INCLUDING LAND VALUE IN HAZARD MITIGATION PLANNING

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LAND USE POLICIES HOLD THE GREATEST LONG-TERM RISK REDUCTION POTENTIAL BUT ARE UNDER-UTILISED

LYLES ET AL., 2014

WHY?

"There is no consideration of land value, …., unless it is necessary to purchase the land" (Lavee 2015)

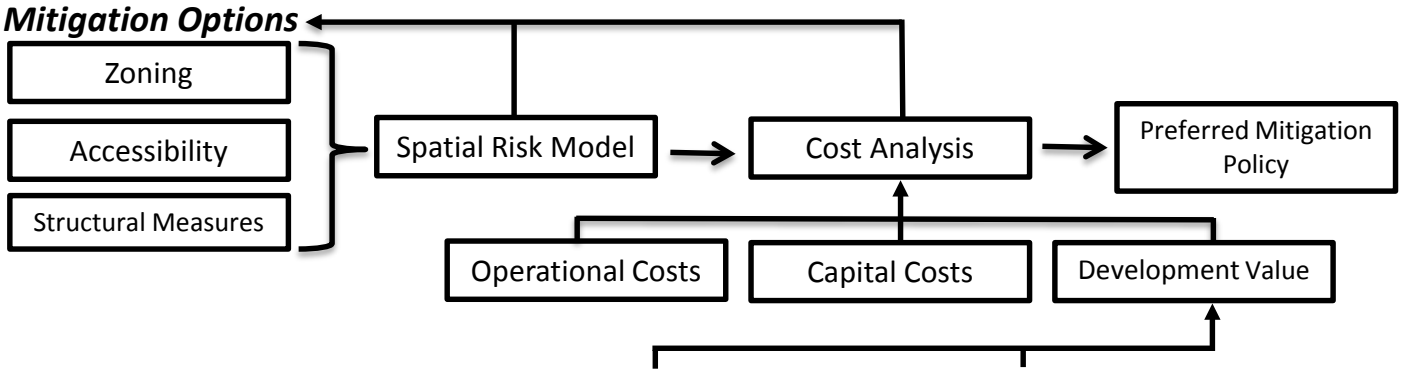
"Relatively few cost assessment approaches for nonstructural measures such as, ….., land-use planning" (Bouwer et al., 2014)

RESEARCH QUESTIONS

- How do we include land use planning decisions in cost analysis for policy development?
- How do we model areas of high future land value and then evaluate them against risk?
- How do we cost the impact of restricting future development in an area of high risk? What is the lost opportunity from not developing there?
- How do we compare the costs of a structural mitigation method versus not allowing development? Which is most cost effective?

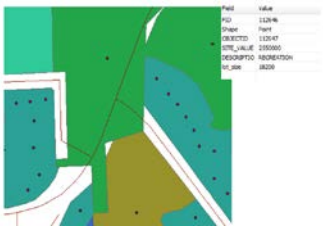
RESEARCH APPROACH

- Develop relationship between historical land value and land use model, allowing future development value to be understood based on factors that contribute to land use change, accessibility, suitability, zoning and the neighbourhood. This is used to include lost or gained development value in cost analysis of mitigation options.
- Model the impact of both structural and land use planning based mitigation options and develop mitigation policies based on both the capital and operational costs of structural measures, along with the altered development value of land based on land use planning decisions.



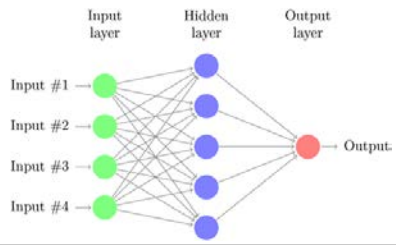
LAND VALUE DATA

Land value data for sites around Greater Adelaide have been sourced.
The values have been rounded to $10,000 increments and are then averaged across a 100m x 100m cell per land use.
Used in ANN to determine the relationship between land use and value



ARTIFICIAL NEURAL NETWORK (ANN)

Data driven modelling approach
Used to develop relationships between parameters of land use model and site value to allow future projections.
The inputs to the ANN are the factors that cause land use changes, with the ANN trained to relate these inputs to the land value.



LAND USE MODEL

Metronamica land use model that allocates land uses based on demand and competition for space at an annual time step.
Land change is based on a cell's accessibility (transport networks etc.), suitability (slope, soil type etc.), zoning and its neighbourhood (what land uses are nearby).
These factors are used as variables to consider future land value.

REFERENCES

Bouwer, L.M., Papyrakis, E., Poussin, J., Pfurtscheller, C., Thieken, A.H., 2014. The costing of measures for natural hazard mitigation in Europe. Natural Hazards Review 15(4).
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