NSO Thailand:
Experience with CAPI software and Survey Solutions in use of data collection and survey management technologies

Regional Training Course on CAPI for Agricultural Surveys and Price Reporting
3 - 7 October 2016, Bangkok

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Presentation *outline*

◇ **Background**

◇ **Implementing new innovation: CAPI**

◇ **First time of CAPI software using Tablet PCs**

◇ **CAPI and survey management technologies in the Agricultural Census 2013**

◇ **First time implementing Survey Solutions**

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Background

✦ **Primary purpose for the NSO statistics production is to provide timely, accurate and useful statistics.**

✦ **Current data collection problems: for example**
   - the field data collection costs continue to rise.
   - the delay of the completed paper questionnaires from the fieldwork to be delivered to the field office is sometimes too late to edited correctly and keyed properly into the data collection system.

Administratively, Thailand is divided into 77 provinces, including Bangkok (Metropolis).

> **In Bangkok, the fieldwork is carried out under the responsibility of the Data Management Division at the NSO Headquarter.**

> **In the other 76 provinces, Provincial Statistical Offices are responsible for the fieldwork.**

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Implementing new innovation: CAPI

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Since 2012, NSO has implemented the CAPI using Tablet PCs in data collection in various surveys (including Agricultural Census) with the main aims
    * to improve timeliness of the data
    * to improve data quality
      (real-time edit checks and ability for supervisors to review work right after the interview is conducted)
    * to reduce data entry costs

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Census/Survey	OS (Window/Android)	Software for data collection
The Thailand Multiple Indicator Cluster Survey: MICS 2012	Android	Outsource
The Agricultural Census 2013	Android	Outsource
The Labour Force Survey 2013 – present (with additional module questionnaires)	Android	Own-developed
The Opinion Survey 2014 - present	Android	ODK

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Census/Survey	OS (Window/Android)	Software for data collection
The Household Basic Information Survey 2014 - present	Android	Own-developed
The Health and Welfare Survey 2015	Android	Survey Solutions
The Reading of Population Survey 2015	Android	Survey Solutions
The Thailand Multiple Indicator Cluster Survey: MICS 2015	Window	CSPro
The Survey of Population Change 2015 - 2016	Android	Out-sourced

First time of CAPI software using Tablet PCs

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The Tablet PCs were put into use by the NSO for the first time for the Thailand Multiple Indicator Cluster Survey (MICS) 2012, with support from UNICEF.

↪ **It is also the first time globally that Tablet PCs have been used for any MICS, which are carried out with support from UNICEF in countries around the world.**

MICS 2012

↪ A company was outsourced to develop data entry software for the Tablet PCs using the Android operating system.

↪ The data were entered during fieldwork on 225 Tablet PCs using data entry software and the data from each Tablet PC were sent directly to the server computer in the provincial office via internet.

From MICS 2012, we learnt that

The use of Tablet PCs has eliminated the lengthy process of traditional data entry in which surveyors had to manually key-in answers from the paper-based questionnaires when they returned to their provincial offices from the field.

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From MICS 2012, one of our enumerator said that

"Tablet PCs are easy to use, save a lot of time and ensure accuracy of the data collection as the software automatically cross-checks the answers for us. I think it's a great innovation of our work now and in the future."

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CAPI and survey management technologies in the Agricultural Census 2013

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"The collection of basic information on fundamental structure of agriculture which was obtained from all agricultural holding throughout the country"

⤷ Interviewing every agricultural holding in the whole kingdom

⤷ Data collection: May 1 – 31, 2013

⤷ Enumeration Area (EA)
- The total of EA: 129,084 EAs
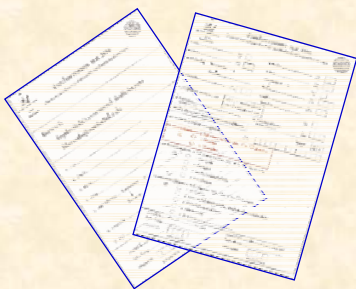- EA of Agriculture: 87,434 EAs (≈ 68%)

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Enumerators ;

   - Village agricultural volunteer: 15,411 persons

Supervisors ;

   - District agricultural extension officer: 3,081 persons

   - National Statistical office's officer: 2,604 persons

**2003
agricultural census**

**Lesson learn from
MICS 2012
use Tablet**

**The Agricultural
Census 2013;
use Tablet**

A company was outsourced to develop data entry software for the Tablet PCs using the Android operating system and develop the web application for fieldwork monitoring.

Infrastructure
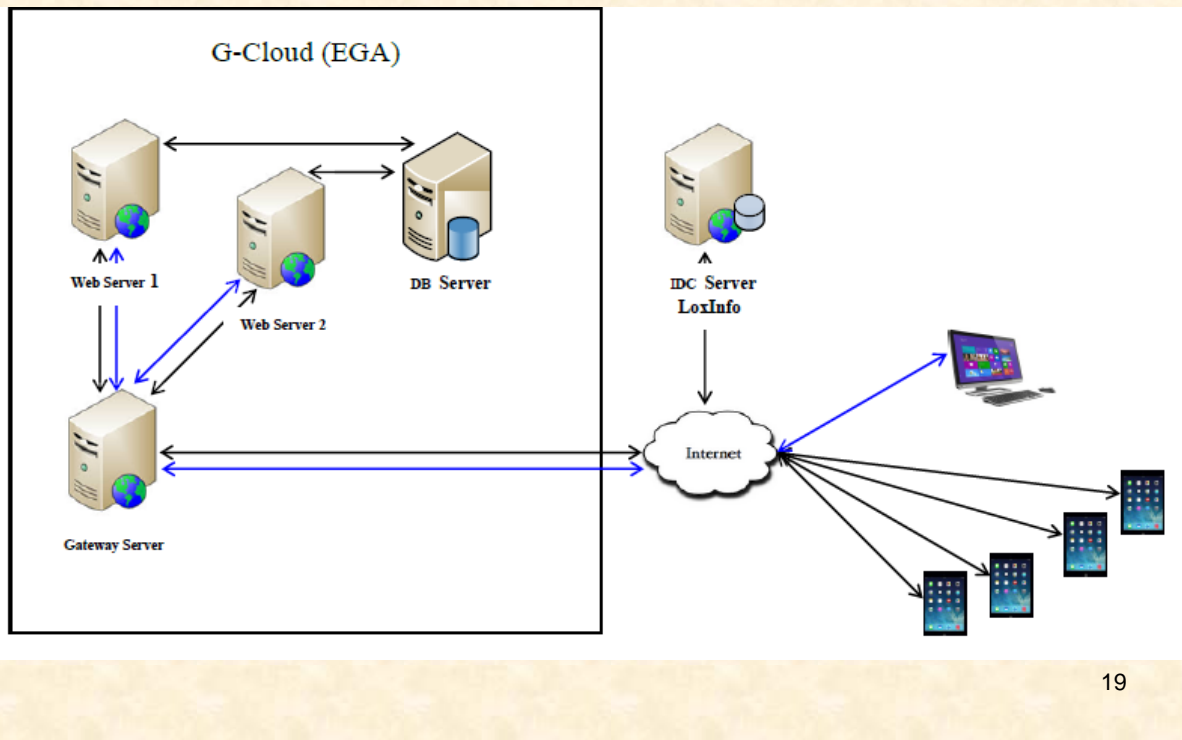
Innovation

1. **Using tablet for data collection instead of a traditional paper form in order to improve the efficiency of field operation**

   1) Be able to immediately check for data consistency and completeness
   2) Reduce time for data processing; be able to present the result in timely manner
   3) Be able to identify the location for the field operation by of each enumerator's work by using GPS (Fieldwork Quality Control)
   4) Be able to constantly upload data to the sever in the cloud computing

Innovation *(cont')*

2. **Using Web Application for monitoring progress in the field operation (real time)**

   1) **Be able to track the field work of each enumerator linked to the maps on the tablet**

   2) **Be able to monitor progress work in the field operation at all levels, in order to immediately solving the problem in case of delay field work or unmet deadline.**

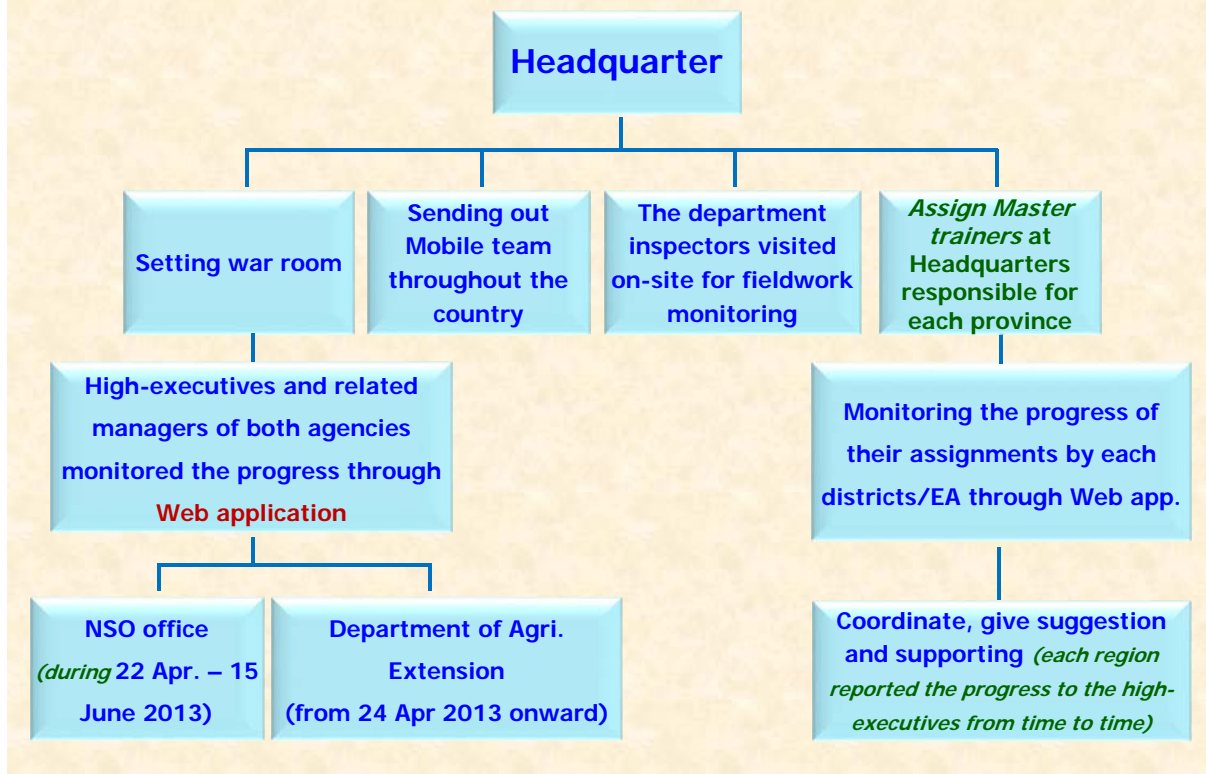**Using Web Application for monitoring and tracking the progress of fieldwork operation**

Consists of
      - **Monitoring at Headquarter base**
      - **Monitoring at Local office base**

By setting the target of tracking the progress (from the listing form) as Real Time

Structure of census operation management

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Headquarter
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- Setting war room
- Sending out Mobile team throughout the country
- The department inspectors visited on-site for fieldwork monitoring
- *Assign Master trainers* at Headquarters responsible for each province

High-executives and related managers of both agencies monitored the progress through **Web application**

Monitoring the progress of their assignments by each districts/EA through Web app.

NSO office *(during* 22 Apr. – 15 June 2013)

Department of Agri. Extension (from 24 Apr 2013 onward)

Coordinate, give suggestion and supporting *(each region reported the progress to the high-executives from time to time)*

Tracking system in field operation

สำมะโนการเกษตร พ.ศ. 2556

สำนักงานสถิติแห่งชาติ

Welcome back : คุณนางพีลาภ รักไทย
สำนักงานเกษตรตำบลทับเที่ยง
อ.เมืองตรัง จ.ตรัง

หน้าหลัก   ค้นหาข้อมูล ตรวจสอบและอนุมัติ   ข้อมูลพนักงานแจงนับและเขตแจงนับ   รายงาน   ออกจากระบบ

พนักงานแจงนับ

Province, District, Sub-district, ID of enumerator, Fieldwork date

เงื่อนไขสำหรับการค้นหา

จังหวัด : ตรัง   อำเภอ : เมืองตรัง
ตำบล : -- Select --   รหัสพนักงานแจงนับ :
วันที่ทำการสำรวจ : 18/03/2556 (วว/ดด/ปปปป)   ถึงวันที่ : 26/03/2556 (วว/ดด/ปปปป)

ค้นหา   ล้างข้อมูล

Tracking system in field operation

ติดตามพนักงานแจงนับ

รหัส พนักงาน แจงนับ	รหัสผ่าน	ชื่อพนักงาน แจงนับ	จังหวัด	อำเภอ	ตำบล	เบอร์ พนักงานแจง นับ	Email พนักงาน แจงนับ	Serial เครื่อง Tablet	Serial แบตเตอรี่ สำรอง	Sim No.	สถานะ การใช้ งาน	แก้ไข	ลบ
9240001	1234	นางสาวกรอง ทอง นวลทอง	ตรัง	เมืองตรัง	ทับเที่ยง	0815368511	trang@nso.go.th	123	123	123	🟢	✏️	❌
9240002	1234	นางสาวฉัตรวดี ฤทธิมา	ตรัง	เมืองตรัง	ทับเที่ยง	0813709280	trang@nso.go.th	123	123	123	🟢	✏️	❌
9240003	1234	นางสาวนิศรา รอดภัย	ตรัง	เมืองตรัง	ทับเที่ยง	0898739391	trang@nso.go.th	123	123	123	🟢	✏️	❌
9240004	1234	นางสาวณัฐรัตน์ เกิดภิบาล	ตรัง	เมืองตรัง	ทับเที่ยง	0840562720	trang@nso.go.th	123	123	123	🟢	✏️	❌
9240005	1234	นางสาวราณี เจริญฤทธิ์	ตรัง	เมืองตรัง	ทับเที่ยง	0817979841	trang@nso.go.th	123	123	123	🟢	✏️	❌
9240006	1234	นางสาววิภา สัญวงศ์	ตรัง	เมืองตรัง	ทับเที่ยง	0869535711	trang@nso.go.th	123	123	123	🟢	✏️	❌
9240007	1234	นายปิยะวัฒน์ ไกรสิน	ตรัง	เมืองตรัง	ทับเที่ยง	0836424366	trang@nso.go.th	123	123	123	🟢	✏️	❌
9240008	1234	นายณรงค์ฤทธิ์ ฟองพิทักษ์	ตรัง	เมืองตรัง	ทับเที่ยง	0815368511	trang@nso.go.th	123	123	123	🟢	✏️	❌
9240009	1234	นายอภิชาติ ทิพย์สิงห์	ตรัง	เมืองตรัง	ทับเที่ยง	0831032848	trang@nso.go.th	123	123	123	🟢	✏️	❌
9240010	1234	นางสาวจิราภ รณ์ ฤทธิมา	ตรัง	เมืองตรัง	ทับเที่ยง	0818931761	trang@nso.go.th	123	123	123	🟢	✏️	❌

Total record = 19 1 2 ▶   Page 1 ▾

➕ เพิ่ม

ID of enumerator, password, name of enumerator, province, district, sub-district, phone number, e-mail, serial no. of the Tablet device, serial no. of the reserve battery, Sim card no., work status, correction, deletion

Tracking system through Web Application as Real time basis
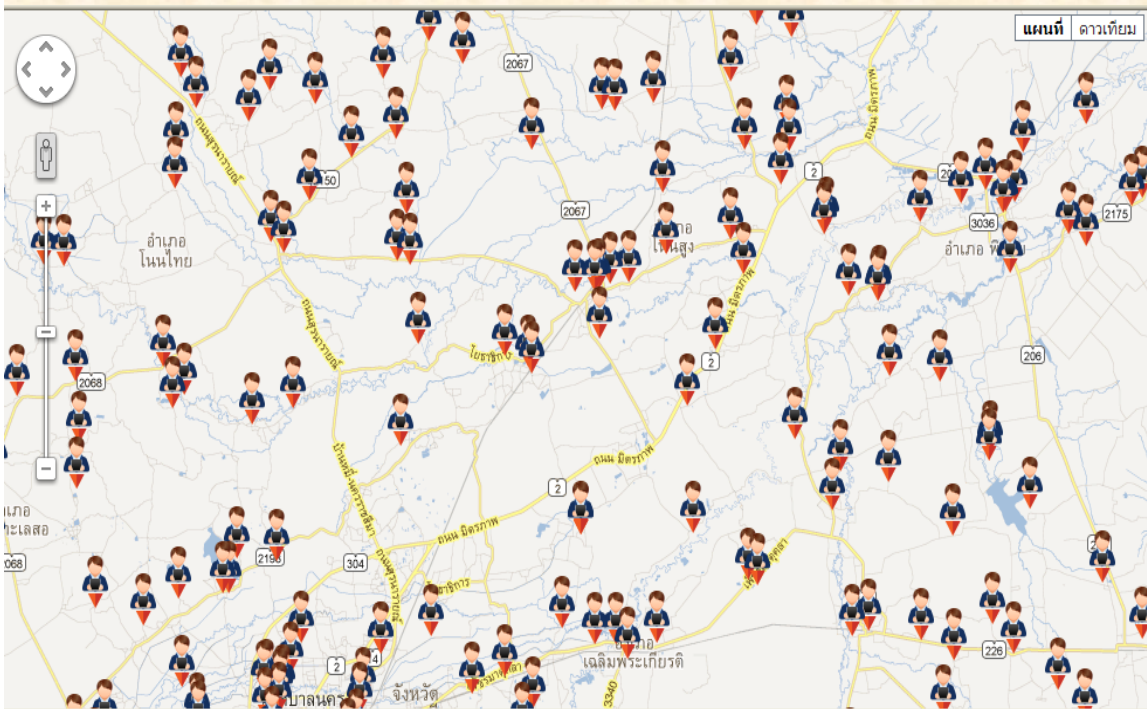
Tracking the progress *(the whole kingdom)*

กราฟร้อยละครัวเรือนทั้งสิ้นและผู้ถือครอง
ทำการเกษตร (F4) และ (F11) : (EA>20)
ทั้งหมด

กราฟความก้าวหน้าทั้งหมด

แสดงกราฟ

ข้อมูลกราฟความก้าวหน้าการสำรวจ ณ.วันที่ 13 มิถุนายน 2556 เวลา 10:28 น.

F4 ■ F11

ยังไม่สำรวจ: 10 / 20.01
สำรวจแล้ว: 90 / 79.99
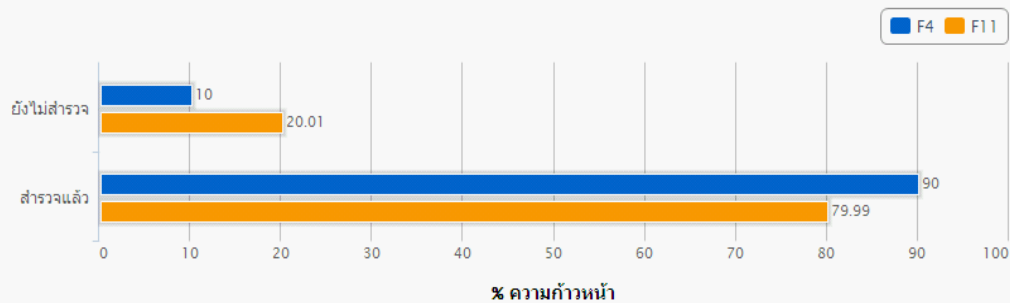
% ความก้าวหน้า

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Tracking the progress *(each province)*

กราฟร้อยละผู้ถือครองทำการเกษตรทั้งสิ้น
(F11) : (EA<=20) และ (EA>20)
แยกตามจังหวัด

เลือกการเรียงลำดับเพื่อแสดงรายงานกราฟ

แสดงข้อมูล : ◉ ทั้งหมด ◯ มากกว่า 100 %
เรียงลำดับตาม % ความก้าวหน้า : ◉ จากมากไปน้อย ◯ จากน้อยไปมาก

แสดงกราฟ

ข้อมูลกราฟความก้าวหน้าการสำรวจ ณ.วันที่ 13 มิถุนายน 2556 เวลา 10:40 น.

F11

ภูเก็ต: 132.97
พัทลุง: 100.85
กทม.: 100.8
ระนอง: 99.67
พิจิตร: 98.15
นราธิวาส: 97.84
กำแพงเพชร: 97.42
น่าน: 96.86
สตูล: 95.52
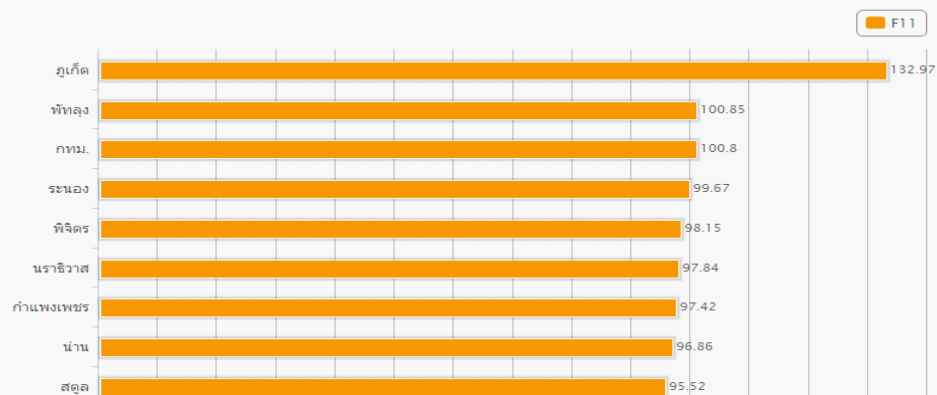
Some main issues arising from fieldwork operation

1. Internet Network

      - some area don't have Internet

      - some area have low signal of Internet

Solutions

1) Interview with offline mode (send data later when Internet is accessible) and/or send out the provincial officers to copy the data, and send the data at provincial office

2) Ask the supervisors/enumerators to meet at some particular places which equipped with Internet access (for example, the district agricultural office, the ICT community learning center, etc.)

3) Install the Router at the community center for the Internet accessible

Some main issues arising from fieldwork operation (cont')

2. Synchronizing the data to the Server : especially during the first synchronization which took long time / could not send the data

Solutions

1) Schedule the synchronization period of each region at different time

2) Frequently synchronize the data but not with a big size of data

3) Increase 'Time out' (the supervisors can check the data at all time)

4) Reschedule the monitoring period to be during 9.00 p.m. – 7.00 a.m.

5) Separate the Server for the monitoring system and the data storing (data sync. from Tablet) system

6) Request the server agency to adjust the CPU of the Cloud Server as from $8 \rightarrow 16 \rightarrow 32$ Core

Some main issues arising from fieldwork operation (cont')

3. Geographical and Climate Conditions

    - Mountain area

    - Islands

    - Rainy area (mostly at the southern region)

Solutions

1) Allow enumerators to stay overnight in some particular area

2) Hire the boat to the particular islands

3) Wait for the rain to stop and spread out the enumerators at one time

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The lessons learnt for further improvement in next census

- Field work operators

    - Skill for using technology

- Server

    - Insufficient performance of server

- Tablet

    - Insufficient Memory

- Application for data entry

- Internet network

- Database management

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First time implementing Survey Solutions

A brief history

✦ **27 – 30 May 2014, two NSO colleagues attended "World Bank Survey Solutions Software Course" at Washington D.C., supported by World Bank.**

✦ **17 October 2014 and 6 November 2014**
"Introduction the Survey Solutions software"
to the NSO high executives and relevant units

✦ **8 December 2014**
"Pre-test Survey Solutions with the Labour Force Survey questionnaire"
Some enumerators were invited to join the pre-test.

Supported from World Bank

✦ **Consultation via E-mail, Skype, Video Conference**

✦ **Experts visiting;**
  - **7 November 2014; before the pre-test**

  - **2 – 6 February and 23 February – 6 March 2015; for the implementation of Survey Solutions with the Health and Welfare Survey 2015**

Real implementation of Survey Solutions with the Health and Welfare Survey 2015

☀ **Sample size: 30,000 households**

☀ **Data collection: March – April 2015, in every province**

☀ **Enumerators: 476 persons**
  Supervisors: 77 persons

☀ **Software version: 3.1.2 ⟶ 4.1.101**

Real implementation of Survey Solutions with the Health and Welfare Survey 2015 (cont')

Tablet specification

Device name: Sonore TAB710Q-3G

Operating system: Android 4.2.2

CPU: Quad Core 1.2 GHz

RAM: 1 GB

Screen size: 7.85" 1024x768

Camera: 2MP front-facing, 5MP rear-facing

GPS: Yes

Storage: 16 GB

Headquarter

Headquarter

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Supervisor

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Impression with the Survey Solutions software

♥ **Simple yet flexible system for the non-expert users (a kind of blended user between subject-matter and programmer)**

♥ **Functionality for data capturing and survey management**

♥ **Tablet-based with ability to display and navigate through multi-level large questionnaire**

♥ **Support of panel surveys and complex validation algorithms**

♥ **Free software**

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Expand the use of Survey Solutions with other survey

The second survey using Survey Solutions software was the Reading of Population Survey 2015, conducted during May – June 2015 (just right after the HWS2015).

A plan to expand Survey Solutions with other surveys was discussed between NSO and WB, however due to The budget constraint and the issues related to the regulation on hiring foreigner consultation, since then Survey Solutions was discontinued.

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Thank You
Q & A

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