

# Experiencias de aplicaciones de TICs en Agricultura

**Eduardo Nakasone**

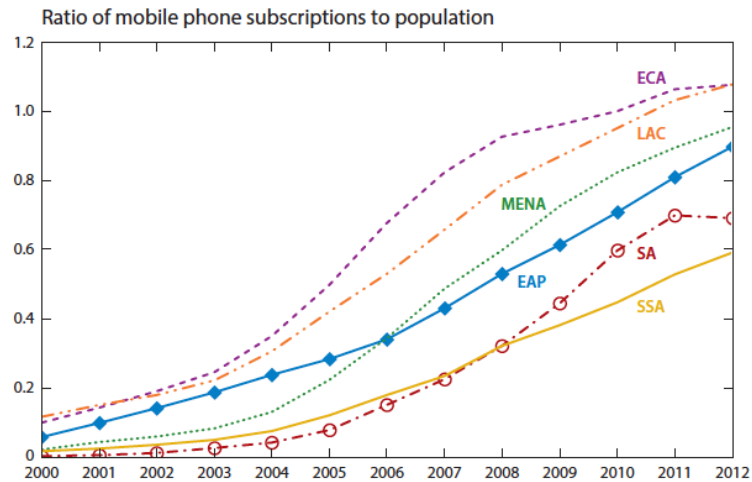
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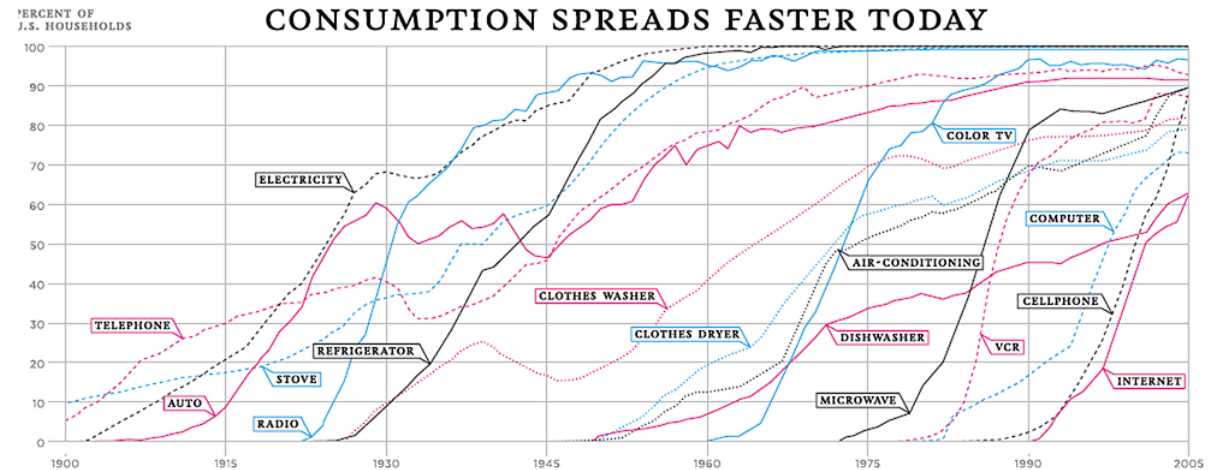
Lima. Marzo, 2022

# Rápida Expansión de TICs en el mundo

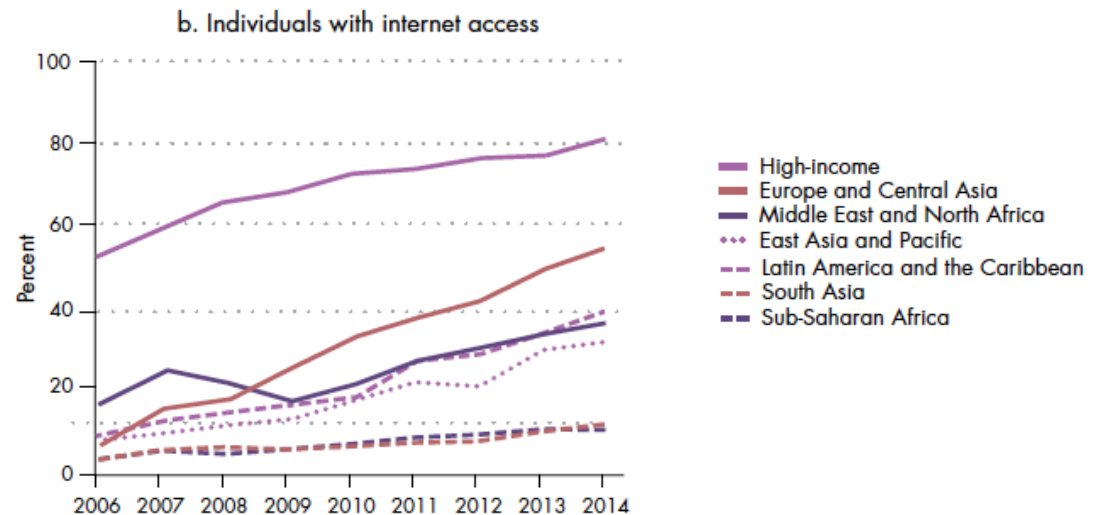


ECA = Eastern Europe and Central Asia, LAC = Latin America and the Caribbean, MENA = Middle East and Northern Africa, EAP = East Asia and Pacific, SA = South Asia, SSA = Sub Saharan Africa

Fuente: Nakasone, Torero and Minten (2015)



Fuente: New York Times, Feb 10, 2008



Fuente: World Development Report (2016)

# Algunos usos de TICs en Agricultura

- Capacitación Agrícola
- Información de Precios de Mercado
- Otras aplicaciones (seguros agrícolas, mercado de alquiler de maquinaria, etc.)

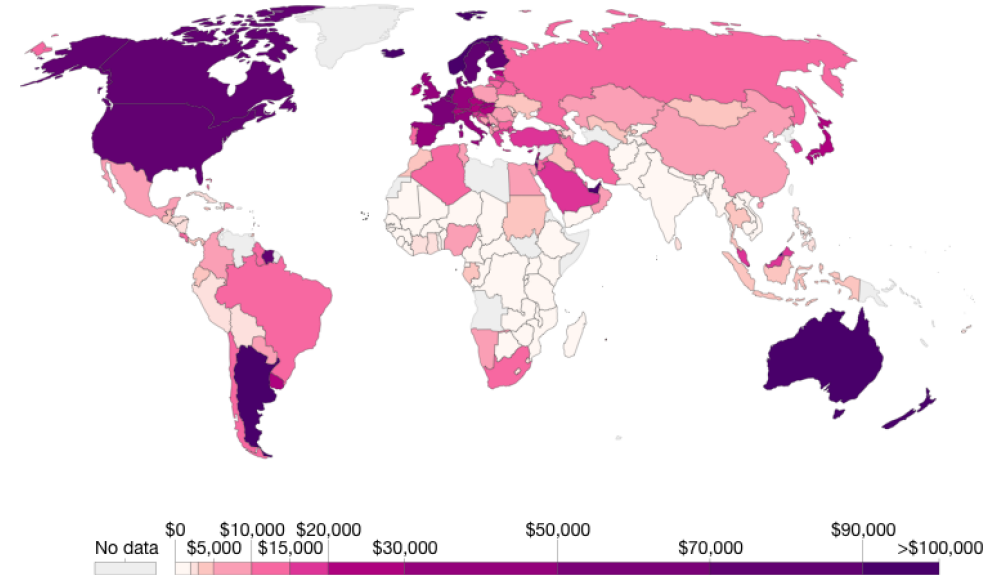
# Extensión Agrícola

- Baja productividad de la agricultura en países en desarrollo
- Política tradicional: extension agrícola
- Problemas de sistemas tradicionales de extension: costo de visitas, y monitoreo del desempeño del personal de extensión
- Oportunidades con TICs: reducción de costos de visitas [virtualidad], capacidad de monitorear personal de extensión

## Agriculture value added per worker, 2017

Agriculture value added per worker is a measure of labor productivity. It corresponds to the ratio between value added in agriculture (constant 2010 US\$) and number of people employed in agriculture.

Our World  
in Data



Source: World Bank

OurWorldInData.org/employment-in-agriculture • CC BY

# Evidencia sobre uso de TICs para Extensión Agrícola

- Evidencia inicial sobre el uso de SMS para diseminar información agrícola.
- Estudios iniciales no encuentran mejoras en la adopción de recomendaciones agrícolas (Fafchamps & Minten 2012)

## Impact of SMS-Based Agricultural Information on Indian Farmers

*Marcel Fafchamps and Bart Minten*

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This study estimates the benefits that Indian farmers derive from market and weather information delivered to their mobile phones by a commercial service called Reuters Market Light (RML). We conduct a controlled randomized experiment in 100 villages of Maharashtra. Treated farmers associate RML information with a number of decisions they have made, and we find some evidence that treatment affected spatial arbitrage and crop grading. But the magnitude of these effects is small. We find no statistically significant average effect of treatment on the price received by farmers, crop value-added, crop losses resulting from rainstorms, or the likelihood of changing crop varieties and cultivation practices. Although disappointing, these results are in line with the market take-up rate of the RML service in the study districts, which shows small numbers of clients in aggregate and a relative stagnation in take-up over the study period. JEL codes: O13, Q11, Q13.

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- No basta con enviar cualquier información.
- Los SMS pueden ser eficaces, pero la información debe ser relevante y transmitida de manera oportuna (Casaburi et al 2019)

***Harnessing ICT to Increase Agricultural Production:  
Evidence From Kenya\****

Lorenzo Casaburi  
*University of Zurich*  
lorenzo.casaburi@econ.uzh.ch

Michael Kremer  
*Harvard University*  
mkremer@fas.harvard.edu

Sendhil Mullainathan  
*Harvard University*  
mullain@fas.harvard.edu

Ravindra Ramrattan\*\*  
*Innovations for Poverty Action*

*THIS DRAFT: September 23, 2019. FIRST DRAFT: October 31<sup>st</sup>, 2013*

***Abstract***

Sending SMS messages with agricultural advice to smallholder farmers increased yields by 11.5% relative to a control group with no messages. These effects are concentrated among farmers who had no agronomy training and had little interaction with sugar cane company staff at baseline. A follow-up trial of the same intervention has, however, no significant impact on yields.

- Problemas con el uso de SMS: tal vez no sean efectivos para transmitir información compleja o detallada.
- Ejemplo: Proyectos que complementan capacitación presencial en el uso de IPM con recordatorios a través de SMS (Laroche et al 2019)

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## Did You Really Get the Message? Using Text Reminders to Stimulate Adoption of Agricultural Technologies

CATHERINE LAROCHELLE\*, JEFFREY ALWANG\*, ELLI TRAVIS\*\*,  
VICTOR HUGO BARRERA<sup>†</sup> & JUAN MANUEL DOMINGUEZ ANDRADE<sup>†</sup>

\*Department of Agricultural and Applied Economics, Virginia Tech, Blacksburg, VA, USA, \*\*The Office of Economic Development, Virginia Tech, Blacksburg, VA, USA, <sup>†</sup>Instituto Nacional de Investigaciones Agropecuaria, Quito, Ecuador

*(Original version submitted October 2016; final version accepted October 2017)*

**ABSTRACT** *This article provides evidence from a randomised control trial conducted among potato farmers in Ecuador about the impact of mobile phone text messages on farmer knowledge about and adoption of integrated pest management (IPM) practices. Using psychological constructs, we examine competing explanations for non-standard decision-making leading to low adoption of beneficial agricultural technologies. Farmers who received text messages have significantly higher knowledge and are more likely to adopt most IPM practices than those in the control group. Findings provide evidence that text messages lead to behavioural changes by reducing inattention and sub-optimal heuristics in the face of complex decisions.*



- **Digital Green:** uso de videos comunitarios para extension agrícola.
- Problemas relevantes para la comunidad.
- Homofilia y ayudas visuales puede ayudar a asimilar mejor recomendaciones y nuevas prácticas



## Research Article

# Digital Green: Participatory Video and Mediated Instruction for Agricultural Extension

## Abstract

*Digital Green is a research project that seeks to disseminate targeted agricultural information to small and marginal farmers in India using digital video. The unique components of Digital Green are: (1) a participatory process for content production; (2) a locally generated digital video database; (3) a human-mediated instruction model for dissemination and training; and (4) regimented sequencing to initiate new communities. Unlike some systems that expect information or communication technology alone to deliver useful knowledge to marginal farmers, Digital Green works with existing, people-based extension systems and aims to amplify their effectiveness. While video provides a point of focus, it is people and social dynamics that ultimately make Digital Green work. Local social networks are tapped to connect farmers with experts, the thrill of appearing "on TV" motivates farmers, and homophily is exploited to minimize the distance between teacher and learner. In a 13-month trial involving 16 villages (eight control and eight experimental villages balanced for parameters such as size and mix of crops) and a total of 1,470 households, Digital Green increased the adoption of certain agriculture practices seven-fold over a classic Training and Visit-based (T&V) extension approach. On a cost-per-adoption basis, Digital Green was shown to be 10 times more effective per dollar spent than a classical extension system. Investments included performance-based honoraria for local facilitators, a shared TV and DVD player in each village, and one digital camcorder and PC shared across the project area. The results are preliminary, but promising.*

Fuente: Ghandi et al (2009)



- Scientific Animations without Borders (SAWBO): Uso de ayudas visuals a través de animaciones
- Menos costoso, pero se limita el rol de la homofilia en los mensajes

## Scientific animations without borders (SAWBO): an innovative strategy for promoting education for sustainable development

María Angeles Rodriguez-Domenech<sup>1</sup>  · Julia Bello-Bravo<sup>2</sup> · Barry R. Pittendrigh<sup>3</sup>

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© Springer Japan KK, part of Springer Nature 2018

### Abstract

While the *United Nations Millennium Declaration* identified several key benchmarks for sustainable development, the UN's 2030 *Agenda for Sustainable Development* (ASD) now reaffirms, refines, and retools those sustainable development goals for the next 15 years. Specifically, the ASD calls for developing and extending opportunities for transitions to sustainable societies—a goal that necessarily includes more sustainable research practices capable of fostering the uptake of the values, behaviors, strategies, and lifestyles required to realize a sustainable future for all people and societies as well. This paper describes one such sustainable practice project: Scientific Animations Without Borders (SAWBO). Housed at Michigan State University in the United States, at all levels of its ESD project, SAWBO enacts a collaborative, flexible, adaptive, and resilient practice with global and local, scientific and indigenous, knowledge experts in order to transfer scientifically grounded knowledge about agricultural, public health, and socioeconomic issues of public concern to rural areas of Africa and other places affected by those concerns. SAWBO's principle medium of transfer uses animated, linguistically localized, educational videos, distributed free of cost, and intended to be both readily accessible and easily shared by all types of audiences, but especially by low-literate adult learners in developing regions. As such, SAWBO's ESD approach addresses many of *Agenda 2030's* 17 Global Goals and aligns with the global effort to develop educational approaches that are not only economically, but also socially and environmentally, sustainable. As a project, SAWBO also embodies a model of sustainability education practice adaptable to different methodologies across a variety of spaces and educational levels and is itself also methodologically sustainable.

- "Público objetivo" para uso de TICs: competencias parciales en poblaciones mayores
- ¿Se puede brindar información a los hijos adolescentes de los productores? (Nakasone y Torero 2018)

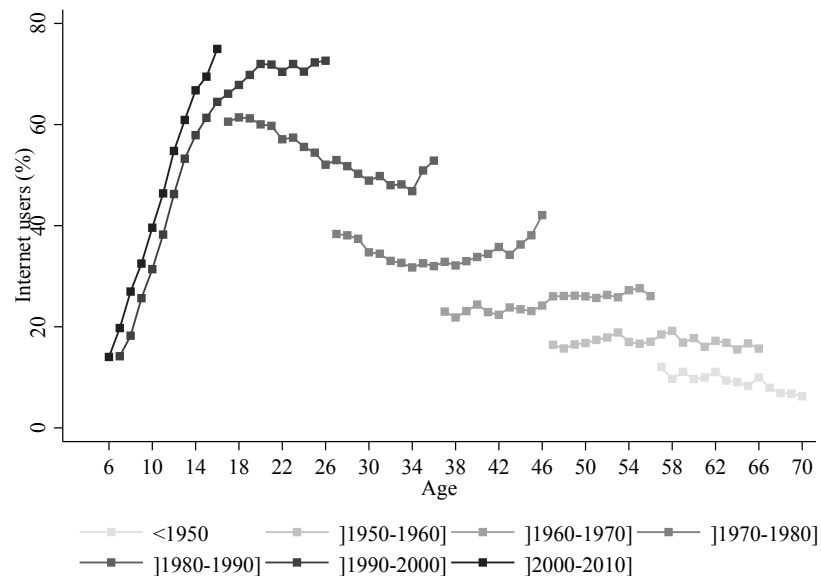


## Agricultural Extension through Information Technologies in Schools: Do the Cobbler's Parents go Barefoot?\*

Eduardo Nakasone <sup>†</sup>

Maximo Torero <sup>‡</sup>

Uso de internet según cohorte de nacimiento (Perú, ENAHO 2006-2017)



### Abstract

We investigate the effectiveness of upper intergenerational transmission of knowledge (from children to parents) to promote awareness and behavior changes among adults. We designed and implemented a field experiment in a rural high school in the northern highlands of Peru, where we screened agricultural extension videos to students in the school's computer lab. We separately interview the parents of these high school students to assess their knowledge about the agricultural practices taught to their children. **We find that, even when the information was not directly available to them, the information provided to the teenagers increased parents' knowledge of agricultural practices by 21%-30%. We also find that our intervention increased parents' adoption of the agricultural practices in the videos by 14-18%.** Our intervention highlights the potential of Information and Communication Technologies (ICTs) to deliver information to children and reach adult populations (who are not usually familiar with ICTs). While our intervention delivered agricultural advice, this method can potentially be expanded to provide other types of information to increase the knowledge and change the behavior of ICT-illiterate populations.

- Plataforma interactiva a través de llamadas (voz)
- Permite acceso a poblaciones analfabetas
- Enfoque de demanda sobre recomendaciones
- Pero... inversión es más costosa

## ‘MOBILE’ISING AGRICULTURAL ADVICE: TECHNOLOGY ADOPTION, DIFFUSION AND SUSTAINABILITY\*

*Shawn A. Cole and A. Nilesh Fernando*

Mobile phones promise to bring the ICT revolution to previously unconnected populations. A two-year study evaluates an innovative voice-based ICT advisory service for smallholder cotton farmers in India, demonstrating significant demand for, and trust in, new information. Farmers substantially alter their sources of information and consistently adopt inputs for cotton farming recommended by the service. Willingness to pay is, on average, less than the per-farmer cost of operating the service for our study, but likely exceeds the cost at scale. We do not find systematic evidence of gains in yields or profitability, suggesting the need for further research.



- "Gamification" en extension agrícola.
- Posibilidad de que los agricultores aprendan a través de juegos virtuales

Mahindi Master (Capturas de Pantalla)

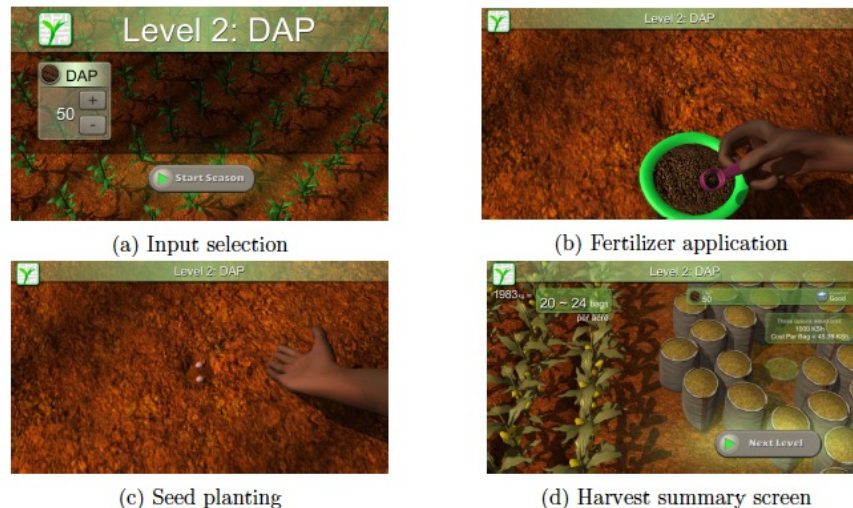


Figure 2: Screenshots from *MahindiMaster* gameplay

## Learning by (virtually) doing: experimentation and belief updating in smallholder agriculture\*

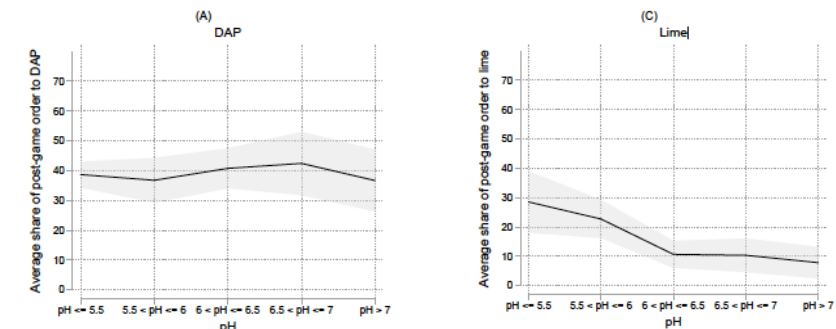
Emilia Tjernström<sup>†</sup> Travis J. Lybbert<sup>‡</sup> Rachel Frattarola Hernández<sup>§</sup>  
 Juan Sebastian Correa<sup>‡</sup>

April 11, 2019

### Abstract

In much of sub-Saharan Africa, substantial soil quality heterogeneity hampers farmer learning about the returns to different inputs and can partly explain farmers' limited adoption of improved inputs in the region. We study how Kenyan farmers respond to an interactive app that enables them to discover agricultural input returns on a virtual plot calibrated to match their own. We find that farmers update both their beliefs and behaviors after engaging with the virtual learning app. We elicit farmers' subjective expectations about the returns to different inputs and find that on average farmers revise their beliefs about returns upwards after using the app. In addition, in an incentive-compatible experiment, we offered farmers an input budget to allocate across delivered inputs and the chance to update these allocations after playing several virtual seasons on the app. Farmers make significant revisions to their input allocations after the virtual learning experience. As evidence that these adjustments emerge from real learning, farmers with the highest predicted returns to lime—an unfamiliar input in this region—increase their lime orders more than others. Our results suggest that engagement with a personalized virtual platform can induce real learning and enhance farmers' beliefs and technology choices.

### Cambios en decisiones hipotéticas de uso de DAP y cal (antes vs. después de juegos)



# ¿Qué hemos aprendido sobre el uso de TICs en agricultura?

- Es posible mejorar conocimientos agrícolas y la adopción de prácticas agrícolas mejoradas a través de TICs bajo ciertas condiciones.
- Sin embargo, la efectividad de esta estrategia depende de diversos factores.
  - Relevancia y "timing" de la información
  - ¿Cuán compleja es la información? ¿Se necesitan ayudas visuales?
  - ¿Quiénes son los usuarios (analfabetismo, familiaridad con TICs, etc)?
  - Costos asociados a diferentes estrategias



# Otros usos de TICs

- Investigaciones previas sobre uso de TICs para información de precios agrícolas (Jensen 2007, Svensson & Yanagizawa 2009, Aker 2010, Goyal 2010, Curtois & Subervie 2015, Mitra et al 2013, Nakasone 2016, etc.)
- Nuevas oportunidades de uso de TICs (proyectos recientes):
  - Seguros agrícolas
  - Alquiler de maquinaria

# Uso de TICs en Seguros Agrícolas

- Proyecto piloto de equipo de IFPRI (Kremer, Ceballos, Robles)
- Problema:
  - Riesgos inherentes a la agricultura. Sin embargo, baja cobertura de seguros
  - Alto costo de monitoreo de seguros basados en “indemnity” (verificación de daños)
  - Alternativa: seguros basados en condiciones climáticas (index-based insurance). Evidencia previa sobre baja adopción.
- Piloto para probar el aplicativo “WheatCam” en dos regiones de India

- El aplicativo WheatCam:

- Captura inicial de foto de parcela (geo referenciada y con registro de hora)
- Envío de tres fotos semanales (tomadas entre 10 AM y 2 PM) durante la campaña agrícola
- Panel de expertos se reúne al final de la campana para analizar daños basados en el registro fotográfico
- Oportunidades futuras: Desarrollo de algoritmos automatizados para detección de daños; posibilidad de integrar un sistema de recomendaciones agrícolas.

Aplicativo WheatCam



Figure 3: Number of uploaded pictures for farmers who took pictures

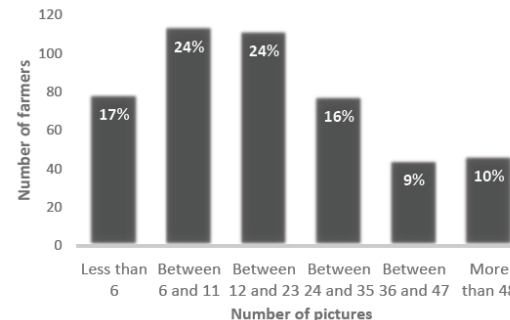
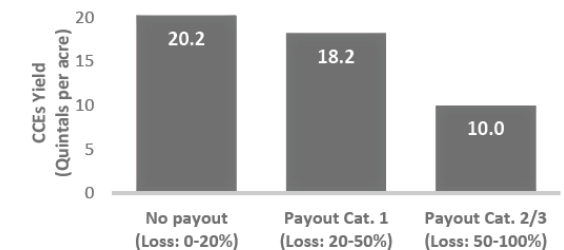
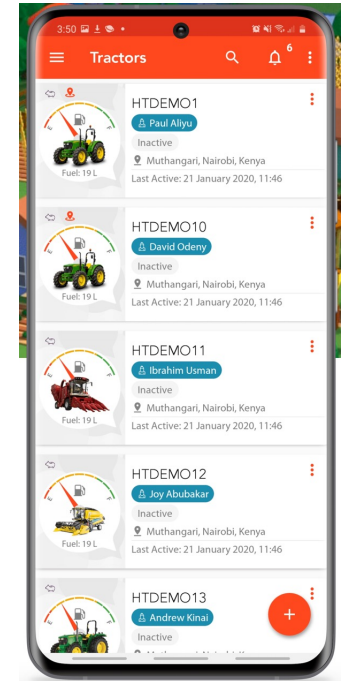


Figure 7: Yields for farmers in different PBI payout categories

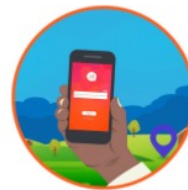


# Uso de TICs en mercados de alquiler de maquinaria

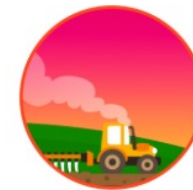
- Problema:
  - Baja mecanización del agro (reducciones de productividad)
  - La maquinaria agrícola es indivisible y costosa.
  - Restricciones al crédito en áreas rurales.
- Hello Tractor:
  - Origen: Nigeria
  - Uber para tractores



## How We Work



Farmer requests tractor service via app  
or booking agents



Tractor owner pairs request with  
available tractor



Farmer is served and tractor is  
monitored