How to insert measurement in the assessment

The use of georeferenced measurement in the Strategic Environmental Assessment

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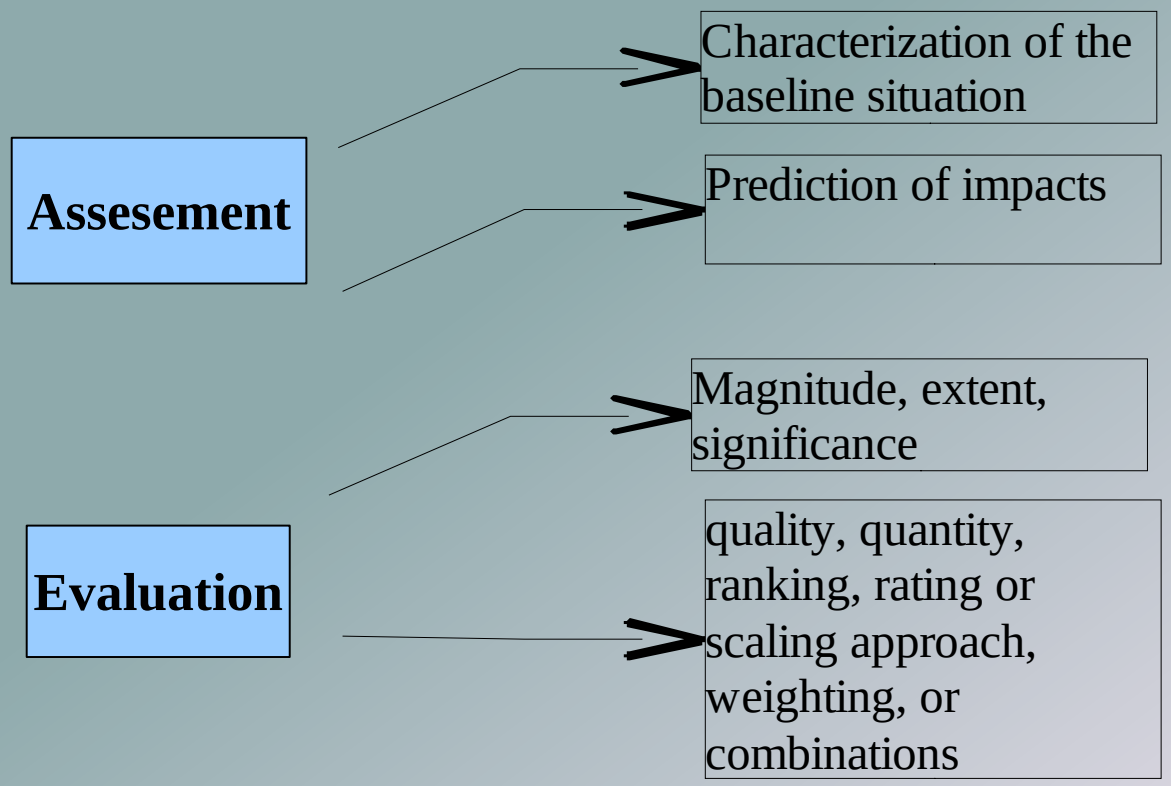
FIG Commission 3 Workshop 2011

The Empowerment of Local Authorities: Spatial Information and Spatial Planning Tools

Paris, France, 25-28 October 2011

The Strategic Environmental Assessment is about the good estimation of the quality and quantity of the impacts of a plan, program or project in an early stage of the planning process. The concrete stages of the hole process are based on the eia logic meaning that sea works as a framework itself (Cassios, 2006).

The evaluation is connected directly to the quality of scoping and the quality of baseline information. Evaluation stage has to answer the key question -how significant is the impact and if the proposal is technically feasible, economically and financially viable and legally permissible (Rajvanshi A., Mathur B. Vinod, Iftikhar A. Usman, 2007).



BASICS OF THE METHODOLOGY:

Data collection from every kind of resources, historical records, direct observations, interviews and professional estimates is helping to predict and quantify the likelihood and the impact of damage effect under the designed scenarios. The need for more detailed data and measurement and also modeling seems to be the safest road to the documentation of the assessment.

Naturalness appears to be the third from the start criteria in the ecological eia studies and starting from that point Treweek, 1999 gives some basic question that have to be answered when impact significance has to be measured and evaluated.

The index for importance values of criteria for naturalness are in order from small to large is high biotic disturbance, moderate disturbance, undisturbed (total natural).

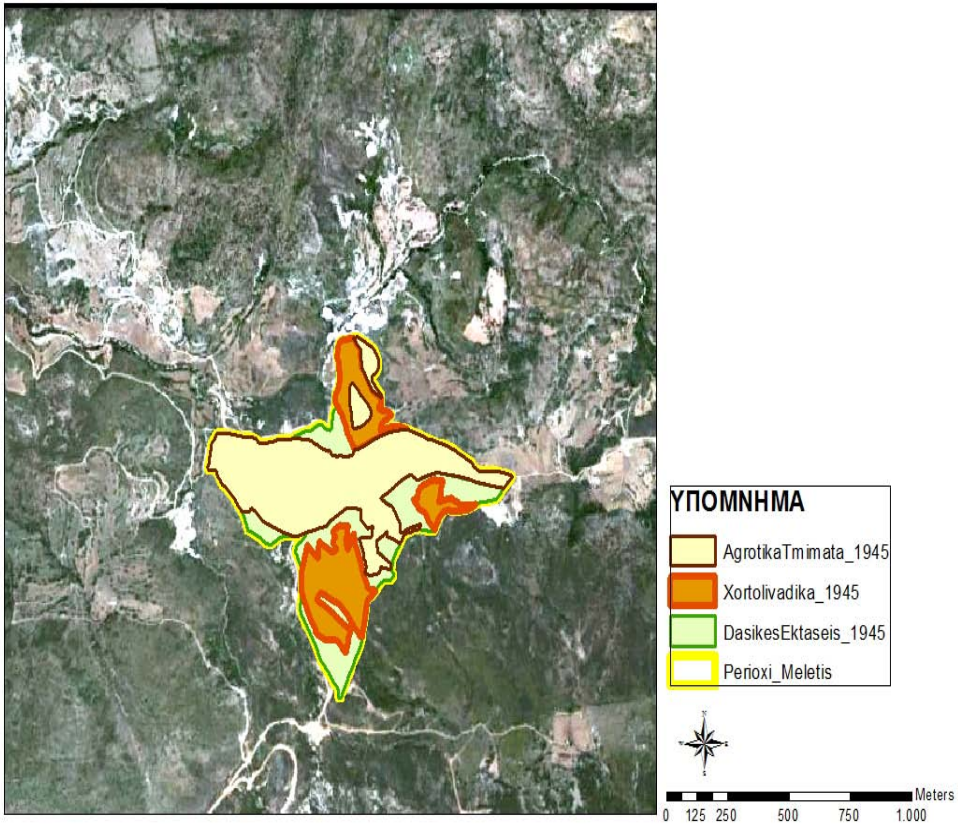
The concept of the fuzzy significance matrix is about to have a tool combining quality and quantity dimensions, having a spatial reference measured in the possible accurate way, so the result could be one solid value ranked and weighted in the proper referenced system.

CORINE Land Cover 2000 (www.opendata.gov.gr)

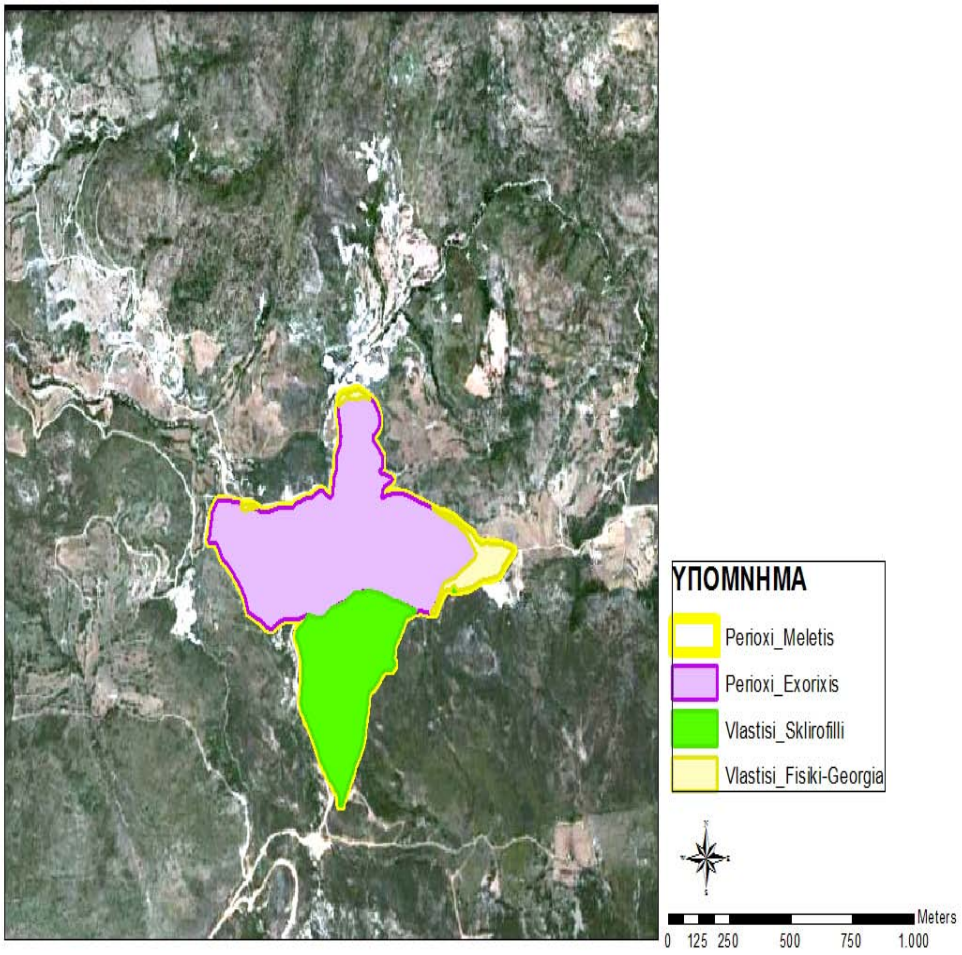
maps from master thesis (Balomenou P.)

land use for aerial photo development of 1946 on site surveys

Χάρτης Χρήσεων Γης (έτος 1945)



Χάρτης Χρήσεων Γης (Corine2000)



Situation1 (spot time1)	Situation2 (spot time2)
Φ1	C1
Φ2	C2
Φ3	C3

Impact (differences)	Baseline reference
Φ1-C1	Φı+C1
Φ2-C2	Φ2+C2
Φ3-C3	Φ3+C3

Impact (differences)	Referenced Impact
Δ1=Φ1-C1/(Φı+C1)	Δ12=Δ1/Σ
Δ2=Φ2-C2/(Φ2+C2)	Δ22=Δ2/Σ
Δ3=Φ3-C3/(Φ3+C3)	Δ32=Δ3/Σ

Index+(Perceived) Value (Vi)

Vi is taken from criteria analysis, a proper but correlated hierarchical system and questionnaires to the involved audience and experts

ΣV=V1+V2+V3 so the Δs are:

Δ12XV1/ ΣV=A1

Δ22XV2/ ΣV=A2

Δ23XV3/ ΣV=A3

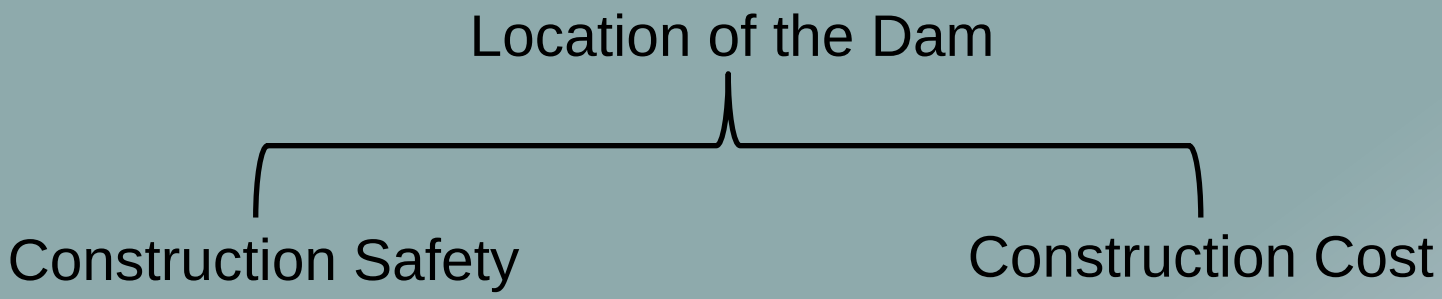
Δ12	Δ22	Δ23
V1	V2	V3

If the relation is linear for the simple way to see it in this case then the conclusion is the final matrix base on the following data: Impact	Value	Referenced Index (%)	Significance
Δ12	V1	A1	S1=A1/V1
Δ22	V2	A2	S2=A2/V2
Δ23	V3	A3	S3=A3/V3

Impact Significance Matrix

	Φi		Ci	-Φi-Ci	Φi+Ci	Δi	Δi2	Vi	Ai	Ai (%)	Si	Si
CORINE 2000	Surface (m²)	**LAND USE 1945**	Surface (m²)									
Extract materials zone	317502,09	Forest Land	121428,49	-196073,6	438930,58	-0,446708	-9,29E-007	1	-0	0%	ΛΆΘΟΣ	
Hardleaves vegetation	139872,49	Landparts with grass	121970,59	-17901,902	261843,08	-0,068369	-1,42E-007	2	-0	0%	ΛΆΘΟΣ	
Cultivated land with big natural parts	23512,08	Rural land	237487,58	213975,498	260999,66	0,8198306	1,70E-006	3	8,52E-007	0%	ΣΩΣΤΌ	
	480886,66		480886,66					6			boolean value	

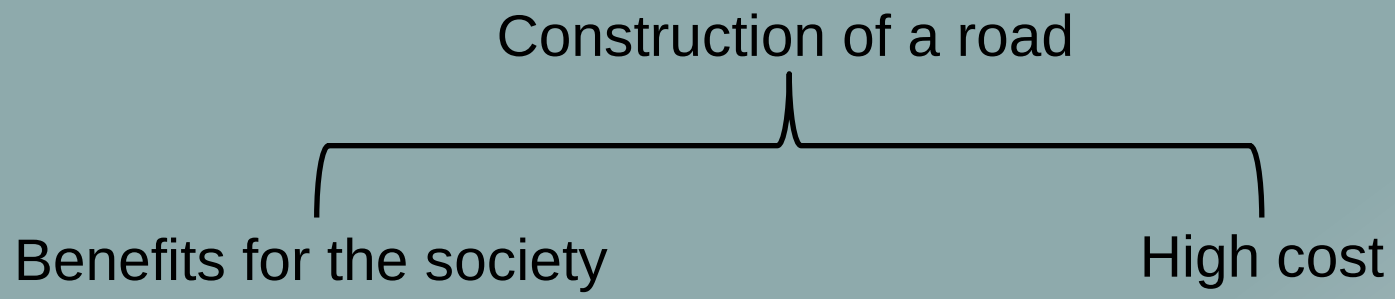
CASE STUDY OF A DAM



High-Precision geodetic measurements to select the best solution, using either Total Station or GPS

- Control points, formatting a network
- Measurement of these point before, (but also during and after) the costruction, in order to detect deformations (e.g. soil movement)

CASE STUDY OF A ROAD



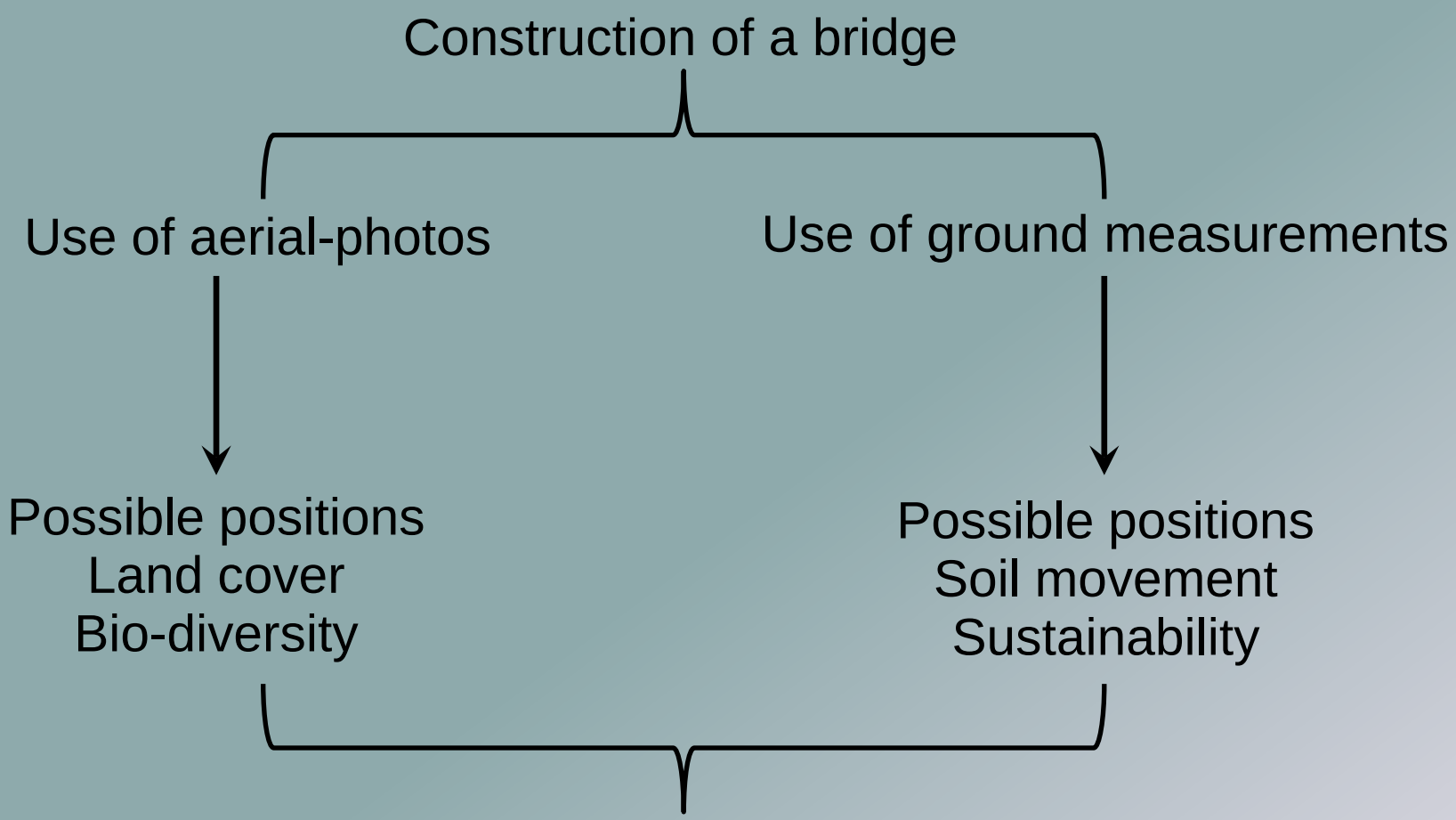
The best stake out is very critical during the strategic planning

DTM (Digital Terrain Model) can be produced taking low-flight aerial-photos (which give both qualitative and quantitative data)

The final decision can be taken, taking into account:

- The geomorphology of the ground e.g. terrain slopes)
- The land cover
- Areas that need bridges or tunnels
- Areas that need expropriation
- An estimation for the final cost

CASE STUDY OF A BRIDGE



Conclusions

An inter-science approach and collaboration of different scientists can achieve optimum results. The Survey Engineer can give answers to questions both quantitatively and qualitatively.

Different geodetic measurements can contribute to decision making, to be considered before a final decision, but also serve as a powerful tool even beyond. This may at any time, check the quality of work, filter the different parameters, and each project can be completed at minimum cost and maximum return to society.

The use of an Impact Significance Matrix (is a possible answer to the question how much significant is the named impact) which can give a solid correlation between impact, value and index can give a good estimation of the significance of the impact referenced to criteria and value ranges. This could be ah hybrid core value system adding a small step foreword and being the stepping stone to the significance quantification of other environmental parameters too.

Each scenario can be checked and assessed with this simple and clear way. The matrix can be used as a well focused and direct tool to the assessment of significance. Within this way of logic general and special requirements can be edited for different categories of plans, programs and works. This matrix could be the way to insert measurement in the strategic environmental assessment in the evaluation stage based on the following theory.

The dynamics of SEA procedure both with the fuzzy logic approach can lead to the configuration of what if choices of the quality and quantity of human interventions on nature so that decisions can be more safe and sound in their relative concept of uncertainty. The effectiveness of the use of indices involved in the environmental assessment is limited since the limits can be changed relatively easily. The quantification of the quality in a mathematical concept where the formation of what if scenarios are based on “numbered” assessments.

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THANK YOU
FOR YOUR ATTENTION

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