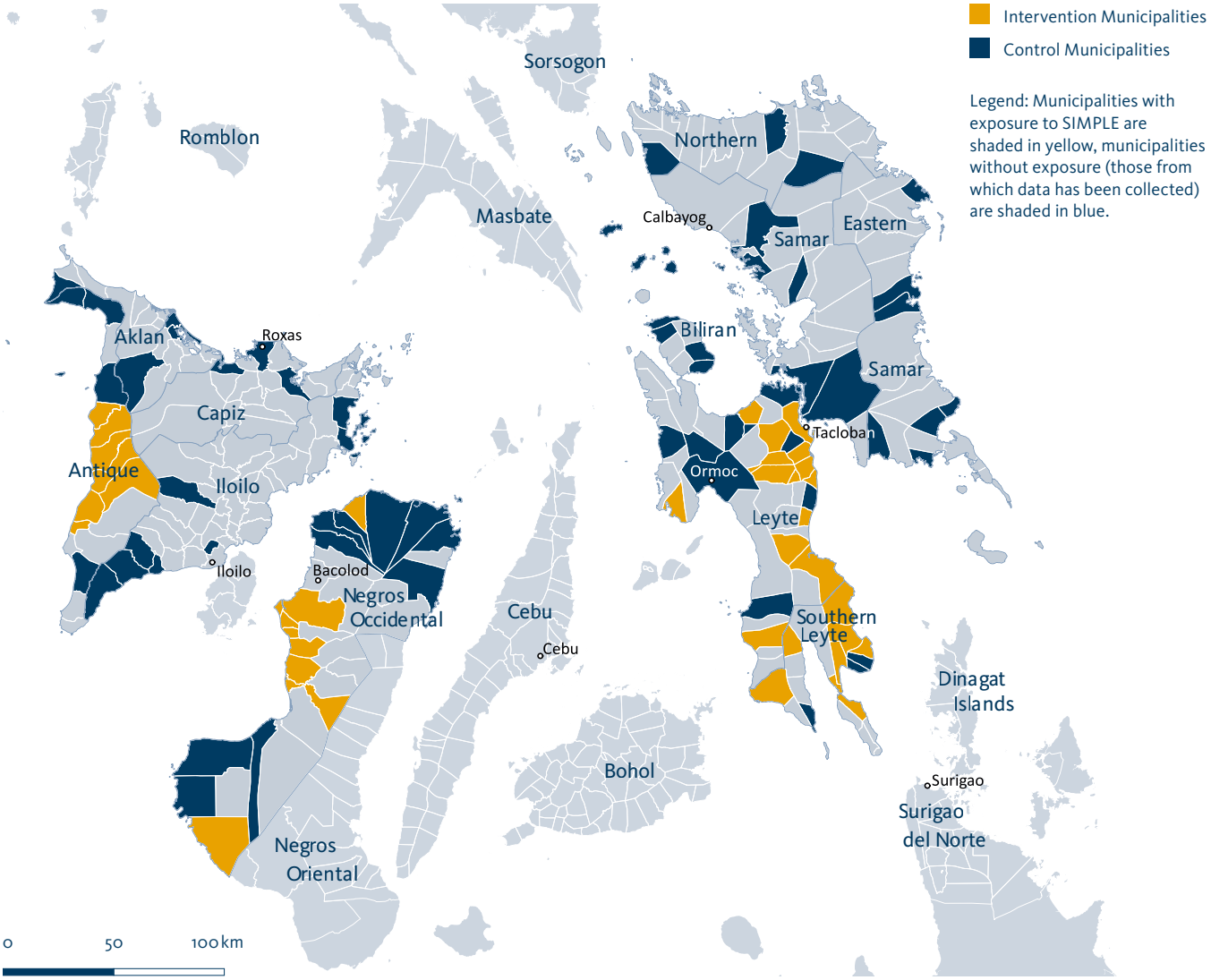
SIMPLE has not been randomly assigned to municipalities. According to the program managers, the adoption of SIMPLE has been mainly demand driven, generally responding to the interest of the provincial governors and requests from the local government chief executives (mayors). Municipalities in Antique and Negros Occidental were included in the program through GIZ support and administrative collaboration. With the program's extension in 2010, the presence of other GIZ components in the municipalities has been one of the main criteria of assigning SIMPLE to streamline its objectives in line with those of the other GIZ programs, but which facilitate its implementation at the same time.

Before the actual SIMPLE implementation, the barangay community and officials are mobilized and informed about the program and its objectives. Subsequently a resolution to adopt the program is made. Procedures and norms to be followed are defined; and barangay committees and volunteers are oriented and sensitized. Community orientation and mobilization accounts for 40 per cent progress on the barangay level.[4]

Assessment and planning are carried out once SIMPLE has been adopted. This consists of a participatory rural appraisal at barangay level, including: data gathering; listing of resource appraisal and listing of issues and development concerns; the production of thematic maps inclusive of conflict identification; profiling and mapping; and hazard map validation. The community plans, the development thrust, and priority programs are identified based on the participatory rural appraisal, in coordination with the municipality. The plans

4 *GIZ staff interview.*

Figure 2. Exposure to SIMPLE (Municipalities with and without SIMPLE)



Source: own figure.

then have to be endorsed by the barangay general assembly. The endorsement of the BDP, including the 6-year investment program, accounts for 60 per cent of SIMPLE progress at the barangay level. Upon completion of barangay planning, the BDPs are referred to the municipal level for integration into the CLUP and zoning ordinances.

Figure 2 below shows the municipalities that adopted SIMPLE (in yellow) and those that did not (in dark blue). Those in dark blue did not adopt SIMPLE but were chosen on the basis of a statistical matching procedure, because they share characteristics with SIMPLE municipalities. Refer to Appendix 1 for a complete list of treatment and control municipalities, including some of the municipal characteristics.

3.3 Component projects

SIMPLE is only one part of a broader EnRD Program, the main objective of which is to improve the poor rural population's livelihoods through better land and water resource management. This is accomplished through capacity building of rural development agencies to sustainably manage natural resources and promote rural development. Program interventions consist of technical advice, capacity building, studies, and pilot projects for improved environment and agriculture-related services.

The other EnRD components consist of Policy Dialogue and Strategic Steering (PDSS), Natural Resource Governance (NRG – whose main product is SIMPLE), Integrated Coastal Management (ICM), Community-based Forest Management (CBFM), Enhancement of Food Security (EFOS), and Disaster Risk Management (DRM). Below is a short description of the EnRD Program. Besides other EnRD component projects, some municipalities experienced the simultaneous exposure to other GIZ-assisted projects by different funding sources. This simultaneous treatment added investment in certain areas, such as forestry, or DRM.

After 2012, SIMPLE was replicated outside the initial treatment municipalities by other GIZ programs, including control municipalities of the baseline study. This situation will be reflected in the final evaluation report.

Information Box: Overview of the Environment and Rural Development Program (EnRD)

In response to the deterioration of its natural resources witnessed for the past four decades, the governments of the Philippines and Germany conceived the Environment and Rural Development (EnRD) Program. Its main objective is to improve the poor rural population's livelihoods through better land and water resource management. This is accomplished through the capacity building of rural development agencies to sustainably manage natural resources and promote rural development. Program interventions consist of technical advice, capacity building, studies, and pilot projects for improved environment and agriculture-related services in: Policy Dialogue and Strategic Steering (PDSS), Natural Resource Governance (NRG), Integrated Coastal Management (ICM), Community-based Forest Management (CBFM), Enhancement of Food Security (EFOS), and Disaster Risk Management (DRM). (www.enrdph.org/index.php)

Natural Resource Governance (NRG)

The NRG component of the EnRD Program aims on improving the planning and implementation procedures for natural resources management and agribusiness development at the local government level. NRG supports developing the capacity of LGUs in sustainably managing their natural resources through participatory land use and development planning at the barangay, municipal/city and provincial levels. NRG activities are implemented using the SIMPLE approach for comprehensive and participatory land-use planning. (www.enrdph.org/docfiles/EnRD_NRG_Oct2012_web.pdf)

Integrated Coastal Management (ICM)

The ICM component of the EnRD Program aims to sustainably improve coastal fisheries management. ICM is assisting coastal communities and LGUs in ICM schemes (www.enrdph.org/docfiles/EnRD_ICM_Oct2012_web.pdf)

Community-based Forest Management (CBFM)

The CBFM component of the EnRD Program aims to sustainably improve the community-based forest management. The CBFM component of EnRD supports the creation of provincial and municipal technical working groups. These groups facilitate participatory rural appraisals and the issuance of tenurial instruments such as CBFM agreements, forest resource inventories, and forest land-use plans (FLUP). (www.enrdph.org/docfiles/EnRD_CBFM_Oct2012_web.pdf)

Enhancement of Food Security (EFOS)

The EFOS component of the EnRD Program aims to improve the income of poor population groups through cash-for-work and productivity enhancing measures in agriculture, forestry and fisheries (www.enrdph.org/docfiles/EnRD_EFOS_Oct2012_web.pdf)

Disaster Risk Management (DRM)

The DRM component of the EnRD Program aims that selected local government units and the affected population have proactively reduced disaster risks. The LGUs are supported in identifying appropriate risk-reducing measures, operationalizing them in local spatial and development planning and implementing them. Awareness of local natural hazards and possibilities to reduce resulting risks is key for the motivation and participation of the affected population as well as decision makers and planners. (www.enrdph.org/docfiles/EnRD_DRM_Oct2012_web.pdf)

Integrated Taxation Management System (iTAX)

The software iTAX offers LGUs a faster and easier way of performing non-tax and tax transactions such as collections, billings, assessments, and reports. iTAX is a comprehensive package that comes with the regular processes such as receiving payments, generating receipts, reports, as well as keeping track of delinquencies. But it also serves as a technical assistant, delivering services according to local ordinances. The result is an easy and hassle-free computerized system that provides accurate information and results required by each municipality, city, or province when dealing with taxation, economic enterprises, water collection, and business processes, all of which are geared towards the improvement of income generation and collection in each LGU. (www.decentralization.org.ph/Editor/assets/GIZ_itax%20brochure.pdf)

Source: GIZ EnRD website, accessed June 2013.

3.4 Data

The data used in this report was collected from 3,000 households in 300 barangays distributed across 100 municipalities in two Philippine regions (6 and 8). The choice of the sample size and control groups are all presented in Appendices 1 and 2. This multi-level data-gathering approach was implemented to ensure that all stakeholders were represented; and to facilitate the tracking of vertical causal chains (municipal to household outcomes).

3.5 Household survey

The data from the household surveys contain information about the household's socioeconomic characteristics; information on (a) access to information and infrastructure, (b) current events and general knowledge test, (c) adequacy of disaster risk management, (d) living conditions, (e) adequacy of land-use planning and management, (f) adequacy of basic public services, (g) citizen's participation in public affairs, and (h) citizen's satisfaction and voting behaviour. Because of the presence of numerous dialects in the region, the questionnaires at household and barangay level were translated into Ilongo, Karaya, Akeanon, Cebuano, and Waray. (Refer to the digital annex for the household questionnaire.)

3.6 Barangay captain survey

The questionnaire contains information about the locality and the barangay captain's views about (a) barangay demographics, (b) nature of barangay planning and consultation, (c) barangay captain's knowledge of SIMPLE and other donor programs, (d) his/her view on the adequacy of disaster risk management, (e) living conditions, (f) adequacy of land-use planning and management, (g) adequacy of basic public services, (h) citizen's participation in public affairs and voting behaviour, and (i) some political and personal background. (Refer to the digital annex for the barangay captain questionnaire.)

3.7 Municipal survey

Municipal officers were interviewed from 100 municipalities, using qualitative methodology. The interview focused on the implementation of SIMPLE for the intervention municipalities, donor financing, CLUP status, adequacy of basic public services, citizen's participation in public affairs and voting behaviour, and some political background. At the municipal office, we sourced information from the mayor and the municipal planning and development officer, or from the relevant officer in-charge for land-use planning. (Refer to the digital annex for the municipal questionnaire.)

3.8 Sampling

While the sample included all 37 intervention sites at that time, the choice of the 63 control sites was based on a matching procedure applying propensity score matching (for more details refer to section 4). Within each municipality, three barangays were randomly selected, proportionally to household population.[5] The barangays were stratified in urban and rural areas, two barangays were randomly chosen from the rural stratum and one from the urban stratum.[6] An interval sampling technique (specified in a sampling protocol) was conducted to select a sample of ten households in each selected barangay. Only the household head or a knowledgeable representative (at least 18 years of age) was interviewed. It was required that the household should be living in the municipality for at least a year.

Each survey team was also required to produce spot maps to ensure that the households had indeed been interviewed. Spot checks were conducted by the supervisors and an external consultant was hired to do double-checks. Household heads and barangay captains were interviewed in each barangay. Should the barangay captain not be available due to unforeseen circumstances, a barangay councillor *(Kagawad)* or another elected barangay official was used as a replacement.

[5] *Data on household population were taken from Local Government Performance Measurement System (LGPMS) 2011 of the Department of the Interior and Local Government, National Statistics Office Census 2007.*

[6] *The barangay classification between rural and urban was obtained from the National Statistical Coordination Board (NSCB) at the time of survey (2012).*

3.9
Secondary data sources

We also used administrative data from the Department of Interior and Local Government (DILG) called Local Governance Performance Monitoring Survey (LGPMS) pertaining to municipal socio-demographics, self-assessment and performance monitoring indicators from 2009 (earliest) to 2011 (latest) on the following areas: peace, security, disaster risk management, education, health, housing, revenue generation, resource allocation, and utilization.

4.

STUDY DESIGN

4.1 Impact evaluation

This study aims to analyse the emerging impacts of SIMPLE on specific set of outcomes and employs well-known impact evaluation techniques.[7] The ultimate goal of impact evaluation is to determine the extent to which observed outcomes can be attributed to the intervention, and to the intervention alone. In reality, changes in outcome may be only partly due to the intervention, and sometimes not at all. Thus, the fundamental problem with evaluation is how to establish attribution; that is, to determine that the outcome is the result of the intervention and not of any other factors. It raises the issue of the counterfactual, "the comparison of what actually happened and what would have happened in the absence of intervention" (White, 2009; White and Barbu, 2006).

Formally, impact is the difference in outcome Y, with Y_1 denoting the outcome if a person is exposed to the intervention, and Yo is the outcome if he/she was not.

$$impact = Y_1 - Y_0 \quad (1)$$

It is possible to observe only the outcome of the person being exposed to intervention, but not the outcome of him/her not being exposed at a specific point in time. The failure to observe Yo is the main challenge to impact evaluation. Impact evaluation hence focuses on the search for a valid counterfactual, and to find an unbiased estimate of impact.

Evaluators and researchers have developed several techniques to overcome the problems associated with missing counterfactual, the most popular procedure being the randomized experiment where individuals (or municipalities) are randomly assigned to the actual project implementation. This concept is in fact not new. In the field of medicine, researchers conduct randomized trials most of the time to test the efficacy of new drugs, assigning patients into either the test or placebo group.

In randomized experiments, the random assignment generates two groups of participants: the treatment (or intervention) and the control group. As the size of the treatment and control groups increase, the difference between the two groups in terms of extraneous factors should even out and the only remaining difference should be the treatment. Thus, impact is calculated by comparing the averages of those who received treatment and those who did not.

Randomized trials may not be suitable in cases where projects are aimed only to reach certain groups. Various ethical, political, and logistical considerations make random allocation also inappropriate. In these cases, a range of quasi-experiments resembling an experimental situation is an alternative. Quasi-experiments ensure that the participants who received the program are as close as possible in terms of their characteristics to those who did not. Therefore, this study belongs to the group of quasi-experiments. The procedures ensure that attribution is addressed in the analysis.

4.2 Matching on municipal level

Given that SIMPLE started without being randomly allocated, municipalities who belong to the intervention group can be matched with one or more municipalities who have not received intervention on the basis of observable characteristics. Various factors played a role why some municipalities chose, or were chosen, to adopt SIMPLE. The selection process of the SIMPLE sites and the socioeconomic conditions in those sites were investigated during the pre-mission visit in August 2012. It is possible that local governments were selected based on promising conditions in the locality, the pro-activeness of the local officials, or because the officials expressed their interest to adopt the program. Identifying factors that led to selection should minimize the bias especially if selection criteria are related to outcomes that could over or underestimate the effects of the program. It is possible that a program manager chose only those municipalities who volunteered or those who happened to have proactive mayors.

To find a valid counterfactual, the evaluators therefore cannot just select any municipalities who did not participate in the program, since those who participated may be inherently different from those who did not. Thus, to ensure that the two groups do not differ systematically across various observable characteristics, a matching procedure is required.

[7] *For this initial study, only data from data collection at one point in time was available (2012/13) allowing for a preliminary analysis on emerging impacts of the intervention. DEval's upcoming fully fledged impact assessment employing data from two points in time will allow a more rigorous approach for impact assessment.*

Matching one characteristic, such as income class, of all municipalities in the intervention group with that of one or more municipalities in the control group is relatively easy; but matching ten characteristics of one municipality in the intervention group with those of, say, 30 municipalities, in the control group is a time-consuming exercise. Furthermore, an exact match of a large number of characteristics is virtually impossible. Rosenbaum and Rubin (1983) therefore recommended matching based on a propensity score. This means that matching is based on the probability that the individual will participate in the programme.

$$Propensity(X_i) = \Pr(Treatment \mid X) \quad (2)$$

Propensity score matching (PSM) eliminates selection bias by pooling municipalities from the control group who have similar characteristics to those of the intervention group. The objective is to increase the similarity of participants and non-participants in the programme. The counterfactuals are the non-participants with characteristics similar to those of the participants.

Some caveats are necessary: first, implementing PSM requires a rich set of control variables and comparable surveys of treated and control groups. Second, matching is based on observable, not on unobservable, characteristics – that is, behaviour that cannot (or cannot easily) be observed and/or measured, such as motivation and enthusiasm of mayors or government officials. Thus the key assumption in PSM is that there is no selection bias due to unobservable characteristics or that participation is independent of outcomes.[8]

As the propensity score is a continuous variable, the probability of obtaining two similar scores from individuals in the intervention and control groups is infinitely small. Consequently, various algorithms have been invented in which propensity scores of the intervention and control observations are selected and matched on the basis of some tolerance level, weights, or neighbourhood. There is no superior algorithm. The selection of the algorithm is a trade-off between bias and efficiency. The PSM proceeds with the following five steps:

1) Collect comparable survey data between intervention and control groups.

   The study employed a sample frame of all municipalities in Regions 6 and 8 as a basis to identify valid control municipalities. Secondary, administrative data from the local governance performance measurement system (LGPMS) was used for matching purposes. The sample frame included 271 municipalities. Out of those municipalities, 37 municipalities received the SIMPLE intervention and 234 municipalities did not.

2) Pool the sample and estimate the probit of programme participation.

   The probability of SIMPLE participation was estimated based on a probit model with covariates from the LGPMS dataset from 2011. The covariates used in this matching were limited given the prospective design of the analysis. The information that was available for all municipalities and was used for the matching procedure related to *geography and administration, population,* and *economy* of the municipalities. Variables on *geography and administration* included information on the province, the total land area, the number of barangays in the municipality, the environment in the municipality (rural/urban), and whether the ecosystems of the municipality included coastal or forest ecosystems. Variables on *population* included the population size and the number of households in the municipality. *Economic factors* comprised information on whether fishery and commercial/service sectors were economic activities in the municipality.

3) & 4) Restrict sample to ensure area of common support, and for each treated municipality find controls with similar or approximately similar propensity scores.

Once the propensity score for each municipality had been estimated, the nearest three municipalities that matched the score of intervention municipality were selected as controls. The final selection of control municipalities had to be conducted in conjunction with qualitative assessment to ensure the plausibility of the selected control municipalities in terms of comparability to the intervention, accessibility, and/or political unrest.

[8] *The Rosenbaum and MH bounds are tests that can provide some indication of the validity of this assumption, although it cannot be directly tested. See Becker and Caliendo (2007).*

Once this PSM had been applied at the municipal level, theoretically all differences in means of control and intervention municipalities (and barangays) could be considered as treatment effects. Owing to the small sample size and limited available data for matching at the municipality level, we, nevertheless, refrained from labelling differences in means as treatment effects, so that there is no false impression of robustness of results at these levels.

Survey data on outcomes was collected in all intervention municipalities, as well as in those municipalities that were assigned to the control group through the PSM procedure. To strengthen our household-level results, an additional PSM at that level was conducted after obtaining the survey data.

4.3 Matching on household level

After data collection, another PSM at household level was conducted to improve data analysis following these five steps:

1) Collect comparable survey data between intervention and control groups.

Datasets from the intervention and control groups were collected at household level for each municipality. Since the surveys took place at the same time for both groups, and used the same survey questionnaires, we deem this to be comparable.

2) Pool the sample and estimate the probit of program participation.

In an ideal world, SIMPLE is assigned randomly at the municipal level. However, that was not the case; programme participation was assigned on purpose for various reasons. Although the intervention was assigned at the municipal level, this study also investigates household-level outcomes. Since not all individuals in the intervention groups have heard of SIMPLE, or been consulted, or have participated in the planning sessions, it might be tempting to divide the fraction of individuals treated to obtain the average intervention effect. Nevertheless, non-treated individuals in the intervention groups benefited from the SIMPLE programs, since they were also exposed to them. Hence, in order not to overstate the impact, no such adjustment should be done.

Randomization does not necessarily have to be at the same level as the intervention (Duflo et al., 2007). For instance, one can randomize across schools but still measure the impact of, say, deworming drugs on individual students (Miguel and Kremer, 2004). Duflo and Chattopadhyay (2004) randomized at the council level (encompassing several barangays) to study women's leadership positions on women's political participation in India. Behrman and Parker (2011) conducted propensity matching analysis to measure the impact of *Oportunidades*, previously known as *Progresa* – a conditional transfer program in Mexico conducted at community level although the analysis was done on household health outcomes. It is also possible to evaluate the impact of an information campaign assigned at the municipal level to measure citizen's participation using PSM (Capuno and Garcia, 2010) or other individual level outcomes (Capuno and Garcia, 2015a, 2015b).

The dependent variable (treatment) and the corresponding descriptive statistics of the entire sample at household level are shown in Table 4. Using these variables, the propensity scores were derived from a probit regression model applied to the sample of treatment and control group. The covariates were chosen to ensure that the individuals in the treatment groups and matched sample in the control group had similar characteristics. However, one important aspect to keep in mind is that the potential outcomes should be independent of treatment after conditioning on the covariates (Rosenbaum and Rubin, 1983). The inclusion and exclusion of covariates had been the subject of extensive research. While some researchers suggest the use of all possible covariates (Rubin and Thomas, 1996), others believe that it could lead to higher standard errors for small samples (Augurzky and Schmidt, 2001). Some researchers also claim that "randomness" in the choice of variables is also optimal given that "very good" data would tend to make the matching fail as the individuals will either always receive treatment or never (Heckman et al., 1997). Note that the goal of the matching is to find individuals that can either be in the treatment or control group given the covariates. Inclusion of variables that are related to program

participation should be fine if they have been relevant before participation, fixed over time, or measured before participation (Caliendo and Kopeinig, 2005). As there are obviously pros and cons on the choice of variables and selection, for the purpose of this analysis, the authors' choice of variables were guided by the local setting, economic theory, and knowledge of their previous research with similar design (Capuno and Garcia, 2010).

Table 4. Variable definition and descriptive statistics

		Obs	Mean	Std. Dev.	Min	Max
Variable treatment	1 = if respondent lives in an intervention municipality; 0 = otherwise	2490	0.45	0.50	0	1
Household variables on location						
hhplain	1 = if house is situated on a plain; 0 = otherwise	2485	0.63	0.48	0	1
hhmount	1 = if house is situated on a mountain or hill; 0 = otherwise	2485	0.15	0.36	0	1
hhdis	Distance of house from municipal town where 1 is < 5 km; 2 is 5 – 10 km; 3 is 10 – 20 km and 4 is > 20 km	2465	1[2]	1[3]	1	4
hh5km	1 = if house is 5 km away from municipal hall; 0 = otherwise	2478	0.60	0.49	0	1
hhwalk	1 = if walking is the main mode of transport within barangay; 0 = otherwise	2487	0.12	0.33	0	1
Res_HH	Years of residency in the municipality	2489	31.96	21.82	1	100
Household variables on demographics						
hhage	Age of respondent, in years	2488	47.49	15.96	18	110
hhfemale	1 = if respondent is female; 0 = otherwise	2487	0.73	0.44	0	1
hhmarried	1 = if respondent is married; 0 = otherwise	2490	0.68	0.47	0	1
hhhead	1 = if respondent is the household head; 0 = otherwise	2489	0.42	0.49	0	1
hhmembers	Number of household members	2484	5.02	2.29	1	19
hhhighschool	1 = if respondent has graduated high school; 0 = otherwise	2489	0.18	0.38	0	1
hhcollege	1 = if respondent has graduated college; 0 = otherwise	2489	0.13	0.34	0	1
Household variables on employment 2006 and 2012						
hhjob	1 = if respondent has a job; 0 = otherwise	2467	0.43	0.49	0	1
hhmemjob	Number of household members with work	2485	1.30	0.98	0	10
hhgovjob	1 = if someone in the household works in the government; 0 = otherwise	2433	0.12	0.33	0	1
hhmemgov	Number of household members who work in the government	2400	0.23	0.51	0	6
hhfarming_2006	1 = if farming was the family's main source of income in 2006; 0 = otherwise	2485	0.28	0.45	0	1
hhfishing_2006	1 = if fishing was the family's main source of income in 2006; 0 = otherwise	2485	0.08	0.27	0	1

		Obs	Mean	Std. Dev.	Min	Max
hhemployment_2006	1=if family's main source of income was from off-farm employment in 2006; 0=otherwise	2485	0.27	0.45	0	1
Household variables on assets						
hhlot	1=if family owns residential land; 0=otherwise	2488	0.41	0.49	0	1
hhlotpermit	1=if family lives for free with permission in the land plot; 0=otherwise	2490	0.45	0.50	0	1
hhwood	1=if walls of the house mainly made of wood; 0=otherwise	2490	0.72	0.45	0	1
hhcomputer	1=if household has a computer; 0=otherwise	2490	0.11	0.31	0	1
hhaircon	1=if household has a aircon; 0=otherwise	2490	0.06	0.23	0	1
hhvehicle	1= if household has a vehicle; 0=otherwise	2490	0.28	0.45	0	1
hhcellphone	1=if household has a cellular phone; 0=otherwise	2490	0.71	0.46	0	1
Household variables on information and knowledge						
hhiradio	1=if respondent listens to news daily on the radio; 0=otherwise	2490	0.34	0.47	0	1
hhitv	1=if respondent watches news daily on the television; 0=otherwise	2490	0.58	0.49	0	1
hhinewspaper	1=if respondent reads news with a newspaper; 0=otherwise	2490	0.16	0.36	0	1
hhiinternet	1=if respondent uses an internet; 0=otherwise	2490	0.19	0.39	0	1
hhtrh	1=if respondent answered correctly a current event question 1; 0=otherwise	2460	0.58	0.49	0	1
hhtdilg	1=if respondent answered correctly a current event question 2; 0=otherwise	2469	0.73	0.45	0	1
hhtlaw	1=if respondent answered correctly a knowledge question 2; 0=otherwise	2451	0.20	0.40	0	1
hhtconduct	1=if respondent answered correctly a knowledge question 1; 0=otherwise	2480	0.53	0.50	0	1
hhtlg	1=if respondent answered correctly a question about a responsibility of local government; 0=otherwise	2477	0.50	0.50	0	1
Municipality variables						
muncollege	1=if the mayor attained at least a college education; 0=otherwise	2490	0.57	0.50	0	1
munlast_elec	1=if mayor has been re-elected; 0=otherwise	2490	0.69	0.46	0	1
muntime_off	Municipal officer's time in office (in years)	2280	15.40	9.70	0.5	37
munjob_biz	1=if mayor's previous occupation before running for office was in business; 0=otherwise	2490	0.42	0.49	0	1
pop_2009_DILG [1]	Municipal population[1] in 2009 sourced from DILG	2370	41598	37550	7974	217199
bara_2009_DILG [1]	Number of barangays in the municipality	2370	31.61	22.41	10	138
hh_2009_DILG [1]	Number of households in the municipality	2370	8858	10361	1000	74241
class [1]	Income class of the municipality (1 – 5)	2490	3.36	1.48	1	5

Source: Own data from 2012 if not marked otherwise, data marked as 2006 are recall data from 2012 survey.
Notes: [1] from 2009 DILG data. [2,3] The scale of variable hhdis is ordinal and therefore median and mode is presented instead of mean and standard deviation.

Table 5. Final sample municipalities in intervention and control sites

Final observations 2012		Households	Number of municipalities
Control	Households in municipalities who did not receive SIMPLE and/or other GIZ EnRD interventions	1380	46
Intervention	Households in municipalities who received SIMPLE	1110	37
Total		**2490**	**83**

Note: 510 households (17 municipalities) were excluded from analysis who received some GIZ intervention in the control group.

Dependent variable: Because the adoption of SIMPLE is very much correlated with the adoption of at least one further GIZ EnRD component, the analysis takes into account the overall influence of SIMPLE and the components of the EnRD Programs. We assigned a binary variable which equals 1 if the municipality adopted SIMPLE and at least one further EnRD component, and 0 if they did not adopt SIMPLE and also do not have any other EnRD components. From the household survey data, we constructed binary outcome measures to capture disaster risk preparedness, well-being, and citizen's perception of household well-being.

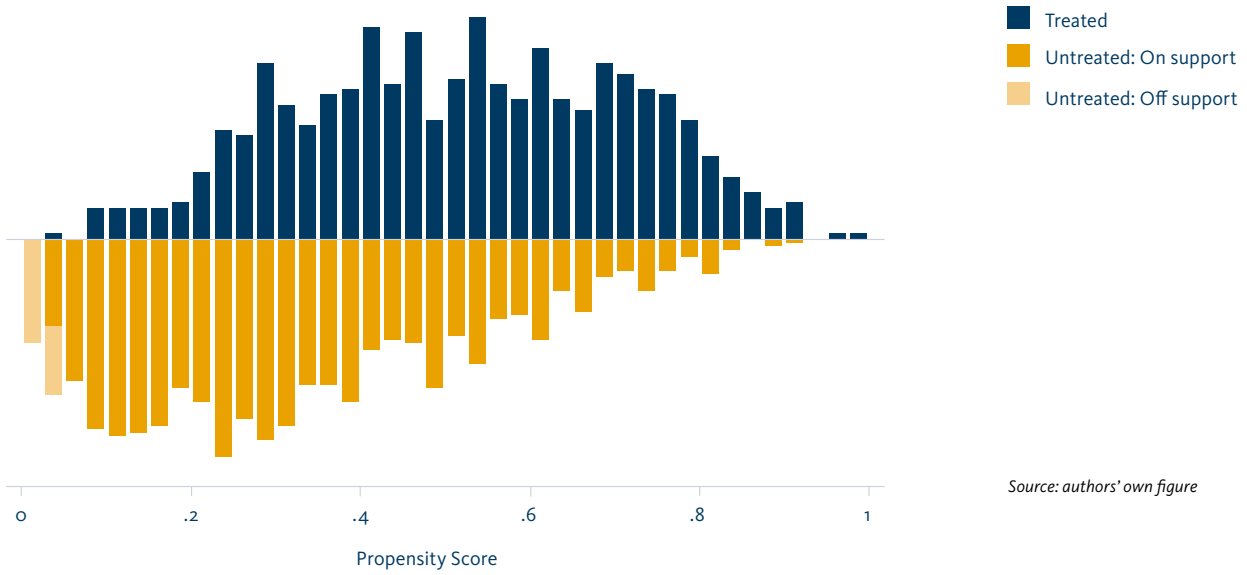
At the municipal level, the pure control group is 46 per cent, for the pure SIMPLE group it is 4 per cent, and for the SIMPLE with other GIZ components is 33 per cent. The observations with at least one GIZ component (without SIMPLE) in the control group are removed from the estimation. This allows us to extract the net effect of SIMPLE and SIMPLE with at least one GIZ component.

For the estimation, we include SIMPLE with and without other GIZ components as the intervention group. The control groups are those having no SIMPLE intervention and no other GIZ component. Those municipalities with other GIZ EnRD interventions (but not SIMPLE) were removed from the control group so we can extract the net effect of the intervention. This means that the total sample becomes 2,490. The total control group size is 1,380 and the GIZ sites are 1,110 (=120 SIMPLE sites and 990 SIMPLE and GIZ sites). This leads to a total of 46 municipalities in the control sites and 37 municipalities in the intervention sites (see Table 5).

Independent variables: The variables used to identify treatment assignment are based on households' socioeconomic characteristics, placement, and character of the house. PSM weakness is the presence of confounding factors – mostly characteristics that are difficult to observe and even to measure, such as motivation or intelligence. Recognizing this weakness, the estimation included some behavioural questions that could proxy some of the respondents' characteristics that are relevant for the study. To capture the extent to which our respondents are informed, we included the frequency in listening to news on the radio, watching news on television, and reading a newspaper. We also included some questions on general knowledge, current events, and responsibilities of the government. All of these factors have been included in the estimation.

Based on responses from the qualitative interviews, it appears that the local chief executive's pro-activeness positively influences program participation. To control for this factor, personal information about the mayor such as his schooling, prior employment before running for office, re-election and time in office have been accounted for in the estimation. Additionally, municipal demographic characteristics such as population size, land area, number of barangays, household number, municipal type (city or municipality), and income class (as of 2011) are also used. The income class is based on average annual income over the last 4 years. A first-class municipality has an average annual income of PHP 55 million or more, while the sixth-class has below PHP 15 million. In comparison, a first-class city has an average annual income of PHP 400 million or more and a sixth-class has below PHP 80 million.

Figure 3. Treatment: SIMPLE and SIMPLE plus at least one EnRD/GIZ component



Source: authors' own figure

The results of the statistical calculation at household level of the probability of receiving the SIMPLE intervention are shown in Appendix 4.[9]

3) Restrict sample to ensure area of common support.

Figure 3 shows that the respondents from intervention municipalities (blue) have propensity scores ranging from 0.1 to 1, while the respondents from control groups (orange) have scores ranging even below 0.1 and 0.9. Although it is easy to find matches for the intervention respondents between 0.2 and 0.6, it becomes more difficult as the propensity score increases. Nevertheless, there are still some very good matches in the intersection that can be utilized for the analysis. After the calculation of the propensity scores, the sample was restricted to all treated plus those controls in the region of common support. The region of common support is between 0.04 and 0.97.

[9] *Another specification of PSM has been conducted based on more parsimonious covariates without socioeconomic factors and we find that the results for the outcome that would be most affected (welfare variables) remained insignificant. See Appendix 3 for details.*

Table 6. Distribution of standardized bias before-and-after matching

	Unmatched	Matched
Mean bias	13.32	2.81
Median bias	10.94	2.58
Minimum bias	0.84	0.05
Maximum bias	102.04	9.43
Pseudo R-squared	0.171	0.011
Chi-squared likelihood ratio	437.16	23.79
P-value	0.000	0.996
Bias on propensity score	102	7.2
Bias reduction in propensity score		**92.90%**
Observations on common support	**1130**	**769**

4) For each treated individual find controls with similar or approximately similar propensity scores.

In finding controls, the estimated propensity scores are then used in combination with various matching algorithms, namely 1-to-1 matching, 1-to-5 matching and kernel matching. We used different types of algorithms to check the robustness of the results. In the 1-to-1 matching, the treated unit is matched with a comparator unit with the nearest propensity score. In the 1-to-5 matching, the treated unit is matched with the five nearest comparator units. With kernel matching, a weighting of all matched control units is used to establish the counterfactual group (Caliendo and Kopeinig, 2005). The matching technique is based on a trade-off between bias and efficiency. For instance, selecting 1-to-1 or 1-to-5 matching means that other controls will be dropped even though they do not differ greatly from the treated observation. The advantage of kernel matching is that less information is wasted and since weights were applied depending on the distance of the controls, the controls that are closer to the treated individual get assigned a higher weight. Hence, we report the kernel matching results for this purpose. The final results tabulated in this report are based on kernel matching.

Appendix 4 shows the covariate test result before-and-after matching for the mean treated and control group. Note that after matching, the differences between the control and treated groups for all variables became insignificant except one (muncollege) which is weakly significant. This indicates that matching has improved the comparability of the two groups.

A further test on covariates is to check whether the distance in the marginal distributions of the covariates *(X)* improves after matching. The distribution of bias before-and-after matching was also analysed in Table 6 for outcome on hazard awareness (local government informed the respondents of the hazard area). In all cases, the mean, median, minimum, and maximum biases improve with matching. Further, the low pseudo-$R2$ achieved after matching, which, following Caliendo and Kopeinig (2005), suggests no systematic differences in the distribution of covariates between the treated and the matched control groups. The *p*-values of the likelihood ratio tests also suggest joint insignificance of the regressors after matching. Last, the matching reduced the bias in the propensity scores by at least 92 per cent. In summary, the matched units have similar observable characteristics.

Table 7. Analytical framework – summary

Data	Data sources	Design
Household level	Household survey	Impact analysis using PSM
Barangay captain level	Barangay captain survey	Descriptive analysis
Municipal level	Municipal survey	Descriptive analysis
Secondary data	DILG LGPMS	Descriptive analysis

5) Calculate the increase/decrease in outcome

Finally, the difference in the outcome of the intervention group is compared to the control group using the average treatment effect on the treated (ATT). The ATT presented in this report is expressed in terms of average differences in probability of the outcome. Following convention, bootstrapped standard errors with 100 replications were generated to incorporate the potential increase in the treatment variance due to the estimation of the propensity score, common support and ordering of observations, and thus provide statistical reliability of the estimates (Caliendo and Kopeinig, 2005).

4.4 Analytical framework

To trace the causal links between the adoption of SIMPLE and the effects on citizen's disaster risk awareness, preparedness, and household well-being we employ a combination of quantitative and qualitative approaches. For the qualitative aspect, we draw on project documents, interviews, barangay captain and municipal surveys, as well as field observations to provide context in understanding the implementation of SIMPLE and the local dynamics of the stakeholders. For the quantitative analysis, we used administrative data sources and the household dataset.

The analysis at the household level employs the propensity score matching technique described above. This is to ensure that household confounding factors are taken into account. The barangay, municipal level and secondary data analysis will be descriptive in nature, either employing a simple T or Z-test statistic and/or simple tables and graphs given their relatively small number of observations. As with any descriptive analysis, care should be taken in interpreting the results of the barangay and administrative data given that they are indicative only of correlation, but not causation. (Refer to Table 7 for a summary of data and design.)

The analysis on disaster awareness and welfare is mainly derived from the household survey since the households are the main stakeholder for this question. The analysis for disaster preparedness is derived from all surveys.

5.

FINDINGS

The findings presented here are not representative of the Philippine population but rather of the municipalities that either (a) received SIMPLE, or (b) those that resembled the SIMPLE municipalities in terms of socioeconomic conditions but did not receive the intervention. Hence the interpretation of this report should be limited to these groups.

The main hypothesis of the study is that the land-use and planning program, SIMPLE, implemented by the Philippine-German cooperation has *local impacts*. That is, a tool that helps local governments manage their lands in a participatory and integrated manner can have an impact by building disaster risk management. Hence, it could have a direct/indirect impact that trickles down to the community by enhancing disaster awareness/preparedness and welfare improvement.

It is possible that no discernible impacts can be found at the local level given that the time span between the introduction of treatment and data gathering in most cases is less than 3 years. Nevertheless, the results can be used as an initial assessment, as input for improving the program, and for designing future programs on land-use planning. DEval is currently undergoing an endline evaluation study on this topic.

5.1 Land-use plans and their implementation

5.1.1 Status of comprehensive land-use plans

It is important to understand the status of the CLUP at the time of the survey for all interventions and control municipalities, given that it is one of the main outputs of the project. One of the main challenges here is that the timing of the CLUP development differs in each municipality. In sum, the speed and quality of how the CLUPs are finalized are largely dependent on the support the municipalities received.

As Table 8 shows, CLUPs that are valid, operational or approved comprise 49 per cent in the control sites and 58 per cent in the intervention sites. Expired CLUPs are more likely in the control sites with 44 per cent compared to 33 per cent in the intervention sites. CLUPs that require updating are not far between the two sites: 82 per cent in the control sites and 89 per cent in the intervention sites. In summary, intervention sites, on average, show a somewhat more advanced status of the CLUP, but still a substantial number of intervention municipalities have not yet completed their work on the CLUP. The situation reflected in the survey period represents a common sight of land-use planning in the Philippines. Despite initial project success there is an existing backlog of CLUPs requiring updating or new development. Given the complexity of the CLUP planning documents and the lengthy development and updating process (the updating, development, and approval of CLUPs can take up several years) the results are not surprising.

However, we find some variation within municipalities that are updating their CLUPs. For example, the majority of the intervention sites receive GIZ support (91 %) compared to the control sites (6 %) out of those municipalities which are currently updating their CLUP. This is somehow neutralized by technical support provided by HLURB to 84 per cent of the control sites, but only 59 per cent of the intervention sites. Notably, more external consultants are being hired in the control group (20 %) than in the intervention group (6 %). This can be explained by the support provided by GIZ experts as well as potentially an initial increase in planning capacity in local planning administrations, which might reduce the demand for external consultants in the process of updating CLUPs within the intervention group. Local planning administrations commonly referred to time constraints as well as staff shortages as major reasons for incomplete land-use plans. External consultants therefore fill these capability gaps. Hence, the quality of CLUP development greatly varies depending on the quality of the external consultant.

Table 8. Status of CLUP

Status of CLUP as of December 2012	Control	Intervention	Total
Valid/operational/approved	30 (49 %)	21 (58 %)	51 (53 %)
Expired	27 (44 %)	12 (33 %)	39 (40 %)
No former CLUP in place	4 (7 %)	3 (8 %)	7 (7 %)
Total	**61 (100 %)**	**36 (100 %)**	**97 (100 %)**
For updating	50 (82 %)	32 (89 %)	83 (85 %)
• With GIZ support	3 (6 %)	29 (91 %)	32 (39 %)
• With HLURB support	42 (84 %)	19 (59 %)	61 (74 %)
• With external consultant	10 (20 %)	2 (6 %)	12 (15 %)
• Own effort (without any support)	3 (6 %)	0 (0 %)	3 (4 %)

Source: Municipal survey.
Note: Total sample of 100 municipalities. Can also be found in Garcia et al. (2013).

5.1.2 Zoning

The GIZ program on land management works under the assumption that there are available personnel in the municipality who are responsible for the creation, implementation, enforcement, and monitoring of zoning ordinances. Due to budget constraints, the common practice in the municipalities is to assign part-time personnel to do this job. These personnel are assigned on an ad hoc basis, and are officially supposed to be working on a different task. Job orders are a common way to occupy vacant planners' and zoning officers' positions. Insufficient qualification and training can lead to insufficient zoning enforcement. Hence, a possible proxy for the municipality's prioritization of land management depends on whether they have a zoning officer in place or not. The second indicator is the presence of a zoning ordinance.

The formulation of zoning ordinance is one of the main outputs of SIMPLE's planning process at the municipal level. Local governments assign or propose use of land to certain delineated zones – for example protection zones for forest and marine areas, commercial or residential areas, agricultural zones, among others. Ideally, this should be an integral part of barangay consultations and community planning sessions. Given the relatively complex planning administration in many Philippine municipalities, it is of interest to assess the degree of awareness for zoning ordinances and zoning officers among the surveyed population.

Table 9. Awareness of households towards presence of zoning officers and ordinance

Zoning	Intervention site	Control site	ATT+	T-stat	Obs. treated	Obs. control
Presence of zoning officer	0.39	0.27	0.075***	3.00	774	1158
Heard of zoning ordinance	0.42	0.24	0.155***	5.34	769	1156
If yes, is there one in the municipality?	0.82	0.66	0.167***	4.53	347	305

Source: Household survey.
*Notes: + Calculated using Kernel algorithm with bootstrapped standard errors, 100 replications. ATT will not necessarily correspond to the exact difference between intervention and control sites due to bootstrapping. Significance level: ***p<0.01; **p<0.05, *p<0.10.*

The results of the matching estimation at the household level show that households in the SIMPLE[10] sites are more aware about the presence of zoning officers and zoning ordinance in the municipality, indicating a trickle-down of information from the project-level to the population affected – refer to Table 9.

This result supports the observation during the course of the study that the participatory aspect of SIMPLE has been effective in making people aware of land uses and its delineation. Given the wide-ranging consultation and the deep involvement of the community in creating maps and identifying specific land use, this should indirectly expose them to the knowledge whether a zoning officer is present and zoning ordinance exists in their municipalities.

In the municipal survey, SIMPLE sites showed a significant presence of zoning ordinance and officers compared to the control sites. As the basis for the planning process, these favourable conditions in local planning administrations can be considered an initial success of the SIMPLE intervention.

However, the municipal officers in the control sites reported higher enforcement of zoning ordinance at the municipal and barangay level. Although non-enforcement of zoning ordinances is prevalent in most parts of the country, this result is somewhat contrary to what one would expect in SIMPLE sites. Non-compliance of zoning ordinance jeopardizes the implementation of land-use plans. These contradictory findings require further analysis in the endline study to follow.

Taking a closer look at the official reports from the national DILG LGPMS to triangulate the results from the municipal survey (see Table 10), SIMPLE sites consistently exhibit better performance in terms of formulating their CLUP compared to the non-SIMPLE municipalities, but the control sites were not far behind. Specifically, 89 per cent reported that the zoning ordinance is enacted by the *Sanggunian* council, 84 per cent reported having an approved CLUP, 90 per cent conducted participatory formulation, and 90 per cent update their CLUP every 10 to 15 years. The latter indicator is quite difficult to attribute to SIMPLE given their relatively young adoption of the intervention, unless it coincides at the time when their CLUP required updating. Finally, an astounding 81 per cent reported using geographic information system (GIS) in the intervention sites compared to 16 per cent in the control site. The use of GIS is one of the cornerstones in the SIMPLE program. Results show that training and local capacity enhancement have been effective. GIS capacities are required for digitalization of the geospatial information collected during the planning process and their transfer into maps and other planning documents. The results from the municipality DILG LGPMS data validate the claim of the municipal officers from the municipal surveys.

[10] *SIMPLE sites or treatment sites are those municipalities that received SIMPLE and at least one GIZ ENRD component projects. The control sites are those who received neither of the two.*

Table 10. Zoning ordinances, zoning officers, and CLUP as reported by the municipalities

Zoning ordinances and zoning officers	Control site	Intervention site	Difference	Z statistic
Municipal survey				
Presence of zoning officer in the LGU	0.73	0.83	−0,099	−5.54***
Presence of zoning ordinance	0.83	0.89	−0,066	−4.64***
Enforcement of zoning ordinance in the municipality	0.95	0.91	0.036	3.25***
Enforcement of zoning ordinance in the barangay	0.50	0.31	0.188	8.36***
*Municipality DILG survey**				
Zoning ordinance enacted by the Sanggunian council	0.78	0.89	−0.109	−7.24***
LGU has an approved CLUP	0.72	0.84	−0.120	−7.11***
Participatory in the formulation of CLUP (Partial[a] vs Yes)	0.85	0.90	−0.055	−3.62***
CLUP updated every 10 or 15 years	0.85	0.90	−0.055	−3.62***
LGU uses GIS	0.16	0.81	−0.650	−32.04***

*Source: * DILG LGPMS 2011.*
Notes: Percentage of municipalities that said Yes. The total number of intervention sites is 37, and control sites is 46. Probability test is based on Ho:prob (0) – prob (1).
*[a] Partial means that not all concerned stakeholders are consulted. No municipalities reported "No participatory aspect". Significance level: ***p < 0.01; **p < 0.05, *p < 0.10.*

5.2 Disaster risk management

5.2.1 Disaster risk awareness

The local municipalities in the observed regions are highly susceptible to disasters. Awareness and preparedness represents an important step to reduce communities' vulnerability. Despite combined SIMPLE and GIZ efforts, we find that the reported likelihood to live in hazard zones appears to be significantly lower in the control group by 7.3 percentage points. However, local governments in the SIMPLE sites seem to be more proactive in informing its constituents of any hazard zones (by 14.6 percentage points) and to even advise them to move or relocate to safer areas (by 12 percentage points). Both results are significantly different from the control sites. (Please refer to Table 11.)

This questions the results that respondents in the SIMPLE sites live more often in hazard zones than respondents in the control sites. It is plausible that respondents in the SIMPLE sites are more informed and aware that they are living in hazard zones than those in the control sites. And this might explain why the reported likelihood of living in hazard areas in the SIMPLE sites is higher. Further investigation also revealed that the respondents in the SIMPLE sites reported to have less often been a victim of disasters between 2006 and 2012 (by 7.9 percentage points) and are more often aware of the risks (15.1 percentage points) compared to the control site.[11] These results show that disaster awareness in the context of SIMPLE has been well integrated in the planning process. This involves hazard assessments and mapping leading to increased disaster preparedness both at the barangay and municipal level. During community planning exercises, the local population is often involved in data collection to identify hazard areas and to draw simple maps. As part of public consultations, maps showing hazardous areas that are, for example, prone to floods or threatened by landslides and tsunamis, are then presented and validated (Garcia and Lange, 2013). If respondents are aware of the risks, they can act using simple mitigation measures such as building their house or planting crops on higher

[11] *Awareness of disaster is a follow-up question after experiencing the disaster. The number of observations is much lower since it is dependent on the number of households who answered "yes" to experiencing the disaster and the matching procedure (where some observations were dropped to satisfy common support).*

Table 11. Respondents' disaster awareness

	Intervention site	Control site	ATT+	T-stat	Obs. treated	Obs. control
Reported assessment of living in hazard zone	0.297	0.263	0.073	3.28***	777	1159
Informed by the local government of any hazard zones in the barangay	0.514	0.354	0.146	5.16***	769	1130
Advised by the local government to move or relocate to safer areas	0.520	0.408	0.120	4.46***	765	1141
Had been a victim of disaster between 2006 and 2012	0.176	0.206	0.079	−3.88***	768	1152
(Follow-up from above) Were aware of such risks	0.906	0.773	0.151	3.68***	138	256

Source: Household survey.
*Note: + Calculated using Kernel algorithm with bootstrapped standard errors, 100 replications. ATT will not necessarily correspond to the exact difference between intervention and control sites due to bootstrapping. Significance level: ***p < 0.01; **p < 0.05, *p < 0.10.*

grounds if the location is susceptible to flooding. In extreme cases, loss of life can be avoided if they evacuate the area on time. However, the interdependency between awareness of risks, awareness of living in hazard zones, and definition of hazards zones by local governments needs to be further investigated in the endline report.

Despite the government's efforts and advice to relocate households living in hazard zones, many households stay. If awareness to hazard areas is not enough to persuade constituents to relocate, why do they decide to stay in these hazardous areas? Taking the Philippine context into account, there are two possible explanations – social and economic. First, the constituents are inclined to stay if their family has been in the area for decades. Hence there is this sense of belongingness and tradition, especially if they own the land. Based on findings from our survey, almost half of the respondents own their plot (42 %). Of those who do not own a lot, 75 per cent claim they have permission to stay. Second, and perhaps more important, constituents stay if the relocation areas were not deemed very favourable. For example, they are too far from work, livelihood, or school, have difficult access to town centre and market, and questionable access to electricity and water, among others. Relocating a population is a complicated and controversial task. Given the situation that local livelihood and thus family welfare is often directly related to the living environment (for instance, fishermen living directly on the seashore) and since SIMPLE can only inform and raise awareness, it is unsurprising to not find significantly lower portions of the population living in non-hazardous locations. Besides, the provision of safe relocation areas is a time-consuming task for municipal administrations, which are likely to overstretch the initial observation period of this study.

5.2.2 Disaster preparedness

Perceived disaster preparedness

Our full household survey sample reveals that the most frequent type of disasters to occur in the area are typhoons (91 %), earthquake (74 %), and flooding (55 %). Of roughly 500 respondents in both intervention and control sites who experienced disasters between 2006 and 2012, 8 per cent experienced loss of life, 51 per cent stated damage to property, and 53 per cent reported damage to livelihood.

Given this background, we examine the subjective perceptions of respondents about their preparedness in case a disaster occurs today. Table 12 shows that we find no significant difference in perception of respondents with respect to disaster preparedness between the intervention and control sites. One explanation for this might be that subjective perception of disaster preparedness is very difficult to explain given the tremendous gap between objective and perceived preparedness (Ablah et al., 2009).

Table 12. Perceptions on disaster preparedness

Disaster preparedness (mean rating)	Intervention site	Control site	ATT+	T-stat	Obs. treated	Obs. control
Households (0 = no, 1 = yes)	0.863	0.805	0.034	1.58*	773	1156
			Difference	Z-stat		
Barangay captain (scale 0 – 10)	6.82	6.95	0.13*	1.50	111	138
Municipal officer (scale 0 – 10)	6.60	6.14	−0.46***	−6.20	37	46

Source: Barangay captain and municipal surveys.
*Note: + Calculated using Kernel algorithm with bootstrapped standard errors, 100 replications. ATT will not necessarily correspond to the exact difference between intervention and control sites due to bootstrapping. Significance level: ***p < 0.01; **p < 0.05, *p < 0.10*

We next examined the responses from the barangay captain and municipal surveys to investigate whether this perception on disaster preparedness is shared by the local government officials. Note that the reported statistical significance here is only indicative and descriptive in nature. We asked local officials to rate the preparedness (10 as highest and 0 lowest) of the barangay/municipality if a disaster occurs "today". We find that the barangay captains, on average, rate 6.82 in the intervention areas and 6.95 in the control areas. Similar to the household survey, the difference between the ratings in the two areas is not statistically significant. Interestingly, the municipal officers, when asked the same question, responded with more or less similar rating (6.60 in the intervention sites and 6.14 in the control sites) but the difference (−0.46) between the two sites is statistically significant. This means that having a GIZ program in the municipalities increases the likelihood of perceived disaster preparedness of the municipal officers. Although the municipal officer's perceived likelihood of preparedness in the intervention sites is higher, such perception has not trickled to the barangay and household.

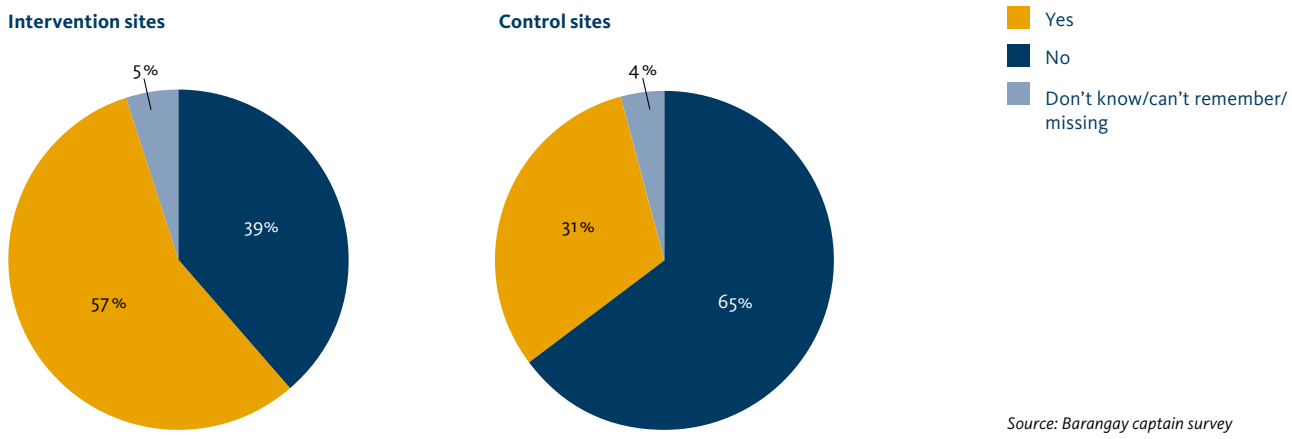
Although the efforts of the SIMPLE approach have a focus at the municipal level, the intervention has nevertheless been very active at the barangay level. Thus, in the following we further elaborate that the perception of barangay captains differs from the municipal officials, and that we do not find a significant difference between intervention and control sites.

Implementation through barangay development plans

By taking a closer look at the SIMPLE approach's theory of change, the intervention supports the participatory land-use planning at the barangay level in order to produce the BDPs. It is hypothesized that BDPs are crucial for barangay officials to make an informed decision about the needs of the barangay (territorial, identification of hazard and evacuation areas, investment opportunities, etc.). At the time of the survey, we find that out of the 111 barangays in the intervention sites, more than half had a BDP (57%) and of the 138 barangays in the control site, about a third had one. Clearly, intervention sites had more BDPs completed (refer to Figure 4).

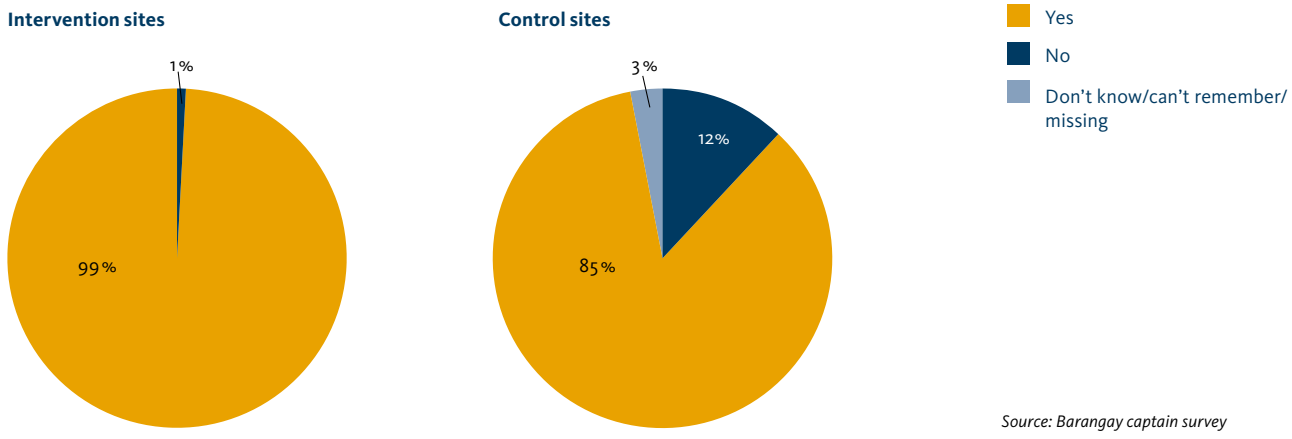
To make informed decisions about disaster preparations, the BDPs should, in principle, include a DRM component. And here we found that almost all barangays in the intervention sites that claimed to have BDPs with an integrated DRM component. Interestingly, the control sites also exhibit a very high proportion of having a DRM component in their BDPs (85%) (see Figure 5). This is contrary to our expectations that the DRM component is a distinct element of the SIMPLE program. However, the streamlining of DRM into national planning and disaster management policy might explain the existence of DRM in non-intervention sites. Notwithstanding other possible factors such as the need for better infrastructure, evacuation centres, and equipment, this result could partly explain the lack of significant difference in the barangay captain's perception of disaster preparedness between the intervention and control sites.

Figure 4. Barangay (Village) Development Plan (BDPs)



Source: Barangay captain survey

Figure 5. Disaster risk management integrated in BDPs



Source: Barangay captain survey

Using the LGPMS data by the DILG, we then examine some of the municipality's objective disaster preparedness measures from the official responses of the municipal officers. Such measures include the existence and functionality of the LDCC, integration of the LDCC in the CLUP, formulation of an operations manual, availability of evacuation centres, equipment and relief goods, mobilization of medical and counselling services, and availability of an operational community-based disaster early warning system.

Table 13. Self-reported objective measures on disaster risk preparedness at municipal level

	Control site	Intervention site	Difference	Z statistic
Local disaster coordinating council (LDCC) functionality				
LDCC exists	1	1		
LDCC composition in accordance to Presidential Decree 1566 s. 1978	0.91	0.97	−0.06	−6.25***
Support groups and community volunteers organized	0.80	0.92	−0.11	−8.08***
LDCC in accordance and support groups organized	0.74	0.89	−0.15	−9.60***
Management tools				
LDCC integrated in Comprehensive Development Plan, Local Development Investment Plan, and Annual Investment Plan	0.98	1.00	−0.02	−4.94***
LDCC has operations manual	0.65	0.51	0.14	6.99***
Operational community-based early warning system is available	0.72	0.73	−0.01	−0.68
Quality of DRM plan	0.80	0.81	−0.01	−0.41
Infrastructure and services				
Evacuation centres available	0.93	0.97	−0.04	−4.42***
Equipment available	0.61	0.59	0.01	0.71
Relief goods available	0.89	0.92	−0.03	−2.32**
Medical and counselling services	0.91	0.95	−0.03	−3.15***

Source: DILG LGPMS 2011.
Note: Percentage of municipalities that said Yes. The total number of intervention site is 37 and control site is 46.
*Probability test is based on Ho: Prob (control) – Prob (intervention). ***p < 0.01; **p < 0.05, *p < 0.10*

Functionality of the local disaster coordinating council

Although the GIZ's SIMPLE and DRM program mainly focus on the local and spatial development planning as well as community-based early warning systems, nevertheless it is crucial to inspect related outcomes that may have influenced municipal officers' perceived preparedness towards disaster. On the existence of the LDCC, all intervention sites reported to have organized an LDCC in their municipalities. The same is true for control sites – meaning all of the sites reported to have organized one. In terms of the composition of the LDCC, intervention sites reported that their LDCC complies with the requirements of the Presidential Decree more than the control sites. The difference (0.06) between the two sites is statistically significant. On whether LDCC have organized support groups and community volunteers, we find that the likelihood to arrange one is higher in sites supported by GIZ, by 11 percentage points. To ensure the functionality of the LDCC, we examine to what extent both conditions – compliance with the Presidential Decree and organizing support groups – have been fulfilled. We find that the probability of fulfilling both conditions is significantly higher in the intervention sites (see Table 13).

Table 14. Need to have protected areas

	Intervention site		Control site	
	Freq.	%	Freq.	%
No	2	5	1	2
Yes	35	95	45	98
Total	**37**	**100**	**46**	**100**

Source: Municipal survey.
Note: The figures exclude municipalities in the control sites with interventions.

Implementation of disaster management tools
Furthermore, we find that the likelihood to integrate DRM in the Comprehensive Development Plan, Local Development Investment Plan, and Annual Investment Plan is significantly higher in intervention sites. Nevertheless, we find that control sites have significantly higher incidence of formulating an operations manual, where the communication strategy and monitoring and evaluation are incorporated. Lastly, we find no significant difference between the intervention and control sites in terms of availability of operational community-based early warning systems and the quality of the DRM plan.[12]

Infrastructure and services for disaster management
After examining the functionality of the development council and the existence of management tools and plans for DRM, we now compare the municipalities' self-reported preparedness based on the availability of evacuation centres, equipment, relief goods, as well as medical and counselling services. We find that intervention sites performed better on all measures except equipment availability, where we find no significant difference between intervention sites and control sites.

The weakness of solely looking at this national figure is sometimes not reflective of the quality of the councils, tools, and infrastructure that really exists. Although SIMPLE sites tend to have better indicators, we nevertheless see cases of no difference, or even where the control sites fared much better. The question is whether many of these municipalities are complying with the requirements for the sake of reporting or whether they are truly fulfilling the pre-requisites for disaster risk preparedness and management when the time arrives. It will be interesting to find out in the upcoming evaluation in detail the way in which control municipalities develop the land-use plans. Some control sites claim that they are conducting participatory planning through the module of HLURB while others are more consultant-oriented planning. In addition to this, further evaluation should also look into the quality of the DRM in the plans.

5.2.3 Disaster risk reduction

Disaster risk reduction involves the investigation on how risks can be reduced in vulnerable areas and what triggers them. Environmental conservation as part of the local government initiatives can be one example.

Table 14 shows that there is a widely accepted consensus among municipal officials regarding the need to have protected areas in their locality, regardless of being an intervention or control site. The municipal officers in the intervention sites reported slightly more protected areas (mean 1.7) than in the control sites (mean 1.4) – refer to Table 15.

[12] *According to the LGPMS questionnaire, the early warning system should be reliable and manned so that it can react when a disaster situation arises. The quality of the disaster risk management plan is assumed to have contained, at the minimum, information (a) on risk areas based from hazard maps, e.g. storm surge hazard map, flood/flash flood hazard map, and rain-induced landslide susceptibility map; (b) on vulnerable groups; and (c) strategies in mitigation, response, and rehabilitation.*

Table 15. Number of protected areas

Number of protected zones	Intervention site			Control site		
	Number of municipalities	Total number of protected zones	% of municipalities	Number of municipalities	Total number of protected zones	% of municipalities
0	5	0	14	26	0	41
1	13	13	35	15	15	24
2	10	20	27	10	20	16
3	7	21	19	5	15	8
4	1	4	3	3	12	5
5	1	5	3	1	5	2
6				1	6	2
7				1	7	2
8				1	8	2
Total	**37**	**63**	**100**	**63**	**88**	**100**

Source: Municipal survey.
Note: Mean number of protected areas per municipality for controls: 1.4, for intervention: 1.7

SIMPLE aims to help formulating small-scale interventions using available barangay budgets. As a result, nurseries for vegetables, mangrove, or forest species are established for communal use. Measures such as mangrove and tree planting and nurseries increase environmental quality as well as contributing to disaster risk reduction by functioning as a national barrier, for instance against flooding or tsunamis (mangrove planting and nurseries), or by increasing soil and ground stability to decrease the likelihood of landslides (tree planting and nurseries).

Based on the household surveys, the awareness of respondents towards barangay initiatives such as having tree nurseries, tree planting, and seedling provision is significantly higher in the intervention sites. Table 16 shows that mangrove nurseries and planting do not significantly differ between intervention and control sites.

Table 16. Respondent's awareness on barangay conservation and livelihood initiatives

Conservation and livelihood initiatives in the barangay	Intervention site	Control site	ATT+	T-stat	Obs. treated	Obs. control
Tree nurseries	0.47	0.40	0.045**	1.63	776	1,159
Tree planting	0.69	0.61	0.042**	1.80	777	1,159
Mangrove nurseries	0.19	0.16	0.012	0.50	776	1,147
Mangrove planting	0.21	0.20	−0.007	−0.27	776	1,147
Seedling provision	0.63	0.53	0.115***	4.07	774	1,157

Source: Household survey.
*Note: +Calculated using Kernel algorithm with bootstrapped standard errors, 100 replications. ATT will not necessarily correspond to the exact difference between intervention and control sites due to bootstrapping. Significance level: ***p < 0.01; **p < 0.05, *p < 0.10.*

It is interesting that local officials in the SIMPLE sites, especially at the municipality level, tend to claim having more conservation and livelihood initiatives than in the control sites (refer to Table 17). Furthermore, with the exception of mangrove planting, the responses of municipal officers in the intervention sites are significantly higher than in the control sites.

Table 17. Local official's response on barangay conservation and livelihood initiatives

Conservation and livelihood initiatives in the barangay	Control site	Intervention site	Difference	Z statistic
Barangay captain				
Tree nurseries	0.33	0.36	−0.03	−1.37
Tree planting	0.82	0.85	−0.03	−1.86*
Mangrove nurseries	0.21	0.24	−0.03	−1.99**
Mangrove planting	0.31	0.31	0.00	−0.13
Seedling provision	0.69	0.79	−0.11	−5.94***
Municipality				
Tree nurseries	0.72	0.81	−0.09	−5.42***
Tree planting	0.87	0.95	−0.08	−6.42***
Mangrove nurseries	0.35	0.46	−0.11	−5.66***
Mangrove planting	0.65	0.68	−0.02	−1.23
Seedling provision	0.83	0.92	−0.09	−6.79***

Source: Municipal and barangay captain surveys.
*Note: Ho: P(control site) – P(intervention site). Significance level: ***p < 0.01; **p < 0.05, *p < 0.10.*

Table 18. Self-reported household welfare

Household welfare	Intervention site	Control site	ATT+	T-stat	Obs. treated	Obs. control
Rate your household well-being	6.487	6.614	−0.144	−1.07	748	1126
Living condition improved today than 5 years ago	0.489	0.446	−0.007	−0.26	777	1158
(Follow-up): Local government helped to improve living condition	0.47	0.43	0.049*	1.31	416	577

Source: Household survey.
*Note: +Calculated using Kernel algorithm with bootstrapped standard errors, 100 replications. ATT will not necessarily correspond to the exact difference between intervention and control sites due to bootstrapping. Significance level: ***p < 0.01; **p < 0.05, *p < 0.10.*

Despite the differences on local officials' responses between intervention and control sites, there are several factors that can explain such positive results, apart from it being an intervention site. According to the qualitative evidence drawn from the surveys, some intervention municipalities have far more initiatives due to the active presence of the Department of Environment and Natural Resources (DENR) or because the municipality is a recipient of a watershed project. Control sites may exhibit fewer activities in this area because some of them claim that although tree/mangrove nurseries and planting were identified in their municipal development plan, these are not local government priorities. One municipality also noted that their municipality simply does not have a mangrove area (e.g. Pavia).

The trend shown above is not far from the results on disaster risk reduction in general: that is, we find significant and (more often) favourable differences in the intervention sites compared to the control sites at the municipal and barangay levels, but not at the household level. Clearly, it shows that specific information does not trickle down to the households.

5.3 Welfare improvements

It is theorized that strengthening disaster awareness, preparedness, and disaster risk reduction in the municipality will eventually lead to improvement in well-being by minimizing damages and losses caused by natural disasters and reducing the strains on natural resources.

To assess welfare improvements, we only use the reported perception of the household heads that they are more informed about their own personal/family welfare rather than seeking the opinion of barangay leaders and municipal officers. We find no significant differences between the respondents in the intervention and control sites on indicators such as household well-being and improvement in living conditions today, compared to 5 years ago. The difference whether the government has helped at all in such improvements is significant, but very small. (Refer to Table 18.)

Note that one should take this result with caution. Perception of well-being is a very difficult concept to quantify and, more important, it would require some time to become evident. The challenge with this indicator is that it is also very difficult to attribute improvements/deterioration in perceived overall well-being due to the program. Given that the intervention timing varied in each municipality, we do not expect to find impacts at this level at present. Thus, it remains to be seen whether SIMPLE in combination with other GIZ programs will eventually translate to improvement in overall well-being. The analysis in the fully fledged impact assessment evaluation report will provide a comprehensive measurement of household welfare based on a longer observation period and more rigorous welfare measurement.

Table 19. Reasons for adopting SIMPLE

Reasons for adopting SIMPLE	No. of sites	Out of 37 SIMPLE sites (%)
Request of mayor	16	43
Proposal by GIZ	20	54
Request of provincial government	6	16
Need to update CLUP	24	65
Heard good things about it	20	54

Source: Municipal survey.
Note: The total number of SIMPLE site is 37. Multiple reasons for adoption could be given.

5.4 Alternative explanations of impact

Despite the robust and significant impacts we see from the household survey, potentially there are other factors that could affect the positive results we find. Based on the municipal surveys conducted with 100 municipal planning officers, we find the following observations:[13]

SIMPLE's success may be dependent on the mayor's support. Table 19 shows that 43 per cent of mayors from the intervention group requested GIZ to provide support. Yet, in 54 per cent of cases GIZ proposed the assistance. If the political support had been in place before the beginning of the GIZ assistance, it might have created a certain bias in the selection of partner municipalities and cities, as this was based on demand and readiness. It might be that the intervention strengthened political support in those areas where GIZ proposed the assistance. The need to update the CLUP and the reputation of the planning and management tool were also often mentioned.

It is plausible that the impacts of the intervention are the result of the combined effort of SIMPLE and the HLURB. We find in the municipal data that HLURB support exists in 59 per cent in the intervention municipality and 84 per cent in the control municipalities. SIMPLE has been supporting the local governments using the HLURB guidelines. SIMPLE also facilitated further HLURB direct assistance to municipalities during the planning process to test new approaches to be included in the national guidelines on land-use planning.

[13] *Also reported in Garcia and Lange (2013), but has been updated for this report.*

Table 20. Support received by the local government

	Intervention site in % (actual number)	Control site (%)	Total (In actual number)
LGUs recipient of at least one government programs (multiple answers possible)			
KALAHI-CIDSS/DSWD	48.7 % (18)	54.0 % (34)	52 % (52)
Agrarian reform community development project / DAR CARP	70.3 % (26)	49.2 % (31)	57 % (57)
Agri-fishery modernization program	35.1 % (13)	22.2 % (14)	27 % (27)
Forest land-use plans	32.4 % (12)	20.6 % (13)	25 % (25)
LGUs received at least one of the GIZ-assisted programs (multiple answers possible)			
Natural resource governance	70.3 % (26)	4.8 % (3)	29 % (29)
Disaster risk management	46 % (17)	4.8 % (3)	20 % (20)
Community-based forest management (CBFM)	35.1 % (13)	7.9 % (5)	18 % (18)
Enhancement of food security (EFOS)	32.4 % (12)	11.1 % (7)	19 % (19)
Coastal fishery resources management (CFRM)	56.8 % (21)	15.9 % (10)	31 % (31)
iTAX	48.7 % (18)	11.1 % (7)	25 % (25)
LGUs received at least one of the German-assisted programs (multiple answers possible)			
Reducing emission from deforestation and degradation (REDD)	21.5 % (8)	3.2 % (2)	10 % (10)
AccBio	24.3 % (9)	3.2 % (2)	11 % (11)
AccCoast	29.7 % (11)	4.8 % (3)	14 % (14)
ForClim	18.9 % (7)	6.4 % (4)	11 % (11)
CBFFMP	24.3 % (9)	4.8 % (3)	12 % (12)

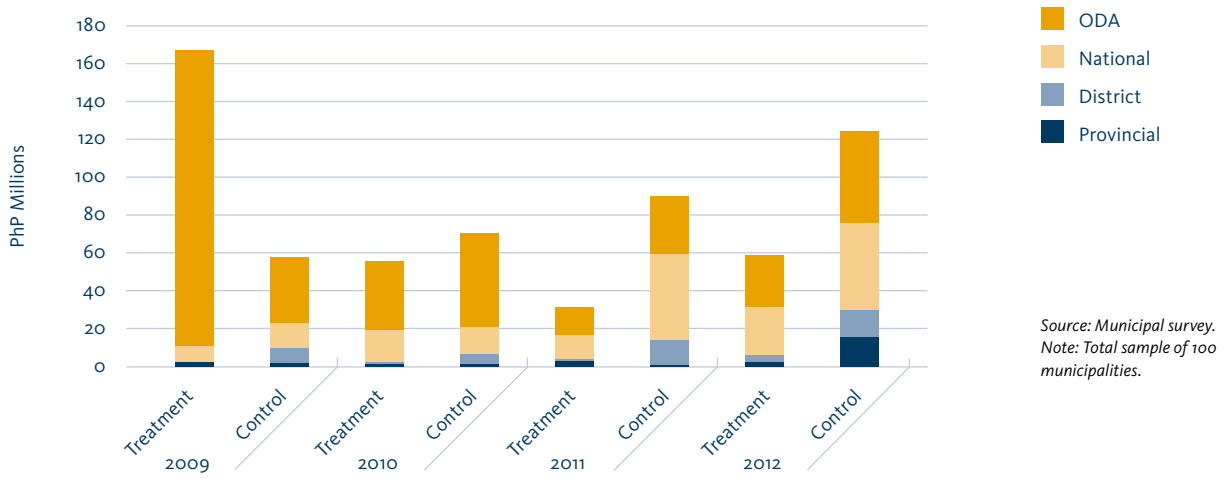
Source: Municipal survey 2013.
Note: Total sample of 100 municipalities.

Table 20 indicates that the presence of other components of the EnRD Program may have positively contributed to impact as well. The coastal fishery resources management component was present in 56.8 per cent of intervention municipalities (15.9 per cent in the control group). The DRM component was present in 46 per cent of intervention municipalities (5 per cent in the control group). The community-based forestry management component was present in 35 per cent of intervention municipalities (8 per cent in the control group). This is in fact a wanted positive correlation as land-use planning fulfils an integrative function for the program and its support components.

More specifically, intervention municipalities do not seem to have additional donor programs that could have led to faster absorption of impact at the household level. For instance, 49 per cent of intervention and 54 per cent of control municipalities reported the presence of the KALAHI-CIDSS program displaying more or less values not far from each other. Differences appeared only for the Comprehensive Agrarian Reform Program (CARP) and Agri-Fishery Modernization Program (AFMP) (CARP was present in 70 per cent of intervention municipalities vs 49 per cent in the control group; AFMP: 35 per cent (intervention), 22 per cent (control)).

One could argue that the positive effects of SIMPLE can be attributed to other donor and other external support, see Figure 6. It is worth noting, however, that in 2009, foreign donor funding and assistance at the national, district, and provincial levels in the intervention sites was higher than in

Figure 6. Donor support to local governments



Source: Municipal survey.
Note: Total sample of 100 municipalities.

the control sites. From 2010 until 2012, external funding from national agencies and donors was higher in the control sites. That means that our impact estimates would be rather conservative – the positive impacts due to additional funding and support are possibly captured by the control group. However, one has to take into account that the large donor support in 2009 in the SIMPLE sites could have played a significant role in shaping the results of SIMPLE two to three years later.

Another criterion might have affected the impact of such an approach is the frequency of disasters. The implementing municipalities are less susceptible to disasters (or perceive less susceptibility) than the control group. We find that in the intervention group, 22 of 36 (61 %) municipalities suffer from flooding regularly. In the control municipalities, 57 of 61 (97 %) indicated that they regularly suffer from flooding. In 29 intervention municipalities (81 %) storm surges, strong winds, and typhoons occurred, while in the control group this disaster was mentioned by 57 respondents (93 %). Some 24 municipalities have experienced landslides (67 %), while 51 (84 %) suffered from this disaster in the control group. Most of the respondents did not indicate the frequency with which such disasters occur. Yet, the intervention group seems altogether less disaster prone, which might influence the impact of such a planning and management tool.

SIMPLE is a relevant program for continual implementation or replication. With the exception of one municipality, all sites plan to continue SIMPLE in preparation for the next CLUP update. However, seven intervention sites claimed that they will only continue it if there is donor support or funding from external sources. Some of the stated reasons for non-continued adoption are lack of funding, manpower, changing political priorities, and lengthy implementation processes.

However, it does have some bottlenecks. Anecdotal evidence shows that stakeholders have difficulties in consolidating at the municipal level. Others claim that the adoption of SIMPLE requires more political support from the local chief executive and municipal planning and development officers. Other officials mentioned the higher costs associated with the high number of barangays in the municipality.

Areas for improvement/suggestions made by stakeholders:

- There is a need to strengthen the Municipal Implementing Team involvement in the SIMPLE process, provision of additional (and permanent) GIS personnel, and the need for decision makers to be heavily involved in the process.
- The process of mapping, data processing and analysis should be completed at the barangay level so that consolidation at the municipal level could be easier.
- SIMPLE tools and processes need to be unified since there is duplication of data and indicators from one tool to the other.
- SIMPLE should be integrated in the planning and budget processes at the municipal level to ensure its continued adoption and appropriate implementation.
- Knowledge skills should be incorporated on zoning ordinance implementation.

To what extent these factors affect the initial findings should also be incorporated in future research and discussion about the efforts on land governance.

6.

CHALLENGES IN EVALUATING SIMPLE AND SIMILAR LAND-USE PLANNING TOOLS

6.1 Attribution

To assess whether SIMPLE had an impact on disaster risk awareness, disaster preparedness, and welfare, ideally we need to compare changes in outcome between those respondents belonging to SIMPLE municipalities and those who do not. However, it is only possible to observe both outcomes to similar respondents at the same point in time. The biggest challenge in evaluating a real-life intervention is to answer the question: What would have happened without the program? Since this information is not observable, researchers can only estimate it.

Researchers have often resorted to "before-and-after" analysis to resolve this problem. The challenge is that changes in outcome before-and-after rarely represent the effect of the intervention, as many events or developments (such weather conditions or new policies) can occur in the meantime, and these can deflate or inflate the impact.

Furthermore, analysis using a comparison group that allows for a "with-versus-without" comparison will also result in biased results if the reasons for participating in the programme are owing to many factors. If at the outset, the intervention municipalities (who adopted SIMPLE) are more motivated than the comparison group, then the increase in impact is probably not (totally) caused by the intervention, but rather by the fact that the intervention group is better at the start.

Given the circumstances described above regarding the assignment of SIMPLE and the challenges in capturing attribution with data for only one survey year, estimates about causality should be taken with certain caveats and should be accompanied by qualitative assessment until a more robust impact assessment can be undertaken in the future. For instance, a repeat survey will provide some insights about the stability of the outcome variables and whether the data fulfils the assumptions required for conducting other evaluation designs, such as difference-in-differences. Such technique, combined with propensity score matching with better balancing, could provide a more robust estimate of impact.

6.2 Contamination of treatment group

At the inception phase of this study, the idea was to develop a methodological framework for SIMPLE as a stand-alone intervention. However, it became clear that the assignment of SIMPLE is strongly correlated with the other components of the EnRD Program as well as other GIZ programs by different funding sources. It might not have been explicit at the beginning of the program in 2006 but it is nevertheless practised.

It was also found out that there are only four pure SIMPLE intervention municipalities, namely: Barbaza, Belison, Patnongon, and Pulupandan. The presence of other GIZ program components virtually makes it difficult to unpack the sole impact of the tool. Furthermore, given the intent and the program objectives, it is clear that SIMPLE is not meant to be as a stand-alone intervention. Hence, the analysis of the study has to be adjusted to take into account the presence of other EnRD and other program components.

6.3 SIMPLE as moving target

SIMPLE as a tool has been changed and improved over time. This makes the evaluation much more difficult since the goals set at the program's conception have drastically changed, encompassing more ambitious goals, even though some of those are no longer valid. The evolution of SIMPLE throughout the years can be best described by the changes in its name: from Participatory Land-use Development Planning (PLUDP) to Land-Use Based Barangay Development Planning (LUBBDP), and finally SIMPLE. Because the logic framework has been reconstructed only recently, it is difficult to point out small goal deviations and to what extent they are still remaining today. But why is noting such deviations necessary? It sets the benchmark to which the tool will be evaluated.

However, the reasons for such changes in the course of 6 years (2006–12) are necessary and understandable. First, program managers learn a lot, over time, on how to improve their programs that would best suit the target groups. Whether through feedback from local officials and constituencies or mini-studies from various consultancies, program managers proactively seek to enhance the tool. Second, staff replacements could also play a role. Program managers at the start of the program may not be the same managers after a few years, and the strategy of the incumbent may differ from the former.

Such observations do not mean that the development of the tool should be constrained for the purpose of an evaluation. Rather, these observations emphasize the need to document the specific changes in goals and processes over time before they are forgotten, where recall data, although feasible, can be time-consuming, if not costly to collect.

SIMPLE is a moving target because the actors (politicians, trainers, policymakers), who were involved in the implementation of SIMPLE set change faster than outcomes can be observed. This implies that ex post evaluations may not capture the relevant outcomes intended by the program. Here, it is crucial to view evaluation as a process rather than a one-time event.

6.4 Large number of outcomes of interest

SIMPLE apparently aims to achieve a lot of outcomes – ranging from territorial development, citizen's improved well-being, good governance, disaster risk management, people's participation, improved investments, improved public service delivery, and many more. Although these factors are related, there is no clear prioritization, apart from the observed sequencing of deliverables and outputs.

6.5 Data collection challenges

Since SIMPLE targets rural municipalities in the Visayas, the study experienced several challenges such as difficult terrain and road conditions and sea crossings to reach far-off island municipalities, which made it often hard to travel. There were also several typhoons that affected the sample municipalities which delayed the implementation of the survey. Security concerns were a serious issue and had to be checked several times before sending the survey teams. The sampling procedures were also difficult to conduct where there is no up-to-date census data.

7.

CONCLUSION

This study sought to identify emerging local impacts of the GIZ-assisted land-use planning and management approach "SIMPLE". We conducted a multi-level survey (at the household, barangay, and municipal levels) between end of 2012 and early 2013 with the aim to measure the results of the program.

The intervention SIMPLE is a participatory approach designed to help local governments to draft sound and viable land-use plans and implement them in line with available budgets of local and national agencies. This is supposed to lead to the adoption of comprehensive land-use plans at the municipal/city level with zoning ordinances describing allowed land uses. A comprehensive plan would integrate all ecosystems, be based on sound data collected from BDPs, and lead to the formulation of sectoral intervention strategies with corresponding budgets.

At the outcome level, SIMPLE is assumed to reduce disaster vulnerability by creating awareness to the citizens regarding hazard zones, optimize land use through zoning ordinances and increased zoning personnel, improve disaster preparedness, and improve disaster risk reduction. Ultimately, it should lead to improved household well-being as impact of the intervention.

This report is based on responses to quantitative questionnaires for 3,000 households and 300 barangay captains as well as qualitative interview guides for 100 municipal planners. For this preliminary analysis, data was only culled using the household-level survey from intervention and control municipalities, taking place from September 2012 until January 2013. The barangay-level data was collected using systematic sampling with 30 respondents per municipality. The 100 interviews with local planning officers were conducted to provide some insights and context to the results derived from the household surveys. This helped to determine other factors that could explain the impacts found in the analysis.

The study aims to address three main themes: enabling institutional environment, disaster risk management, and perceived welfare. On setting the enabling institutional environment, we investigate to what extent SIMPLE facilitates the progress of CLUPs and whether they helped in improving awareness on zoning ordinances and establishment of zoning officers. The results at the level of the local planning administration suggest a higher presence of zoning officers and zoning ordinances among intervention municipalities. Despite similar needs for updating outdated CLUPs between intervention and control sites, intervention sites show a decreased reliance on external consultancies for the formulation of land-use plans, hinting at an increase in own planning capacity in the SIMPLE planning process.

Regarding disaster risk management, we explore to what extent the program leads to increased disaster awareness, preparedness, and risk reduction. The results show that positive impacts can be found regarding the awareness of households on disaster-relevant issues such as presence of hazard zones, risk involved in living in hazard areas, and disaster preparedness; some positive impacts were also found on disaster risk reduction.

Relating to welfare, we investigate whether the program leads to improvement in self-perceived well-being today compared to 5 years ago and whether the local government has contributed to that improvement. We find no evidence of the program's impact on all of these aspects. This result is not surprising given that capturing such impacts can take longer to manifest and that the intervention is still ongoing at the time of the survey.

Overall, the results indicate that the donor-assisted participatory land-use planning has contributed to addressing some of the important land-related issues. Given that local communities are consulted and involved in the local processes, and local officials are implementing the planning process themselves, there is increased acceptance of planning decisions. This resulted in positive impacts. Nevertheless, the implementation can be time-consuming for both participants and local officials alike. More importantly, however, is the point that the program did not touch the two core issues related to land: unequal distribution of landownership and land rights. As long as nothing is done to improve this situation, the positive effects of improved land-use planning will remain limited.

Some caveats are also necessary: it is possible that the impacts are confounded by factors that are difficult to measure. The success of SIMPLE can also be affected by a mayor's all-out

support to the program, external resources and other donor funding, as well as frequency of disasters in the areas.

When designing donor programs, the impact of land-use planning might increase in the combination with other support interventions because planning pools scarce local resources. The presence of other agencies in land-use planning such as HLURB and other external donors ensures a positive spill-over effect in terms of better cooperation with oversight agencies, knowledge exchange within stakeholders, and integration of SIMPLE on a larger scale.

In 2016, DEval started to undertake an endline survey within a more rigorous impact assessment to finalize the findings in this baseline report, because it is able to draw on data collected from two separate occasions. This allows for a fully fledged impact assessment using a difference-in-differences approach given that the same LGUs and households were interviewed. The impact assessment can shed more light on the contribution of land-use planning in the Philippines, especially in the aftermath of typhoon Haiyan.

Areas for future research include research replication in other countries to test whether land-use planning in different country contexts can have major differences in impact. The design, methods, and questionnaires in this project are standardized, relatively easy to use, and can be adapted to a specific country context. Therefore, such a replication study should be feasible. Another interesting research topic would be to explore the relationship between land rights and land-use planning with different interest groups.

8.

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APPENDICES

1.
SIMPLE treatment /control LGU summary information

Region	Province	Municipality	Class	Pop.	House-holds	Land area	Barangays	Income class	Total income (000 PHP)	Total income (per capita)	SIMPLE treatment	SIMPLE start
VI	Aklan	Buruanga	M	11767	1204	8810	11	5th	42192	3585.6	Control	
VI	Aklan	Kalibo	M	74061	1184	1071	16	1st	199111	2688.5	Control	
VI	Aklan	Madalag	M	22401	1714	28181	21	4th	11418	509.7	Control	
VI	Aklan	New Washington	M	18117	8148	6102	16	3rd	72760	4016.1	Control	
VI	Antique	Culasi	M	40276	8122	22816	44	3rd	71122	1765.9	Control	
VI	Antique	Hamtic	M	48017	9712	11101	47	3rd	61092	1272.3	Control	
VI	Antique	Libertad	M	16118	1212	9700	19	5th	17119	1062.1	Control	
VI	Antique	Pandan	M	12167	6881	11172	14	4th	17118	1406.9	Control	
VI	Capiz	Ponteverda	M	41116	8707	11110	26	3rd	71112	1729.5	Control	
VI	Capiz	Roxas City	C	160641	11914	10196	47	3rd	180207	1121.8	Control	
VI	Capiz	Sapi-an	M	24114	1101	10614	10	4th	44180	1832.1	Control	
VI	Iloilo	Concepcion	M	16881	6942	9702	21	3rd	69841	4137.3	Control	
VI	Iloilo	Guimbal	M	11199	6168	4461	11	4th	12998	1160.6	Control	
VI	Iloilo	Igbaras	M	29417	6141	11241	46	4th	19211	653.1	Control	
VI	Iloilo	Janiuay	M	17878	11411	17910	60	1st	97677	5463.5	Control	
VI	Iloilo	Miagao	M	62682	11472	11696	119	1st	106868	1704.9	Control	
VI	Iloilo	Pavia	M	41618	9000	2701	18	1st	78190	1878.8	Control	
VI	Iloilo	San Dionisio	M	14740	6741	12706	29	4th	18085	1226.9	Control	
VI	Iloilo	San Joaquin	M	11119	9721	213	81	2nd	87261	7847.9	Control	
VI	Negros Occidental	Cadiz City	C	110710	28671	12417	22	2nd	190208	1718.1	Control	
VI	Negros Occidental	Calatrava	M	78412	16167	41982	40	1st	118991	1517.5	Control	
VI	Negros Occidental	Cauayan	M	97168	19474	11994	21	1st	287412	2957.9	Control	
VI	Negros Occidental	Enrique B. Magalona	M	17424	11481	14480	21	2nd	88411	5074.1	Control	
VI	Negros Occidental	Escalante City	C	97412	19767	19276	21	4th	419881	4310.4	Control	
VI	Negros Occidental	Ilog	M	11460	8179	10196	11	2nd	101112	8823.0	Control	
VI	Negros Occidental	Sagay City	C	146884	11668	11014	21	3rd	102214	695.9	Control	
VI	Negros Occidental	Silay City	C	128211	21148	21480	16	2nd	421607	3288.4	Control	
VI	Negros Occidental	Sipalay City	C	70126	11477	44270	17	4th	414768	5914.6	Control	
VI	Negros Occidental	Victorias City	C	92019	16817	11192	26	4th	408972	4444.4	Control	

Region	Province	Municipality	Class	Pop.	House-holds	Land area	Barangays	Income class	Total income (000 PHP)	Total income (per capita)	SIMPLE treatment	SIMPLE start
VIII	Biliran	Almeria	M	14420	1111	6149	11	5th	16782	1163.8	Control	
VIII	Biliran	Cabucgayan	M	8799	1976	4871	11	5th	19901	2261.8	Control	
VIII	Biliran	Caibiran	M	20616	4011	9140	17	5th	41024	1989.9	Control	
VIII	Biliran	Kawayan	M	21942	4111	6102	20	5th	19770	901.0	Control	
VIII	Eastern Samar	General MacArthur	M	12127	2119	11740	10	5th	16295	1343.7	Control	
VIII	Eastern Samar	Giporlos	M	11286	1641	797292	18	5th	11123	985.6	Control	
VIII	Eastern Samar	Hernani	M	8161	1111	1943	11	5th	26912	3297.6	Control	
VIII	Eastern Samar	Lawaan	M	10641	2114	17111	16	5th	44177	4151.6	Control	
VIII	Eastern Samar	San Julian	M	11690	1094	11180	16	5th	41120	3517.5	Control	
VIII	Eastern Samar	San Policarpo	M	11689	2118	80	17	5th	11149	953.8	Control	
VIII	Eastern Samar	Sulat	M	14191	2841	16622	18	5th	46197	3255.4	Control	
VIII	Leyte	Babatngon	M	21112	1248	11207	21	4th	49720	2355.1	Control	
VIII	Leyte	Carigara	M	41919	9168	11786	49	2nd	80101	1910.9	Control	
VIII	Leyte	Dulag	M	47612	9660	11007	41	3rd	71718	1506.3	Control	
VIII	Leyte	Inopacan	M	21277	4649	18240	20	5th	42015	1974.7	Control	
VIII	Leyte	Kananga	M	50482	10971	16110	21	1st	201945	4000.3	Control	
VIII	Leyte	Ormoc City	C	191796	19161	464	110	1st	941722	4910.0	Control	
VIII	Leyte	Santa Fe	M	17841	1817	8190	20	5th	47009	2634.9	Control	
VIII	Leyte	Tunga	M	6221	1162	1820	8	5th	24101	3874.2	Control	
VIII	Leyte	Villaba	M	18870	6482	14791	11	3rd	66129	3504.5	Control	
VIII	Northern Samar	Las Navas	M	11029	6989	28261	11	4th	68179	6181.8	Control	
VIII	Northern Samar	San Isidro	M	26129	1608	21190	14	4th	60122	2301.0	Control	
VIII	Northern Samar	San Roque	M	21118	4411	17912	16	5th	46182	2186.8	Control	
VIII	Samar	Almagro	M	8610	2861	2720	21	5th	11161	1296.3	Control	
VIII	Samar	Basey	M	48189	9906	11	11	1st	100100	2077.2	Control	
VIII	Samar	Gandara	M	11891	6678	49442	69	2nd	91112	7662.2	Control	
VIII	Samar	Jiabong	M	11968	1041	8	14	5th	19199	1604.2	Control	
VIII	Samar	Santa Rita	M	14919	6618	41	18	3rd	81209	5443.3	Control	
VIII	Samar	Santo Niño	M	12777	2187	2822	11	5th	16268	1273.2	Control	

Region	Province	Municipality	Class	Pop.	House-holds	Land area	Barangays	Income class	Total income (000 PHP)	Total income (per capita)	SIMPLE treatment	SIMPLE start
VIII	Samar	Tagapul-an	M	9278	1824	2711	14	5th	26617	2868.8	Control	
VIII	Samar	Tarangnan	M	22002	4441	10427	41	4th	47919	2177.9	Control	
VIII	Southern Leyte	Anahawan	M	8669	1714	1809	14	5th	11821	1363.6	Control	
VIII	Southern Leyte	Padre Burgos	M	11194	2146	4860	11	5th	10721	957.8	Control	
VIII	Southern Leyte	San Juan (Cabalian)	M	11998	1112	4916	18	5th	41722	3477.4	Control	
				36771.7	**6896.0**	**24171**	**26**		**99720**	**2780.5**		
VI	Antique	Barbaza	M	21617	4117	11416	19	4th	10101	467.3	Treatment	Nov-11
VI	Antique	Belison	M	11076	2891	1978	11	5th	11914	1075.7	Treatment	Aug-12
VI	Antique	Bugasong	M	12919	6429	20170	27	3rd	62212	4815.5	Treatment	Nov-11
VI	Antique	Laua-an	M	27060	1129	18692	40	4th	49189	1817.8	Treatment	Nov-11
VI	Antique	Patnongon	M	18919	7911	161	16	3rd	61696	3261.1	Treatment	Nov-11
VI	Antique	Tibiao	M	27111	1289	17742	21	4th	11406	420.7	Treatment	Aug-12
VI	Antique	Valderrama	M	18878	1181	27179	22	4th	17902	948.3	Treatment	Nov-11
VI	Negros Occidental	Bago City	C	166179	11110	40210	24	2nd	606718	3651.0	Treatment	Sep-10
VI	Negros Occidental	Binalbagan	M	68718	11642	18141	16	1st	114100	1660.4	Treatment	Sep-10
VI	Negros Occidental	Hinigaran	M	81921	17122	11	24	1st	119441	1458.0	Treatment	Sep-10
VI	Negros Occidental	Hinobaan	M	11684	10107	42410	11	1st	99110	8482.5	Treatment	Sep-10
VI	Negros Occidental	Manapla	M	14062	10811	11286	12	2nd	80162	5700.6	Treatment	Sep-10
VI	Negros Occidental	Pontevedra	M	48191	10110	11112	20	3rd	78187	1622.4	Treatment	Sep-10
VI	Negros Occidental	Pulupandan	M	28661	6184	2101	20	3rd	11817	412.3	Treatment	Sep-10
VI	Negros Occidental	San Enrique	M	24444	1117	2885	10	4th	2216	90.7	Treatment	Sep-10
VI	Negros Occidental	Valladolid	M	14891	8000	4801	16	4th	61141	4105.9	Treatment	Sep-10
VIII	Leyte	Abuyog	M	62001	11886	18849	61	1st	114918	1853.5	Treatment	Nov-09
VIII	Leyte	Alangalang	M	41669	9011	11012	14	2nd	71843	1724.1	Treatment	Nov-09
VIII	Leyte	Barugo	M	27169	1198	8913	17	4th	17071	628.3	Treatment	Nov-09
VIII	Leyte	Dagami	M	10411	6090	16166	61	4th	61462	5903.6	Treatment	Jun-12
VIII	Leyte	Hilongos	M	11911	12146	18914	11	3rd	94813	7960.1	Treatment	Oct-11
VIII	Leyte	Isabel	M	40608	8100	9710	24	2nd	98105	2415.9	Treatment	Oct-11
VIII	Leyte	Javier	M	24121	4820	11270	28	4th	11891	493.0	Treatment	Nov-09
VIII	Leyte	Mayorga	M	11809	2971	6	16	5th	11216	949.8	Treatment	Nov-09
VIII	Leyte	Palo	M	16781	11271	8018	11	3rd	101120	6025.9	Treatment	Oct-11
VIII	Leyte	Pastrana	M	16992	1121	7910	29	5th	19161	1127.7	Treatment	Jun-12

Region	Province	Municipality	Class	Pop.	House-holds	Land area	Barangays	Income class	Total income (000 PHP)	Total income (per capita)	SIMPLE treatment	SIMPLE start
VIII	Leyte	Tabontabon	M	11206	2448	2487	16	5th	26112	2330.2	Treatment	Oct-06
VIII	Leyte	Tacloban City	C	217199	47119	20172	118	1st	778176	3582.8	Treatment	Nov-09
VIII	Leyte	Tanauan	M	49110	9862	6789	14	2nd	86695	1765.3	Treatment	Oct-06
VIII	Leyte	Tolosa	M	16819	1416	2171	11	5th	16172	961.5	Treatment	Oct-06
VIII	Southern Leyte	Bontoc	M	28111	1117	11791	40	4th	11212	398.8	Treatment	Nov-09
VIII	Southern Leyte	Hinunangan	M	26729	6111	17117	40	3rd	70419	2634.6	Treatment	Oct-06
VIII	Southern Leyte	Hinundayan	M	11164	2918	6108	17	5th	11862	1062.5	Treatment	Oct-06
VIII	Southern Leyte	Liloan	M	22201	4117	9610	24	4th	49885	2247.0	Treatment	Oct-06
VIII	Southern Leyte	Maasin City	C	84897	17121	21112	70	4th	187081	2203.6	Treatment	Nov-09
VIII	Southern Leyte	Saint Bernard	M	21212	1691	10020	10	4th	11140	525.2	Treatment	Oct-06
VIII	Southern Leyte	Silago	M	11619	1041	21101	11	4th	41113	3538.4	Treatment	Oct-06
				36758.6	**7425.0**	**12690**	**26**		**88886**	**2441.1**		

Sources: LGPMS 2011, National Statistics Office 2007 Census, National Statistical Coordination Board, and interviews GIZ staff, and program manager.

2.
Sampling calculations

To decide on the sample size to achieve a given level of power, we use the formula below:

$$n = \left(1 + p(m-1)\right)\left[(z_{1-a} + z_{1-\beta})^2 \frac{\frac{1}{r}(s_1^2 + s_2^2)}{(x_1 - x_2)^2}\right]$$

Given that not all information was available at the time of the survey, we used as benchmark the household data from a quasi-experimental study by Capuno and Garcia (2010).

Parameters	Description	Value	Source
$1+p(m-1)$	Design effect due to clustering	2.35	household data from Capuno and Garcia (2010)
p	Intra-cluster correlation coefficient for the indicator	0.15	household data from Capuno and Garcia (2010)
m	Projected average number of interviews per cluster	10	defined
z_{1-a}	Z-score corresponding to degree of confidence	1.65	convention
$z_{1-\beta}$	Z-score corresponding to degree of confidence	0.84	convention
r	Projected ratio of treatment/control or endline/baseline observation	0.53	household data from Capuno and Garcia (2010)
s_1	Standard deviation of indicator for baseline/control group	9099	census data from Eastern Visayas 2011 Press release (census.gov.ph)
s_2	Standard deviation of indicator for endline/treatment group	9189	calculated through minimum detectable effect size
X_1	Level of indicator estimated at baseline/control group	160267	census data from Eastern Visayas 2011 Press release (census.gov.ph)
X_2	Level of indicator estimated at endline/treatment group	161869.67	calculated through minimum detectable effect size
$1-\beta$	Statistical power	0.80	defined
$\frac{\lvert x_2 - x1\rvert}{x_1}$	Minimum detectable effect size (%)	1%	defined

The important parameter in considering the sample size is the minimum detectable effect size. In the table below, for a pre-defined minimum detectable effect, we calculate the total sample size required. The final decision is to select ten interviews per barangay for a total sample of 2,658, which was chosen given budget constraints; the differences in terms of design effect is not large. To account for nonresponses, margin of error, among others, some buffer was included.

Main parameters (calculation #1):
Sample size required for various Minimum Detectable Effect (average family income)

Power = 0.8; Municipalities = 35 treated, 65 control

Interviews per barangay = 10

Minimum detectable effect	Intraclass correlation	No. of barangays	Design effect	Units within treatment group	Units within comparison group	Total sample
1%	**0.15**	**266**	**2.35**	**921**	**1737**	**2658**
1.5%	0.15	119	2.35	411	777	1188
1%	0.20	317	2.8	1097	2070	3167
1.5%	0.20	142	2.8	491	925	1416

Main parameters (calculation #2):
Sample size required for various minimum detectable effect (average family income)

Power = 0.8; Municipalities = 35 Treated, 65 Control

Interviews per barangay = 15

Minimum detectable effect	Intraclass correlation	No. of barangays	Design effect	Units within treatment group	Units within comparison group	Total sample
1%	0.15	233	3.1	1215	2291	3506
1.5%	0.15	104	3.1	544	1025	1569
1%	0.20	287	3.8	1489	2809	4298
1.5%	0.20	129	3.8	666	1257	1923

Using some adjustments to account for non-randomness, nonresponse and margin of error:

Final	Municipalities	Barangays	Adjusted 10%	HH interviews	Total sample
Treatment	35	93	102	10	1024.1
Control	65	173	190	10	1901.9
Total	100	266	293		2926.0

3.
Probit model of probability of receiving SIMPLE/GIZ program

Dependent variable: Respondent belongs to municipalities that adopted SIMPLE/GIZ approach

Covariates	Coefficient	Standard Error	z
hhplain	0.175	0.086	2.03**
hhmount	0.471	0.114	4.12**
hhdis	-0.157	0.084	-1.87*
hh5km	0.019	0.138	0.14
hhwalk	-0.541	0.106	-5.11**
Res_HH	0.007	0.002	3.57**
hhage	-0.002	0.003	-0.89
hhfemale	-0.150	0.082	-1.83*
hhmarried	0.304	0.071	4.29*
hhhead	-0.108	0.078	-1.38
hhmembers	-0.042	0.015	-2.76**
hhhighschool	0.037	0.088	0.42
hhcollege	-0.068	0.103	-0.66
hhjob	0.240	0.076	3.15**
hhmemjob	0.032	0.040	0.81
hhgovjob	0.274	0.131	2.09**
hhmemgov	-0.156	0.091	-1.71*
hhfarming_2006	0.001	0.082	0.01
hhfishing_2006	-0.440	0.144	-3.06**
hhemployment_2006	-0.080	0.084	-0.95
hhlot	0.146	0.104	1.41
hhlotpermit	0.039	0.102	0.38
hhwood	-0.105	0.074	-1.42
hhcomputer	0.045	0.117	0.39
hhaircon	-0.181	0.147	-1.23
hhvehicle	0.140	0.077	1.81*
hhcellphone	0.011	0.078	0.14
hhiradio	0.066	0.074	0.89
hhitv	-0.207	0.074	-2.78**

Covariates	Coefficient	Standard Error	z
hhinewspaper	0.067	0.142	0.47
hhiinternet	0.157	0.131	1.2
hhtrh	0.188	0.073	2.58*
hhtdilg	-0.052	0.079	-0.65
hhtlaw	0.100	0.081	1.23
hhtconduct	-0.051	0.066	-0.77
hhtlg	0.289	0.065	4.42*
muncollege	-0.005	0.065	-0.08
munlast_elec	0.269	0.073	3.66*
muntime_off	-0.026	0.004	-7.37**
munjob_biz	-0.148	0.068	-2.17**
pop_2009_DILG	0.000	0.000	-1.85*
bara_2009_DILG	-0.015	0.002	-7.32**
hh_2009_DILG	0.000	0.000	-6.22**
class	-0.501	0.043	-11.64**
constant	2.688	0.398	6.75**
Number of observations	1936		
Likelihood ratio chi-square	428.11		
probability > chi-square	0.000		

*Note: Significance level: **p < 0.05 ; *p < 0.10*

The propensity scores are derived from a probit regression model applied to the sample of treatment and control group. The covariates are chosen to ensure that the individuals in the treatment groups and matched sample in the control group will have similar characteristics. There are obviously pros and cons on the choice of variables and selection but for the purpose of this analysis, the authors' choice of variables was guided by the local setting, economic theory, and knowledge of previous research with similar design (Capuno and Garcia, 2010). The variables used to identify treatment assignment are based on standard household socioeconomic characteristics, placement, and character of the house as well as some municipal level characteristics. The weakness of propensity score matching is the presence of confounding factors – mostly characteristics that are difficult to observe and even to measure, such as motivation or intelligence. Recognizing this weakness, the estimation included some behavioural questions that could proxy some of the respondents' characteristics that are relevant for the study. To capture the extent to how much our respondent is informed, we include his frequency in listening news on the radio, watching news on television, and reading a newspaper. We also included some questions on general knowledge, current events, and responsibilities of the government.

Since one cannot directly test whether potential outcomes are independent of treatment after conditioning on the covariates, the selection of covariates can be also subjective. What is relevant is that suspected variables that are related to program participation should have been relevant before participation, fixed over time or measured before participation (Caliendo and Kopeinig, 2005).

While it is possible to claim household assets, internet and newspaper use, income class of the municipality or employment might be influenced by the treatment, an alternative parsimonious model was also used to check the outcome variable that will be most affected, in this case the welfare outcomes. The parsimonious probit model eliminates all the household assets, internet and newspaper use, income class, and work-related variables. The result shows that the outcome variables remain insignificant. The advantage of the original specification is that it is more conservative in selecting the matched controls given fewer observations are used in matching than the parsimonious specification. The parsimonious model may have larger issues by not capturing the unobservable variables. Given this trade-off, the authors decided to use the original specification.

4.
Covariate test before-and-after matching

Variable	Unmatched (U) Matched (M)	Mean treated	Mean control	T-test
hhplain	U	0.66	0.63	1.5
	M	0.66	0.67	-0.35
hhmount	U	0.18	0.12	3.58**
	M	0.18	0.18	-0.11
hhdis	U	1.51	1.62	-2.90**
	M	1.51	1.51	0.67
hh5km	U	0.63	0.59	1.98**
	M	0.63	0.65	-0.74
hhwalk	U	0.08	0.17	-5.75**
	M	0.08	0.08	0.12
Res_HH	U	33.95	29.76	4.27**
	M	33.95	33.04	0.84
hhage	U	48.14	46.89	1.67*
	M	48.14	48.02	0.14
hhfemale	U	0.69	0.75	-2.90**
	M	0.69	0.68	0.17
hhmarried	U	0.74	0.64	4.63**
	M	0.74	0.74	0.01
hhhead	U	0.46	0.43	1.04
	M	0.46	0.48	-0.84
hhmembers	U	4.86	5.20	-3.16**
	M	4.86	4.94	-0.66
hhhighschool	U	0.17	0.16	0.18
	M	0.17	0.17	-0.13
hhcollege	U	0.15	0.14	0.89
	M	0.15	0.16	-0.34
hhjob	U	0.48	0.38	4.73**
	M	0.48	0.45	1.24
hhmemjob	U	1.32	1.26	1.27
	M	1.32	1.29	0.5

Variable	Unmatched (U) Matched (M)	Mean treated	Mean control	T-test
hhgovjob	U	0.16	0.11	2.78**
	M	0.16	0.14	0.7
hhmemgov	U	0.25	0.23	0.93
	M	0.25	0.24	0.62
hhfarming2006	U	0.30	0.29	0.54
	M	0.30	0.28	0.95
hhfishing2006	U	0.04	0.10	-4.55**
	M	0.04	0.04	0.2
hhemployee2006	U	0.25	0.25	0.35
	M	0.25	0.27	-0.71
hhlot	U	0.47	0.42	2.30**
	M	0.47	0.48	-0.35
hhlotpermit	U	0.41	0.44	-1.25
	M	0.41	0.40	0.52
hhwood	U	0.70	0.75	-2.50**
	M	0.70	0.73	-1.52
hhcomputer	U	0.13	0.10	1.97**
	M	0.13	0.13	-0.22
hhaircon	U	0.06	0.06	-0.19
	M	0.06	0.06	-0.07
hhvehicle	U	0.34	0.26	3.57**
	M	0.34	0.32	0.81
hhcellphone	U	0.74	0.70	1.71*
	M	0.74	0.73	0.05
hhiradio	U	0.38	0.33	2.35
	M	0.38	0.41	-1.03
hhitv	U	0.60	0.58	0.69
	M	0.60	0.62	-0.65
hhinewspaper	U	0.20	0.15	2.78**
	M	0.20	0.21	-0.12
hhiinternet	U	0.24	0.18	3.29**
	M	0.24	0.25	-0.35
hhtrh	U	0.63	0.53	4.62**
	M	0.63	0.65	-0.43

Variable	Unmatched (U) Matched (M)	Mean treated	Mean control	T-test
hhtdilg	U	0.75	0.72	1.55
	M	0.75	0.74	0.5
hhtlaw	U	0.24	0.18	2.94**
	M	0.24	0.23	0.32
hhtconduct	U	0.51	0.50	0.58
	M	0.51	0.50	0.38
hhtlg	U	0.58	0.49	3.59**
	M	0.58	0.56	0.66
muncollege	U	0.56	0.57	-0.63
	M	0.56	0.51	1.84*
munlast_elec	U	0.73	0.64	3.93**
	M	0.73	0.71	0.89
muntime_off	U	14.63	16.63	-4.36
	M	14.63	14.65	-0.04
munjob_biz	U	0.44	0.49	-2.12**
	M	0.44	0.43	0.38
pop_2009_DILG	U	38816.00	39627.00	-0.52
	M	38816.00	40185.00	-0.92
bara_2009_DILG	U	28.87	30.10	-1.38
	M	28.87	29.39	-0.58
hh_2009_DILG	U	7687.50	9141.80	-3.03**
	M	7687.50	7986.60	-0.98
class	U	3.41	3.68	-4.48**
	M	3.41	3.40	0.25

*Note: Significance level: **p < 0.05; * p < 0.10. Results based on kernel matching.*

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