



Title: Challenges of obtaining Land Use data using conventional methods: Opportunities for Remote Sensing

Mphethe Tongwane

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Outline of Presentation



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Introduction to Lesotho



- Lesotho is a small mountainous country landlocked by South Africa. Area approximately 30,355 Km² of which of 9% is arable.
- About two thirds of the country is mountainous (highlands).
- Lowlands/highlands are densely/sparsely populated.
- Most of the economic activities are concentrated in the lowlands which primarily covers the last third of the country's land.
- Highlands primarily consists of rangelands and large animal stocks.
- Most places in the highlands are not easily accessible.
- Vandalism of surface equipment is a major concern in the highlands.
- Land degradation is one of the major factors that threaten national development.



- The main challenge in the country is exchange of data.
- At the moment there is no clear policy or legal framework on data exchange, therefore institutions do not feel mandated to disseminate their data sets.
 - This poses a problem for updating of the metadata bases and,
 - Affects state of environment reporting processes and other livelihoods related assessments.
- Land degradation is perceived as one of the main effects of land use change and is not adequately monitored
- Data gaps are one of the problems that made it impossible to determine trends in the state of environment, and more importantly, projecting future scenarios – State of Environment Report.
- A common method for the collection of environmental statistics is to identify and compile the existing environmental data, within and outside the statistical institution.
 - This is done in an ad-hoc manner for most indicators, therefore will depend on the scope and timing of the specific project funding the collection.
 - This applies also to data collected from administrative registers, which does not always merge with data from surveys. That is,
 - There are spatial and temporal data gaps, where some indicators might be updated while others are not.
- Dissemination of the available data and information not always in a timely manner and products not user friendly



Improvements due to Remote Sensing

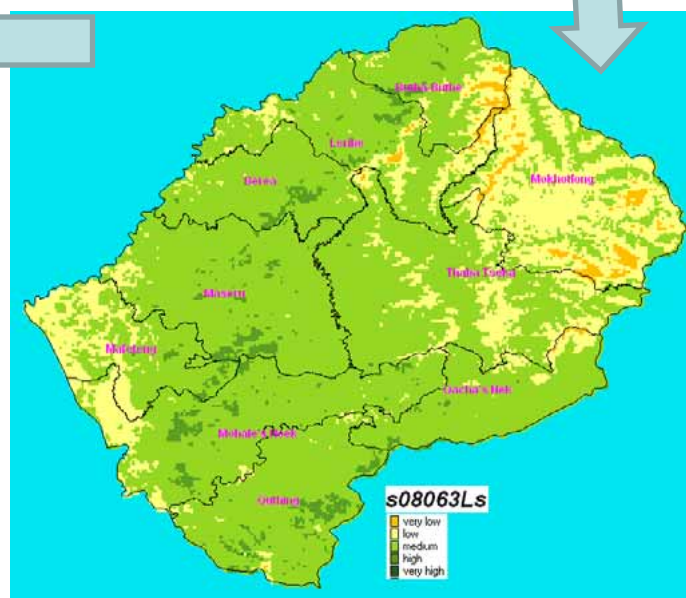
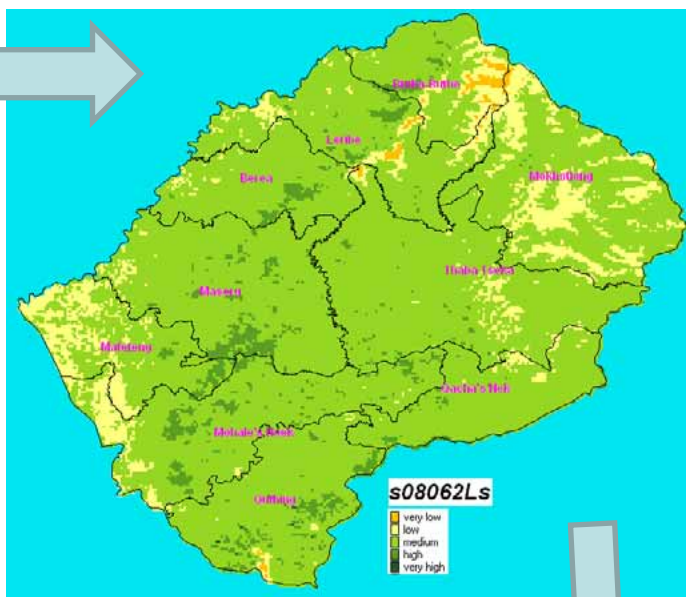
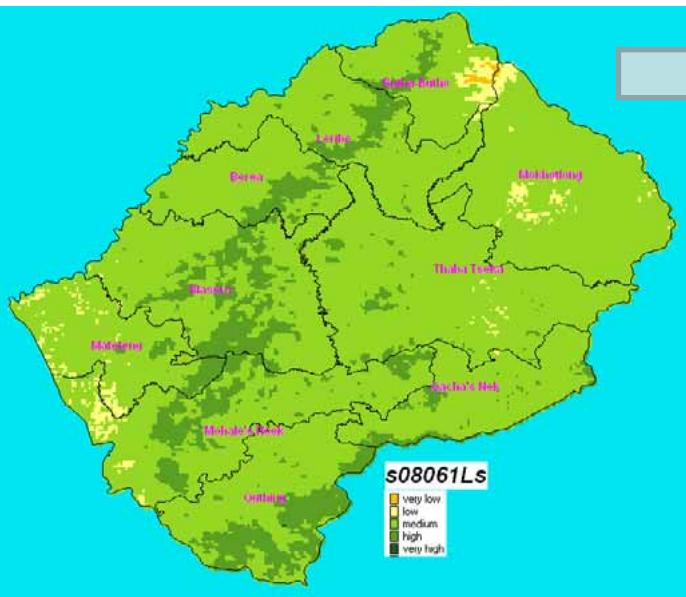


There have some improvements in these areas:

1. Weather Forecasting
2. Publications
3. Data verification
4. Filling data gaps
5. Reduction of severe weather causalities



Remote Sensing in Season Monitoring



Spot NDVI images provide very important early warning information when monitoring agricultural season.

Areas of vegetation development/deterioration can be identified as season progresses.

these images when used in association with meteorological and other information help make informed early warnings.



What makes Land Use and Environment vulnerable



- Landscape/topography
- Poor land use management
- Climate variability and climate change
- Lack of continuous monitoring and assessment
- Over exploitation of resources



Land Use and Land Use Change



- Lesotho has very poor land-use planning measures.
 - This is characterised by unplanned and unchecked human settlements, particularly in the urban and peri-urban areas.
 - A lot of settlements in these areas are situated on the 9% arable land
- Main land use changes are an increase in settlements and population, a decrease in crop lands and crop production.
- Low agricultural productivities result from a combination of factors including: Dependence on rain-fed agriculture; low and declining soil fertility due to low levels of organic matter in the soil
- Available Land Use data is scattered and depends on the project funding and interest
 - Methodologies and formats may be different
 - Some areas are/may not be assessed (gaps)
 - There maybe overlaps in some areas (double counting)
 - ❖ These lead to very inconsistent data sets



Land Degradation



Sources of Land Degradation

- Soil erosion causes extensive environmental degradation.
- Climate variability
 - Droughts
 - Flash floods
- Human Induced Degradation
 - Poor farming practices
 - Uncontrolled human settlements
- It is estimated that 15 million tons of topsoil from arable lands is lost annually

Presently no continuous monitoring

Impacts of Land Degradation

- Landlessness has increased dramatically from 13 per cent in the 1970s to 55 per cent in 1990
- Ecosystems are threatened by the pollution of the head waters in the form of siltation caused by soil erosion from overgrazed rangelands
- Decline in agriculture contribution to national GDP.
 - Donga formation and bare land exposure decrease arable land
 - Loss of fertile top soil due to erosion result in poor land productivity
 - Deterioration of rangelands result in poor animal productivity
- There is an increase in sand stone mining due to soil depletion.

“Advances in Remote Sensing have made vegetation assessments an attractive option for addressing land degradation”.

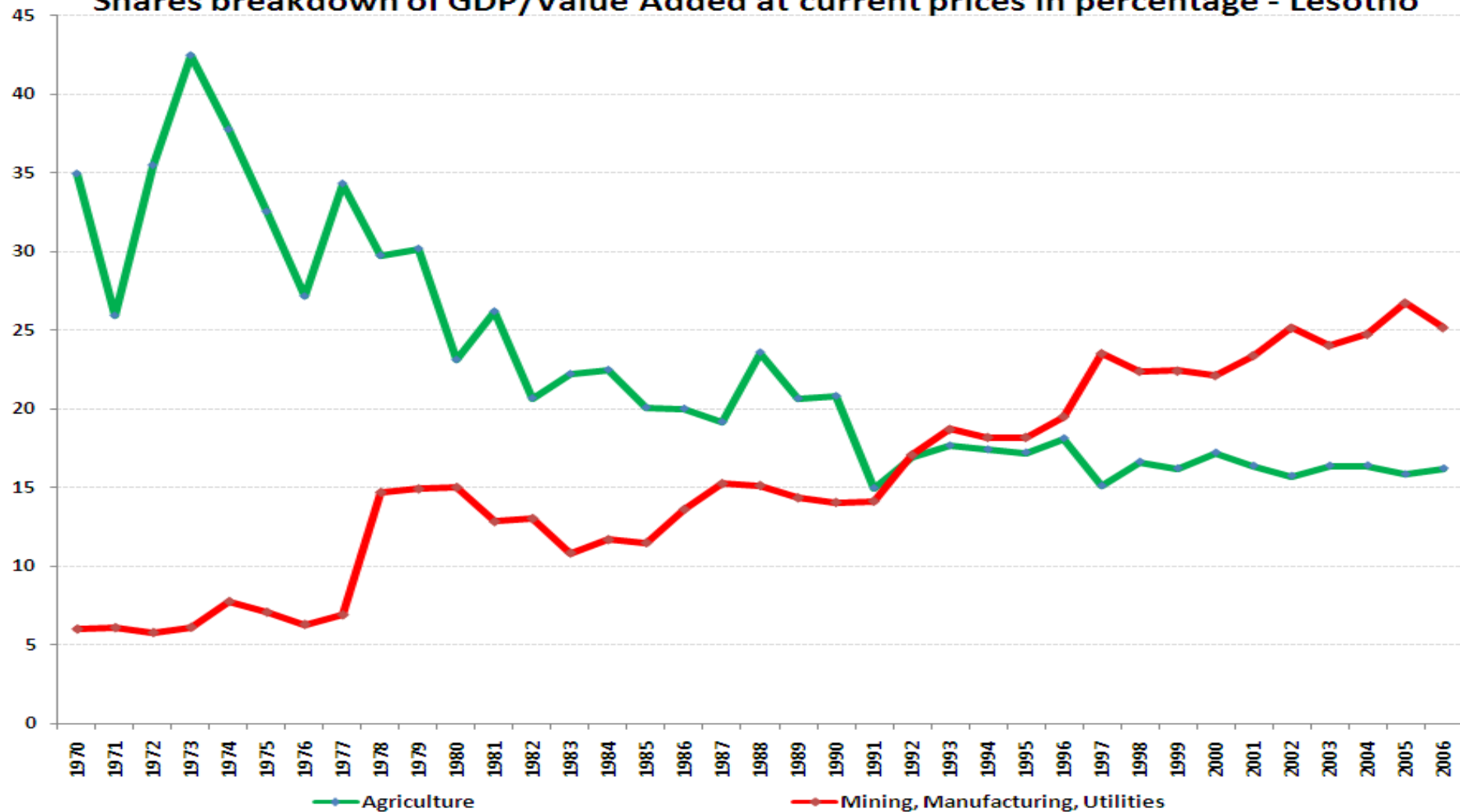


Land Degradation





Shares breakdown of GDP/Value Added at current prices in percentage - Lesotho



Data Source: United Nations Statistics Office

“Agricultural production is hampered by land availability and quality and water constraints. Lesotho is a long way from being even self-sufficient in grains”



Challenges to Remote Sensing (Lesotho)



- Insufficient equipment
 - Hardware & software
- Human resources
- Public Awareness



Conclusion



- For Lesotho and other developing countries to meet their developmental goals consistent and reliable data need to be developed and processed.
- Modern technologies and other resources (technical or otherwise) are needed to build up information base for better planning.
- RS products play important roles in early warning and if optimally accessed and used they can facilitate to attain many developmental goals and informed policies.
- With the RS technology duplication of efforts and gaps in data collection can be avoided
- Integrate the principles of sustainable development into country policies and programmes and reverse the loss of environmental resources (MDG 7.A).
- Availability of RS data help identify emerging hot spots during the season. And long term environmental trends can be identified. Human and animals mortality can be reduced.
- Different clusters of land use patterns (wetlands, settlements, croplands, etc) can be mapped by using **Very High** resolution pictures.



I thank You

