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Application of spatial resource data to assist in farmland valuation

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ABSTRACT

A land transaction is generally not a recurring action for most buyers and sellers, their experience and knowledge are limited, for this reason the services of property agents and valuers are sometimes used, just to get more information available. The condition of insufficient information and the inability to observe differences in land productivity gives rise to the undervaluation of good land and overvaluation of poor land. The advent of the Internet made access to comprehensive information sources easier for property agents and valuers whose critical time and resources can now be effectively managed through Geographic Information System (GIS) integrated workflow processes. This study aims to develop the blueprint for a *farm valuation support system* (FVSS) that assists valuers in their application of the comparable sales method by enabling them to do the following: (1) Rapid identification of the location of the subject property and transaction properties on an electronic map. (2) Comparison of the subject property with the transaction properties in terms of value contributing attributes that can be expressed in a spatial format, mainly (a) location and (b) land resource quality factors not considered in existing valuation systems that primarily focus on residential property. An algorithm, that generates an index value, was developed to allow easy comparison of the land of a subject property and that of transaction properties. This index value distinguishes the proposed FVSS from other existing property valuation systems and can therefore be used by valuers as a first approximation of a property's soil suitability, before doing further field work. The FVSS was successfully developed and tested, primarily using data obtained in the Western Cape, South Africa.

Introduction and orientation

Farm valuations are normally done by using the comparable sales method through which valuers can establish a price guideline by synchronising transaction property prices (prices of comparable farms sold in the area) with their value bearing attributes. This price guideline can then be synchronised with the value bearing attributes of the subject property (the farm to be valued) in order to determine its value. Transaction properties in a district are identified from Deeds Office records. Valuers normally use hard copy maps to find the location of the subject property and transaction properties. This process can be quite time consuming. The location of such properties can also be determined by using digital spatial data sets, but this requires knowledge of Geographic Information System (GIS) computer software. GIS software has a wide range of tools available to determine, record and disseminate information about ownership, land registration, cadastre, valuation and land inventory. Few, if any, valuers are GIS literate.

This study aims to develop the blueprint for a farm valuation support system (FVSS) that assists valuers in their application of the comparable sales method by enabling them to do the following:

1. Rapid identification of the location of the subject property and transaction properties on an electronic map.
2. Comparison of the subject property with the transaction properties in terms of value contributing attributes that can be expressed in a spatial format, mainly (a) location and (b) land resource quality factors.
   (a) Assessment of the location of the subject property relative to that of the transaction properties can be determined by evaluating the accessibility of the subject and transaction properties relative to the existing road and rail infrastructure and towns and cities. The transport infrastructure digital data set is available and is used for transport planning purposes.
   (b) Comparison of the subject property with the transaction properties based on land resource quality attributes. Various digital data sets were developed over many years to assist agricultural planning, for example precipitation and

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temperature maps, topography, soils and land-use maps. These maps can be used effectively to compare e.g. the climate, terrain and soil characteristics of the subject property with that of the transaction properties.

3. Interpretation of soil characteristics to determine the suitability of a soil for annual or perennial crops requires specialised knowledge of soil scientists, knowledge not normally found among property valuers or estate agents. For this reason an algorithm, that generates an index value, was developed to allow easy comparison of the land of a subject property and that of transaction properties. Determining whether this index value reflects the soil suitability of different areas sufficiently accurate, in order to serve as a basis for comparison of the subject property with transaction properties, forms a major part of this investigation.

The result of this study should provide a blueprint to operationalize a *farm valuation support system* to be used by farm valuers and also farm estate agents in South Africa. The FVSS can be a useful starting point to facilitate the field visit. The FVSS aims to provide a reference framework for the valuer to provide information about the subject and transaction properties, mainly to sensitize the valuer with regard to possible differences or similarities between the subject property and the transaction properties in terms of relevant value bearing attributes. This may enhance the quality of the valuation and should save time. It would not replace valuers' visits and thorough inspection of properties and does not aim to automate the valuation process.

Research approach and methodology

Guidelines for the design of the proposed FVSS are determined by means of a nationwide survey among valuers and estate agents specialising in farm valuations. An algorithm, that generates a *land type suitability index value* (LTSIV), is then developed with the help of soil scientists. Soil suitability data of the Breede and Berg River areas in the Western Cape was available in such a format that it could be compared with the LTSIV to determine whether this index value reflects the soil suitability of different areas sufficiently accurate. A blueprint of the FVSS is then created.

Valuers' needs assessment

A survey was done among South African valuers and estate agents specialising in farm valuations. Questionnaires (Appendix A) were distributed nationwide and 96 were completed and successfully retrieved. Professional and associate valuers were the largest component of the sample (40 each) and of the 40 professional valuers, 3 of them also served as property agents. The survey demonstrated that the need for a farm valuation support system does exist and that it will be used by valuers. The survey also collected information that provided guidelines for the design of a farm valuation support system (FVSS) that enables the valuer to compare a subject farm with transaction farms based on relevant value bearing attributes.

Indication of the need for a farm valuation support system and the benefits thereof

Out of the 96 questionnaires retrieved, 54 valuers (56.3%) indicated that they make use of property valuation software namely WinXfer or Lightstone to find farms or smallholdings. A valuer spends on average two hours to locate a subject property and transaction properties on a paper map. The valuer that uses WinXfer or Lightstone potentially saves 0.71 h (≈ 43 min) while trying to locate a subject property and transaction properties and potentially retrieves an additional 3.40 districts' monthly reports on average per month. Valuers therefore benefit by using WinXfer or Lightstone. This information demonstrates that the need for a farm valuation support system does exist and that it will be used by valuers in spite of the survey results indicating that they tend to have limited GIS skills (Table 1).

Table 1
Valuers' average self-rated computer skills.

Skills	RATING
WORD	3.16
EXCEL	3.05
IMAP	2.55
GOOGLE	2.90
GIS	2.44

Note: Rating 1, no skills; Rating 2, limited skills; Rating 3, quite skilled; Rating 4, highly skilled.

Valuers' importance-rating of available spatial data sets to compare the subject property with transaction properties

In the questionnaire valuers were asked to rate 19 factors according to their impact on farmland value. The proximity of subject and transaction properties to railroads was the only factor that was of low importance to valuers, the rest were all considered as important factors affecting farmland value. Fig. 1 shows the result.

The development of a farm valuation support system that incorporates soil characteristics

The qualitative characteristics and interactions of soil determine a soil's suitability for crop production or agricultural activity on a farm and therefore play a very important part in the valuation

CHARACTERISTICS	IMPORTANCE
CADASTRAL MAPS	3.77
IRRIGATION SCHEMES	3.51
CULTIVATED LAND	3.48
REAL LAND USE	3.47
VELD TYPE	3.41
LAND TYPE	3.38
ROADS	3.36
RAINFALL PATTERN	3.35
TOPOGRAPHY	3.31
BUILDINGS	3.22
RIVERS	3.12
VILLAGES	3.04
TEMPERATURE REGIMES	2.92
FORESTS	2.86
COLD UNITS	2.63
HEAT UNITS	2.60
POWER LINES	2.60
BOTANICAL HOTSPOTS	2.56
RAILROADS	2.31

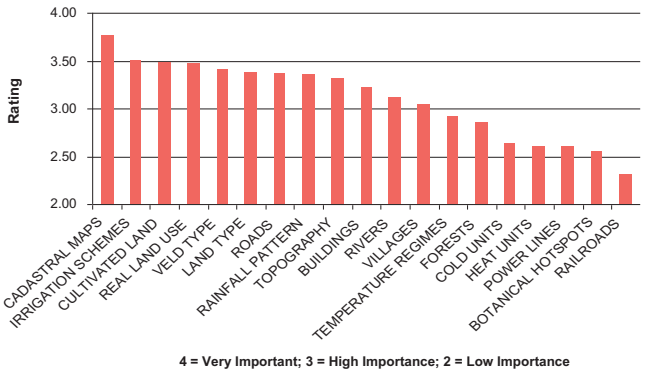

Fig. 1. Valuers' importance-rating of spatial data sets for valuation purposes.