AN IMPLEMENTATION OF NOMINAL ASSET BASED LAND READJUSTMENT

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What is LR?

Land Readjustment (LR) is a crucial planning tool in order to provide new settlement lands in urban and rural areas.

It is an effective method to transform irregularly shaped cadastral parcels to appropriate plots that can be used in more economical manner.
What is LR?

Process...

All land parcels within a project area are grouped together and a percentage of each land parcel calculated to determine a contribution to public areas. This percentage depends on the size of the project area and the total size of required public-use areas. The remaining land is then reallocated within the blocks defined by the plan.

Objectives of LR...

Land readjustment aims to manage existing land structure when a systematic urban land development is required. The main objectives of a land readjustment project may be given as follows:

- Development of new urban sites
- Redevelopment of an already urbanised area
- Improvement and expansion of public facilities
- Disaster rehabilitation

LR is often used by municipalities in order to provide new built-up areas for urban development needs.

Using this method, available zoning plans are reflected on to land and new lots are created in a short time.
Issues of LR?

* Information management

* Decision-Making

* Land valuation ?…

for example, has not been dynamically involved in the entire process...

Many substantial criteria which may affect a land parcel's value can ignored during the process...

As a result of this, inequitable land distribution occurs to the original landholders so that their benefits differ from the project...

Nominal Land Valuation Method…

Using the comparison method of valuation, physical, legal and market factors can be compared directly but every property are spatially unique, so spatial factors requiring an alternative method of adjustment.

• The value of property reflects its capacity to fulfill a function. With regard to commercial property, functional qualities may include,

• Location influences (accessibility to the market place, proximity to suppliers of raw materials and important nodes such as railway stations, car parks and open spaces)

• Physical attributes (size, shape, age and condition)

• Legal factors (lease terms and restrictive covenants)

• Planning and economic factors (planning constraints, permitted use and potential for change of use).
Nominal Land Valuation Method…

Nominal values of property can be calculated in a parametric way instead of definite value.

Objective and subjective criteria selected for this aim are evaluated one by one.

Then, doing in a unit area or volume, these evaluations are reflected to all land parcels.

Land valuation factors which may affect a land parcel value

1) Supplied basic services
2) Permitted number of floors
3) Permitted construction area
4) Landscape, view
5) Access to street
6) Environment
7) Parcel location within block
8) Street frontage
9) Distance from nuisances
10) Land parcel shape
11) Currently usable area
12) Distance to city centre
13) Distance from noise
14) Soil condition
15) Distance to educational centres
16) Distance to health services
17) Access to highway
18) Distance to shopping centre
19) Available utilities
20) Distance to recreational areas
21) Topography
22) Distance to religious place
23) Distance to play garden
24) Distance to car parking area
25) Distance to fire station
26) Access to waterway
27) Distance to police station
28) Access to railway

\[ V = \text{AREA} \cdot \sum_{i=1}^{n} (P_i \cdot W_i) \]

where:
- \( V \): Total nominal asset value of a land parcel
- \( \text{AREA} \): Land parcel size (or pixel size)
- \( P_i \): Factor value
- \( W_i \): Factor weight
- \( n \): Total number of factors
Calculation of a nominal asset value on a pixel-base.

\[
\text{NAV} = \sum_{i=1}^{n} P_i \cdot W_i \\
\text{Value} = \sum \text{NAV}
\]

\( P_i \): Point determined to each pixel  
\( W_i \): Weight of factor  
\( \text{NAV} \): Nominal asset value  
\( n \): Number of factor

The Spatial analysis process of creating the raster based land value map by GIS
The main objective here is to give back a new parcel to a landowner with the same value that owned before the project.
4. EXAMPLE

The sample study area selected for this study is in the city of Trabzon which is located on the Black Sea coast (Figure 4). Study area is 9.8 hectares with by 105 land parcels. The property map, the land-use plan and topographical maps were digitized. Land cadaster records were also included in the database. Then, 169 site blocks were subdivided into 156 land parcels according to the plan’s rules. Because of the nature of the ERC concept, the total area of all land parcels was reduced to 0.2 hectares with the process. In another words, 3.6 hectares of public-use areas were gained by the contribution of the landowners. Including the previous public-use area of 0.8 hectares a total of 4.4 hectares of land was reserved for public-use after the project.

Figure 4. Study Area in Trabzon, Turkey

<table>
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<th>Parcel ID</th>
<th>New Parcel ID</th>
<th>New size (ha)</th>
<th>Total size (ha)</th>
<th>Market value (X)</th>
<th>Ward value (X)</th>
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</tbody>
</table>

Table 1. An example of new parcel ownerships in the study area.
CONCLUSIONS...

- To increase the effectiveness of land readjustment method, a nominal asset value-based land readjustment approach has been developed using GIS.

- The main objective in this model is to determine the asset value of a land parcel before and after a project, then giving back a new parcel to a landowner with the same value that owned before the project.

- Based on the determined nominal asset values, land distribution is accomplished. Using such an approach, the nominal asset value profiles among the landowners are preserved after the project so that the planning effects can therefore be shared similarly by all the landowners who are involved in the project.

- The performance of the LR process was increased by the use of raster based GIS functions.
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