
The Agricultural Survey Improvement Program

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Main approaches for agricultural statistics

- “Exhaustive” data: Subjective estimates by local experts, administrative data, census, etc...
 - Problems: completeness, objectivity.
- Data on a sample
 - List frame: **cheaper and easier if lists (agricultural census) are available and updated and if farmer’s answers are reliable**
 - Area sampling frame: **The population is based on the geographic borders of the region**
 - completeness is easier to ensure
 - Multiple frame (combining list and area frame)

For general purpose or environmental area estimation, it is difficult to make without area frame sampling

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Area frames

Segments

with physical boundaries

- Area frame long and expensive to set up on a geometric grid (squares, rectangles, hexagons)
- Some problems to match the grid with a detailed stratification
 - Similar estimation accuracy with the same sample size

Points

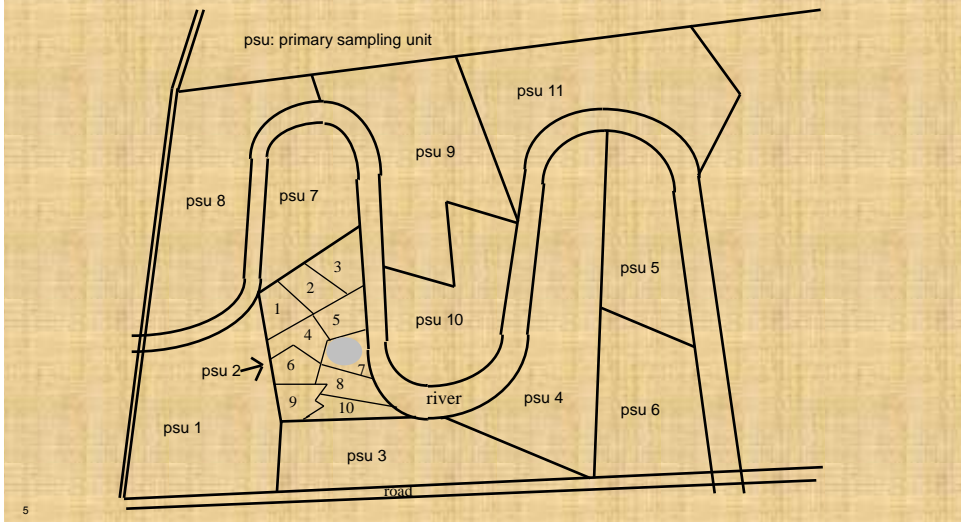
Two-stage frame (points clustered in “segments”)

Single stage

- Simple random, systematic, stratified, etc...

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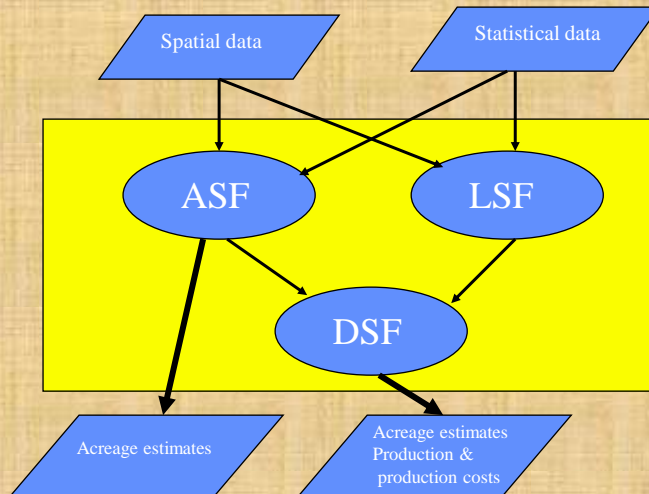
Area frame of segments with physical boundaries



Definition of the objectives

- **Arable farming**
 - Annual estimation of area of major crop
 - Wheat, barley, alfalfa, potato, summer crops, cucumbers
 - Annual estimation of production of major crops
 - Wheat, barley, alfalfa, potato, summer crops, cucumbers
 - Annual production estimats
- **Annual estimation of major livestock**
 - industrial, traditional
- **Annual estimation of area of major orchards**
 - Grape, Apples, Pear...

Conceptual presentation of the survey design



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Method

- **Dual frame agricultural survey:**
 - **Area frame sample**
 - Acreage and production of arable farming
 - Acreage of major orchards
 - **List frame sample**
 - Livestocks
 - services

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Major activities

- **Area frame sampling**
 - Stratification
 - Design of primary sampling units
 - Design of secondary sampling units
 - Identification of field segments
 - **Field data collection**
 - Area
 - List
 - Data processing

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Stratification

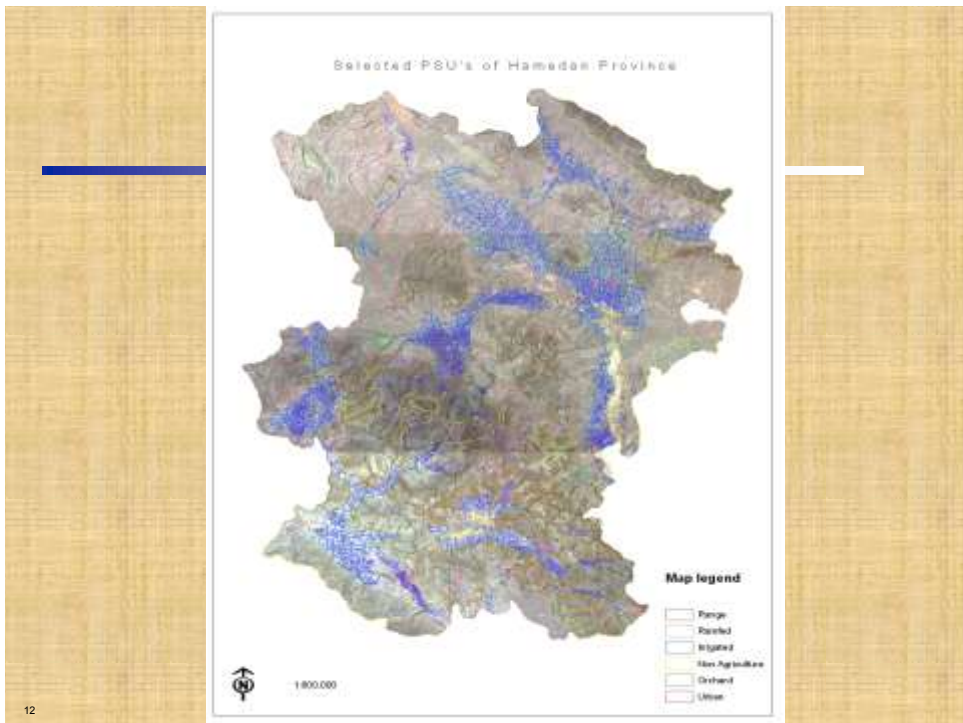
- **Based on satellite data,**
 - AWIFs data (swatch of 740 km with 60 m resolution)
 - Land sat ETM+,
 - Land use map
 - Topographic maps
 - Manual image interpretation

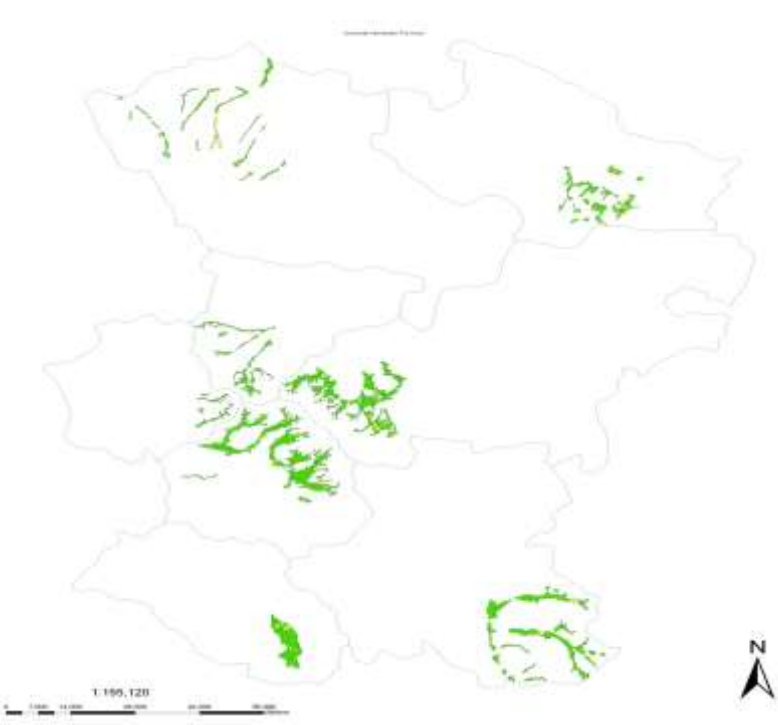
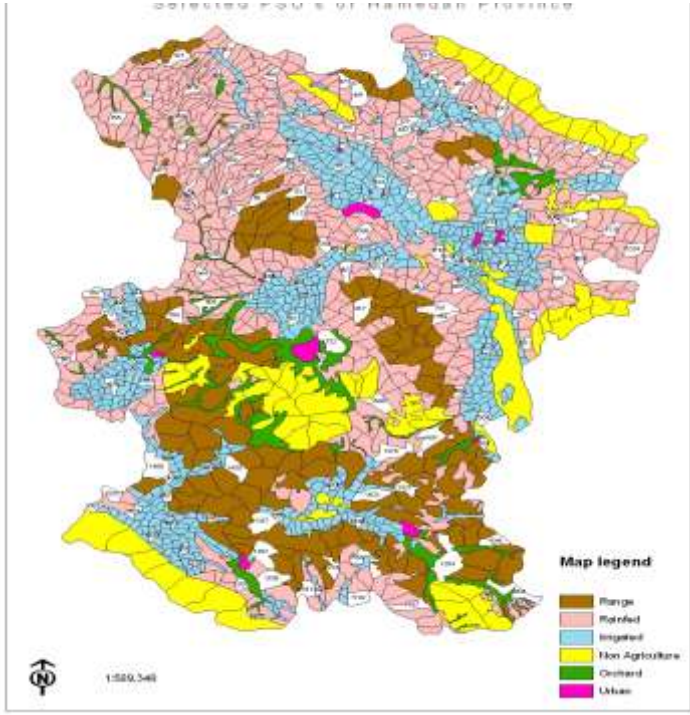
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Strata

- Irrigated agriculture
- Rain fed agriculture
- Orchard
- Rang land
- Non agricultural

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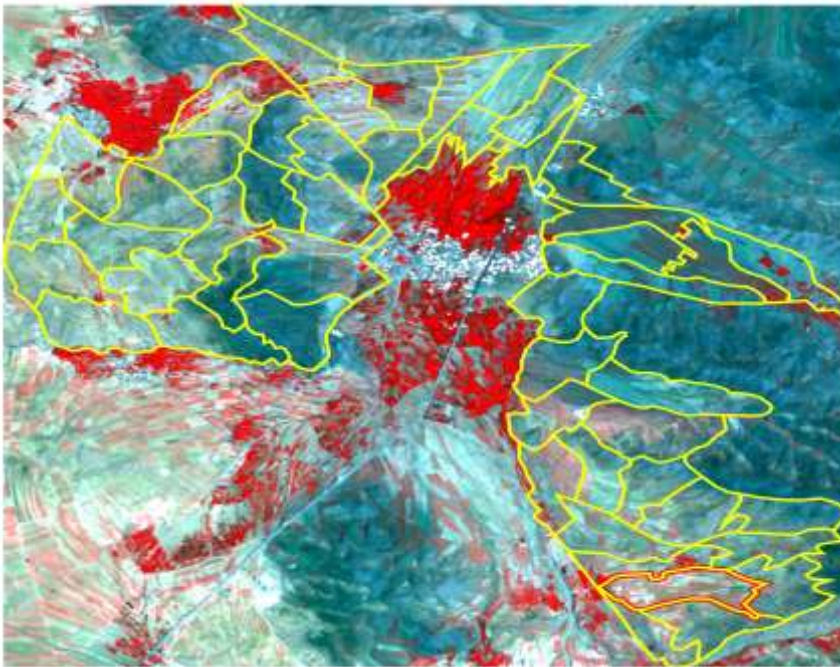




Design of primary sampling units

- Based on:
- Color composite AWIF
- Color composite Landsat ETM,
- Color composite LISS-3 or LISS-4 or SPOT
- Manual image interpretation

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Design of secondary sampling units

- Based on:
- Color composite Landsat ETM,
- Color composite LISS-3
- IRS- pan, or SPOT pan
- Manual image interpretation

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Design of secondary sampling units

- Based on:
- Color composite Landsat ETM,
- Color composite LISS-3
- IRS- pan, or SPOT pan
- Manual image interpretation

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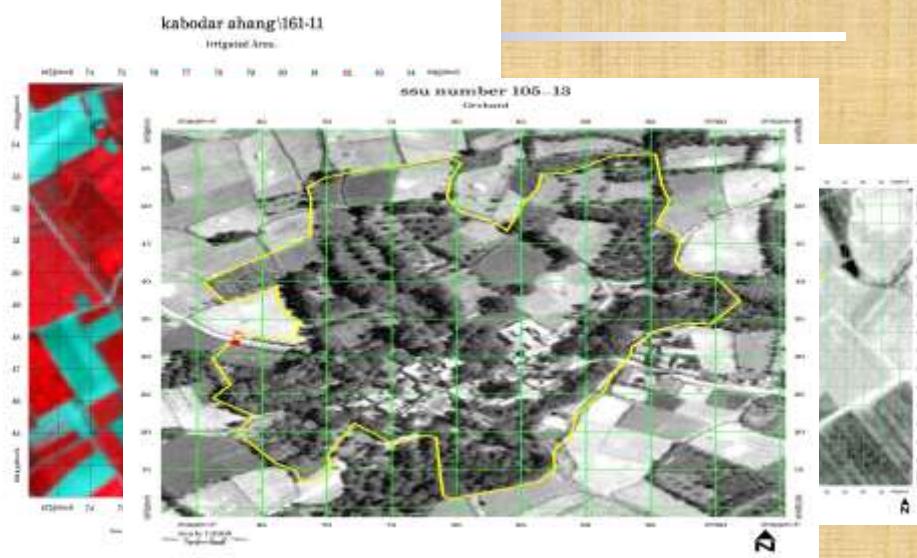
Dividing the SSU into SSU's in an irrigated stratum



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SSU's selection & producing photomaps for survey

- Delineation of SSU's boundary on satellite images & printing photo map



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Field data collection

- **Round-1**
- **Identification of the segments**
- **Preparation for data collection**
 - Identification of operators in each segment
 - Verification of their holdings inside
 - Collection of information outside of the segment (township)
- **Collection of crop type for area estimation**
- **Collection of livestock information**
- **Collection of production information**
- **Round-2 (area, production and other information)**
 - Production information
 - Measurement of plots
 - Based on the HH info on the field

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Results

Table 3: Area estimates for Cops in Hamedan province

crops	Total In irrigated land	Total In rainfed land	Total In range land	Total in province
Wheat <u>rainfed</u>	34622	261957	47941	344521
Wheat irrigated	77186	19278	1838	98302
Barley <u>rainfed</u>	11824	12840	14852	39516
barley irrigated	25395	5417	171	30983
Maize	3060	965	0	4025
potato	17965	348	166	18479
Beans	784	84	0	869
alfalfa	50137	5919	3644	59701
other silage	4274.38	4607	8147	17029
other crops	25719	30431	27733	83883
Total	250 958	341 847	104 493	697 307

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Conclusions

The evaluation of the whole survey work in Hamedan province through the final survey findings were good enough ensuring technically that the extension of this new methodology to other regions would be without any risk and particular problems. However, decision makers have to determine when and where the extension of this new methodology should be and make sure to have the necessary facilities and staff competency for processing data and building a good data base system.

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Issues in application of RS, GIS & GPS Technologies in agricultural statistics and proposed solutions

The most important issue is availability & accessibility of remotely sensed data. Because of international sanction against Iran, ordering & purchasing satellite data is very difficult. So we need to list & organize existing data & apply them for similar projects in the MOJA. In this regards two main activity have been done:

1. Activating council of RS & GIS users of the MOJA in order to coordinating RS-GIS activities & decreasing implementation of parallel projects.
2. Design & development of spatial data clearing house the MOJA in order to inform data users of existing data like satellite data, aerial photograph, topographic maps in different scales, thematic maps, GIS information layer & so on.

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Issues in application of RS, GIS & GPS Technologies in agricultural statistics and proposed solutions(continue)

Regarding international sanctions against Iran purchasing RS/GIS software is very difficult so council of RS & GIS users of the MOJA in coordination with the national council of GIS Users decided to change to open source RS & GIS software.

Dual frame sampling surveys is capable to produce reliable information on area and production but doesn't produce any map, so combination of DSF with modern digital image processing for producing precise spatial statistics is a field for future research.

Application of RS, GIS & Crop growth simulation models to monitor & forecast of crop production is a field for future research. (the MOJA is testing use of SEBAL model)

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**Questions
Comments
???**

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