SEASONAL AGRICULTURE SURVEY (SAS)

The Overview of the Multiple Frame Sample Survey in Rwanda

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Outline

- Introduction
- What is MFS?
- Stratification
- Sampling
- Data collection
- Survey documents and equipments
- Survey documents

1. INTRODUCTION?

- Useful and timely agricultural and rural statistics are crucial to both policy makers in Gov, NGOs and private sector.
- Scientific principles of probability sampling, and not subjective methods, have been applied in the design of Seasonal Agricultural Surveys (SAS) to ensure the data collected would be comprehensive, credible, accurate and timely for food security monitoring, programme evaluation, national accounting and other purposes.
- The survey is conducted by the National Institute of Statistics of Rwanda (NISR) in collaboration with the Ministry of Agriculture (MINAGRI).

2. What is Multiple Frame Survey

- The Multiple Frame Survey (MFS) design in Rwanda combines a probability sample of segments selected from an area sampling frame, with a complementary list of Large Scale Farms (LSF) to be completely enumerated.
- ***Area Frame Construction***: Most area frames are constructed by using satellite imagery and dividing the land into land-use and domain strata. In Rwanda, AF was constructed using the orthophoto imagery from RNRA.
- ***List Frame:*** The list of LSF includes those farms with the largest area for a given crop or those with the largest number of livestock and the reporting unit is the *farm.*

3. Stratification

- Theoretically, land-use strata are defined by the proportion of cultivated land, predominance of certain crops, special agricultural practices, average size of cultivated fields, agro-urban areas, or other land use characteristics.
- The entire land area of Rwanda was subdivided into 12 non-overlapping land-use strata.
- Although Area Frame is not efficient in estimating rare items or items concentrated in small geographic areas, an ad-hoc stratification enables the provision of good estimates of crop areas. In this regards, a special stratum for rice needed to be defined.

3. Stratification (Cont)

Strata	Area_SQkm
Intensive agriculture (Season A and B)	14,686
Intensive agriculture (Seasons A&B&C)	484
Marshalands for other crops	289
Marshalands for rice	949
Rangelands	183
Non cropland	1,305
Urban area	243
Water	439
National Parks	1,370
Uncultivated marshalands	2,307
Forest	357
Tea plantation	2,680

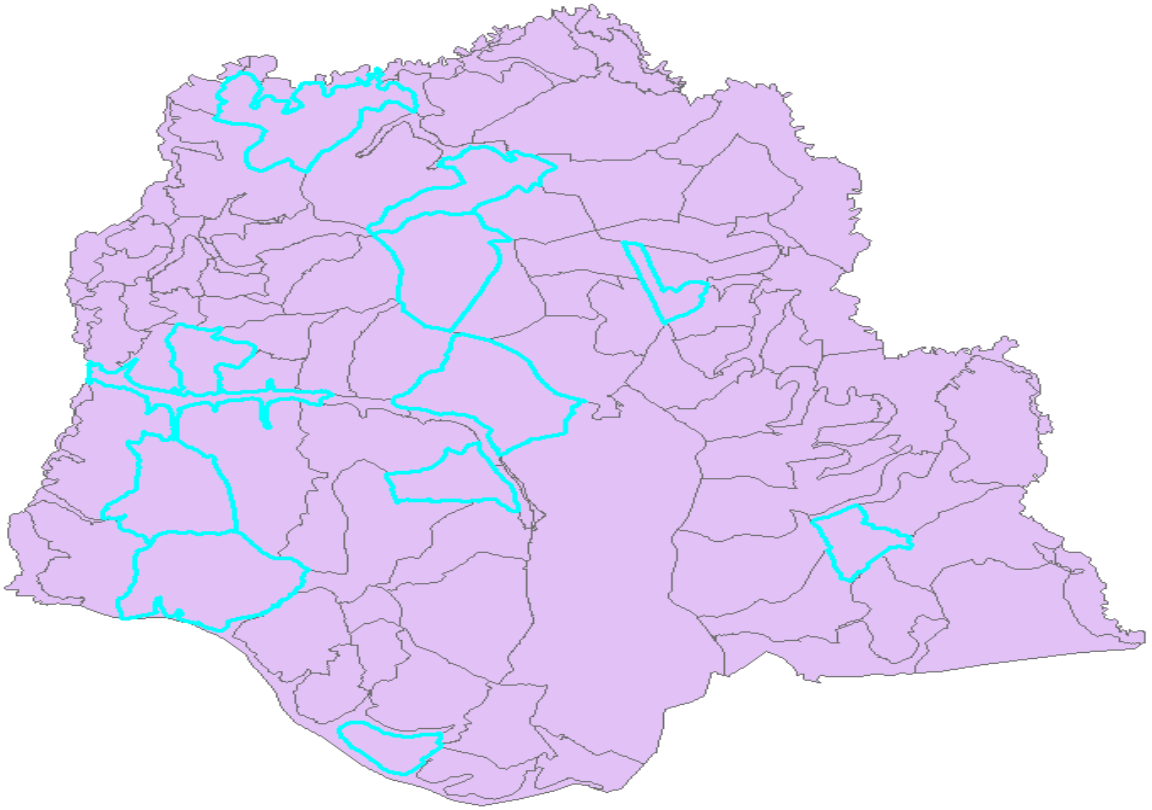
3. Sampling

- Based on work previously done, the total sample size was determined to be n = 540 segments in all strata as follows:

Strata	Area_SQkm	No of Segments	%
Intensive agriculture (Season A&B)	14,686	340	63
Intensive agriculture (Season A&B&C)	484	48	9
Marshalands for rice	949	64	12
Marshalands for other crops	289	40	7
Rangelands	183	48	9
Total	16,591	540	100

- Random replicated sample with replicates in each stratum to allow rotation and measure yearly changes.

PSUs in Bugesera district



Our selected PSU

Selected segment

Photo 1: Example of Segment Orthophotos used in Pilot Survey

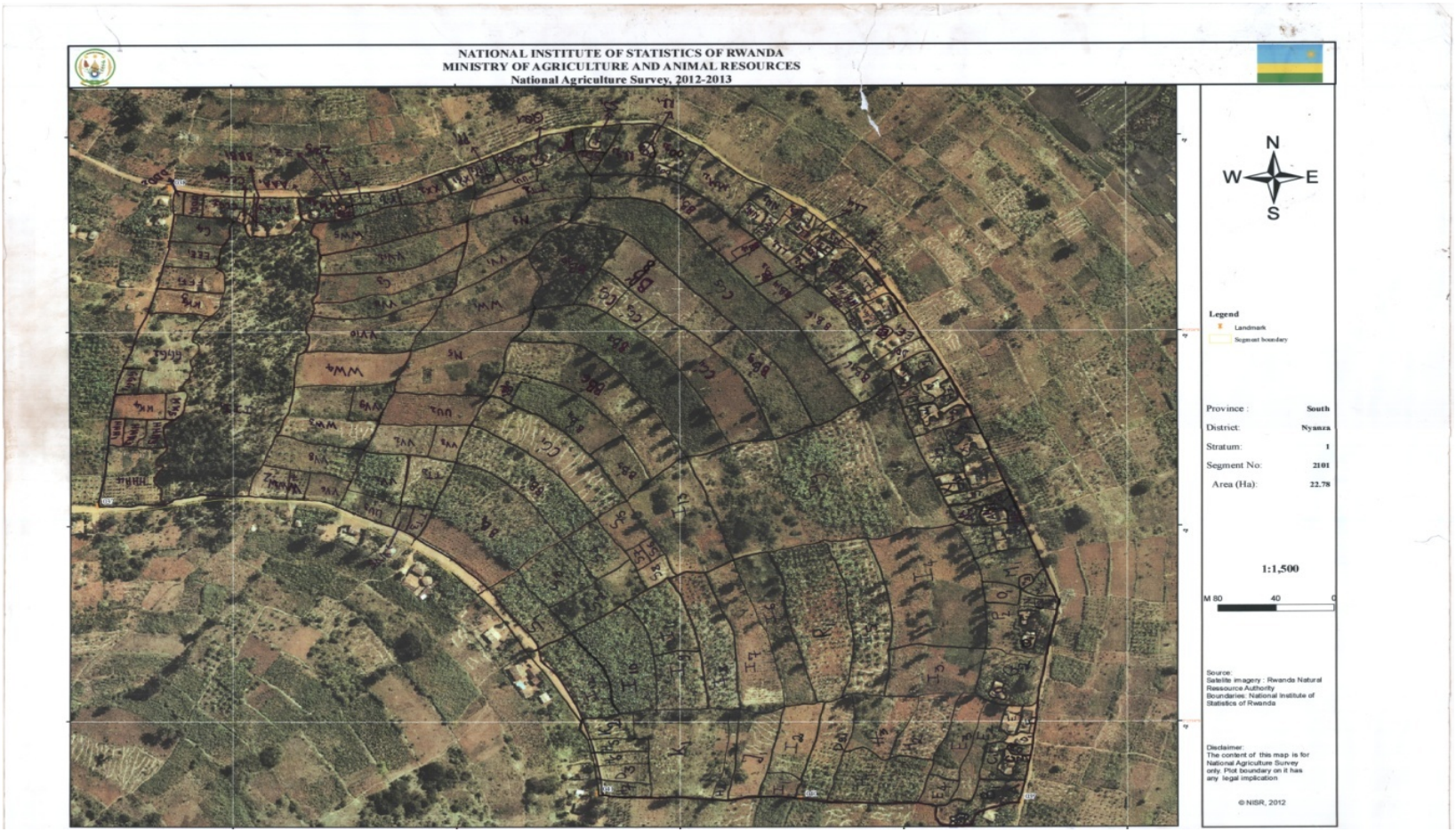
3. Data collection

- For seasons A and B data collection is done in two phases.
  - The first phase is for crop area measurement and cost of production (inputs)
    - The first step is screening activity and consists of identification of all tracts and plots (land use) inside the segment and marking them on the segment map with orthophoto imagery. For the agricultural land the area and type of crop grown is identified and for non-agricultural land the type of land use i.e. Building, Forest, etc. is also identified.
    - The second step is data collection on cost of production (inputs)
  - The Second phase is for estimation of production (yield)
- For the short season C data collection is done in one phase that combines area measurement and estimation of production

3.2. Summary SAS questionnaire content

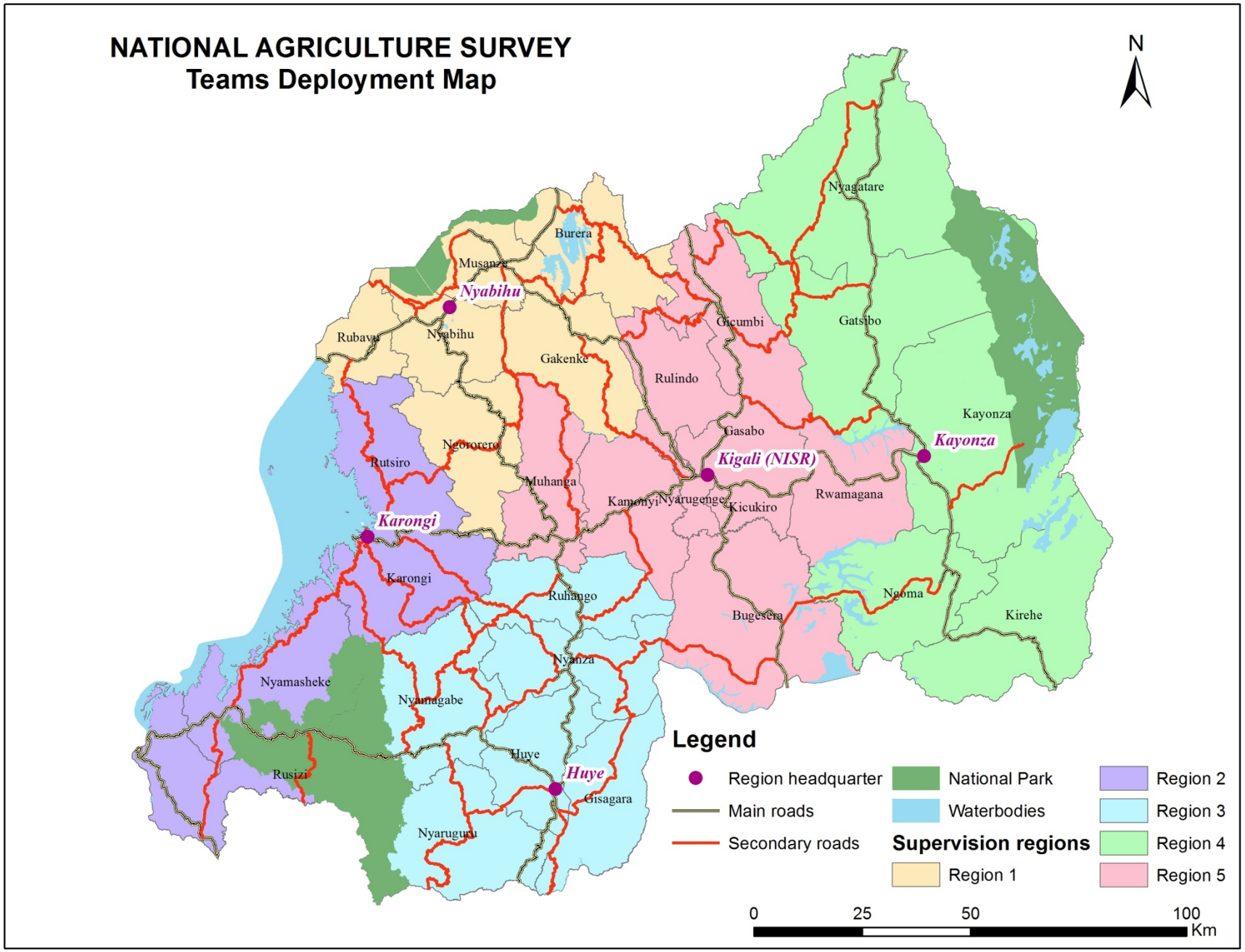
PHASE 1	PHASE 2
1. General characteristics of the agricultural holding; 2. Field staff information; 3. Planted area, area to be planted; 4. Crop density; 5. Planting and harvesting dates for each crop; 6. Intermediate consumption & inputs; 7. Amount of seed, by type; 8. Amount of fertilizers used; 9. Livestock, Animal characteristics & products; 10. Capital formation	1. General characteristics of the agricultural holding; 2. Field staff information; 3. Intermediate consumption & inputs; 4. Actual quantity harvested and/or to be harvested.

Photo 2: One example of a delineated Segment Orthophotos by enumerators *(Nyanza: Segment # 2101)*



5. Field documents and Equipments

- Field Documents
  1) a screening questionnaire or form;
  2) a farm questionnaire; and
  3) Segment map
  4) Enumerator's manual (how to collect and record data).
- Equipments
  1) a vehicle for 4 enumerators and 1 team leader;
  2) GIS Tools (PDA, GPS, Laptops)
  3) measurement tapes, rulers, pens, pencils, calculators, weighing scales
  4) rain coats, boots, umbrella, first aid equipment


NATIONAL AGRICULTURE SURVEY
Teams Deployment Map
N
Nyagatare
Burera
Musanze
Nyabihu
Gicumbi
Gatsibo
Rubavu
Nyabihu
Gakenke
Rulindo
Kayonza
Gasabo
Kayonza
Ngororero
Rutsiro
Kigali (NISR)
Muhanga
Kamonyi
Nyarugenge
Kicukiro
Rwamagana
Karongi
Karongi
Ruhango
Ngoma
Bugesera
Kirehe
Nyanza
Nyamasheke
Nyamagabe
Huye
Rusizi
Huye
Gisagara
Nyaruguru
Legend
Region headquarter
Main roads
Secondary roads
National Park
Waterbodies
Supervision regions
Region 1
Region 2
Region 3
Region 4
Region 5
0
25
50
100
Km

3. Data processing and analysis

- Segment maps are digitalized using GIS technology from which the areas of plots are obtained.
- To ensure appropriate matching of data in questionnaires and plots area measurements from GIS unit, a lookup file is integrated in the CSPro data entry program to confirm the identification of each agricultural operator.
- Thereafter, data is entered in computers, edited and summarized in tables using SPSS statistical package.
- Results of the survey will be presented for each of the three agricultural seasons.

7. Lesson learnt

- Area Frame sampling + List Frame Sampling = MFS
- Stratification is key to success
- Availability of good imagery and GIS skills
- Adequate field work materials and equipment
- Link the Population Census to Agriculture

Thank you

for

your attention!!!