
Combining Ecological, Social and Political
Factors in a Ranking Approach

Combining Factors

Ranking approach can include a lot of factors

Methods to combine

Combining Factors

Simplest Case-weighting:

1 set of factors for all objectives and all activities

Weight factors by importance for overall objective

$$\text{Score} = \frac{\text{Factor}_1 * \text{Weight}_1 + \text{Factor}_2 * \text{Weight}_2 \ldots..}{\text{max}}$$

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Slope	Slope values	Rank
Flat slope	0--9	0.33
mid slope	9--25	0.66
steep slope	>25	1

Water Bal	P-ET	Rank
Surplus	>0	1
Balanced	0	0.66
Deficit	<0	0.33

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S = 35
WB = 10

$$\frac{1*1+1*1}{2} = 1$$

S = 40
WB = 0

$$\frac{1*1+0.66*1}{2} = 0.8$$

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Weight factors by importance for overall objective

$$\text{Score} = \frac{\text{Factor}_1 * \text{Weight}_1 + \text{Factor}_2 * \text{Weight}_2 \ldots\ldots}{\text{max}}$$

Slope (w=2)	Slope values	Rank
Flat slope	0--9	0.33
mid slope	9--25	0.66
steep slope	>25	1

Water Bal (w-1)	P-ET	Rank
Surplus	>0	1
Balanced	0	0.66
Deficit	<0	0.33

S = 35
WB = 10

$$\frac{1*2+1*1}{3} = 1$$

S = 40
WB = 0

$$\frac{1*2+0.66*1}{3} = 0.9$$

Combining Factors

Complex Case:

Combining Factors

Complex Case:

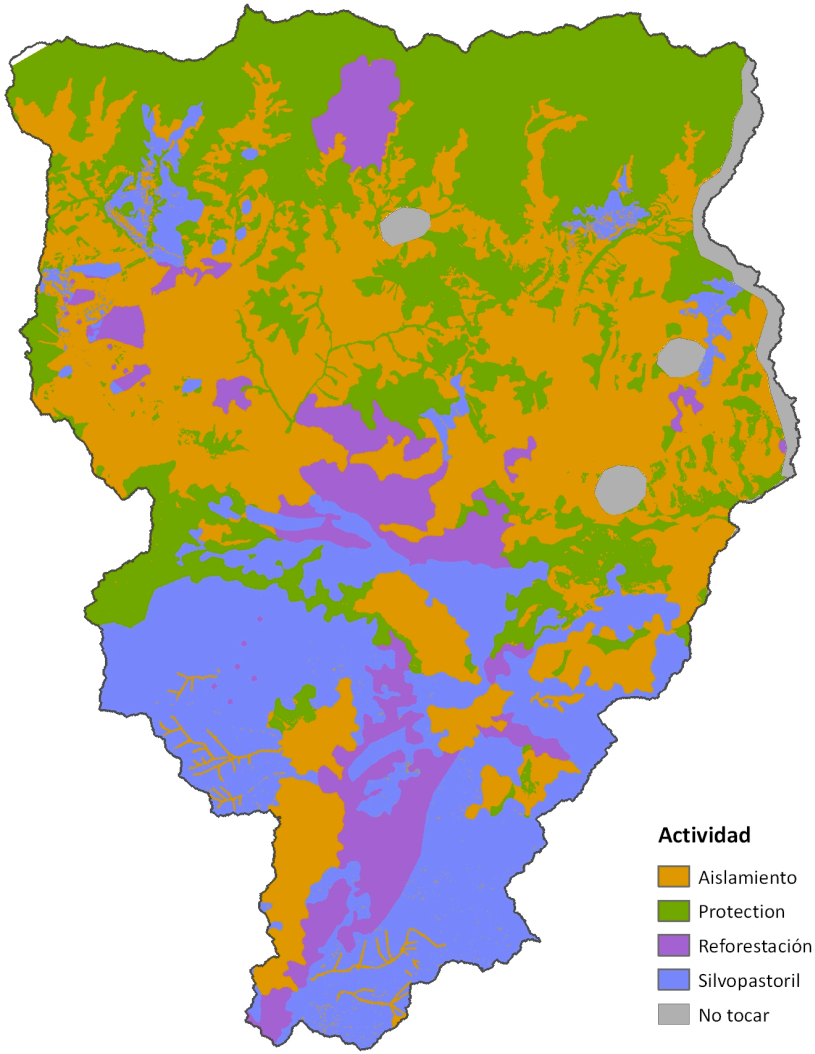
Fencing

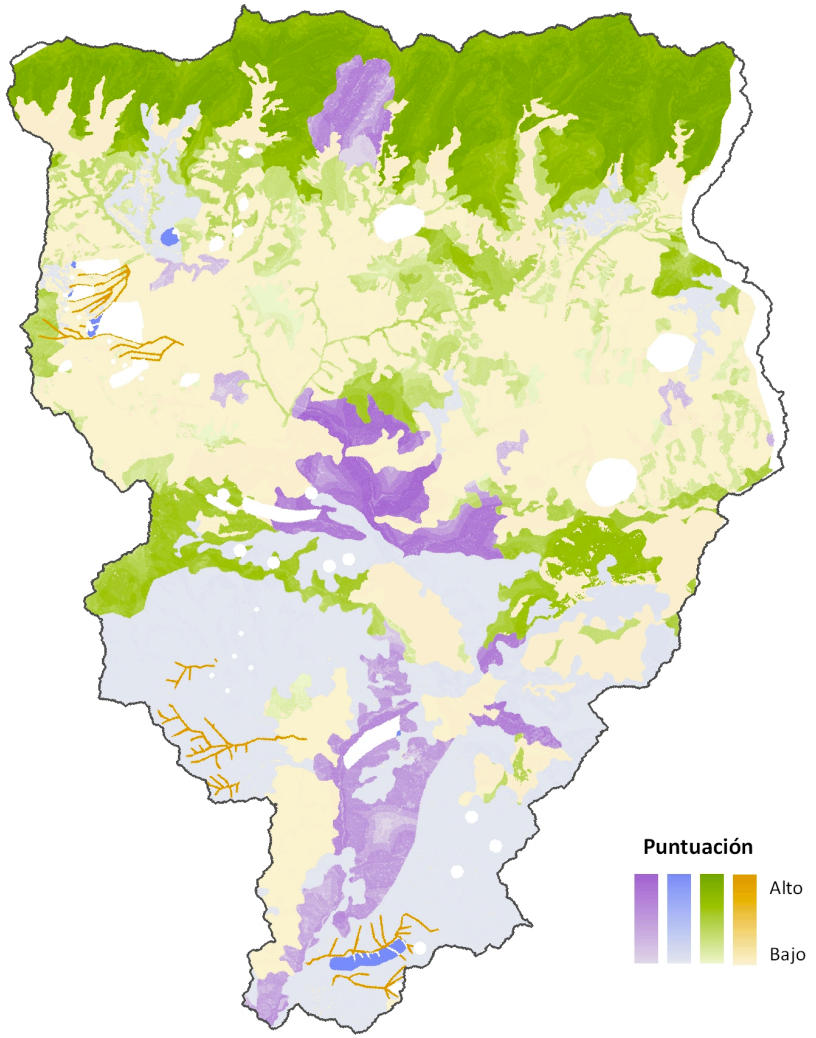
Objective	Weight
social feasibility	100
erosion control	2
biodiversity	2
baseflow	1
ann avg yield	1

Protection

Objective	Weight
social feasibility	100
biodiversity	3
baseflow	2
erosion	2
ann avg yield	1

Activity Scores for Tulua Watershed





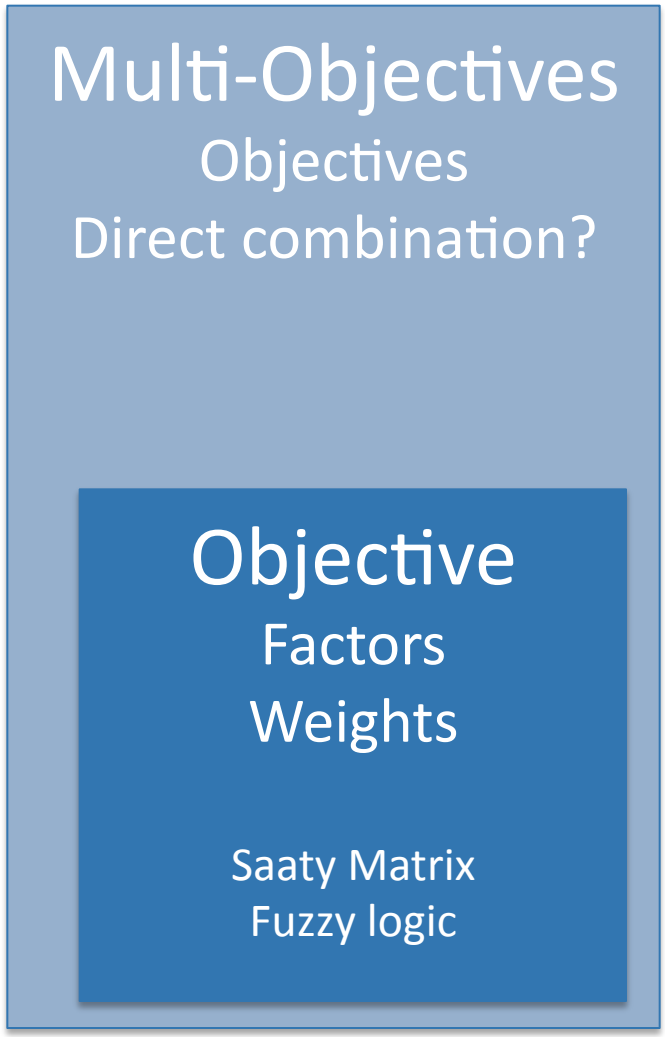
More Sophisticated Models: Fuzzy Logic

Same idea with set of factors

Saaty Matrix used to derive joint weights

Gives priority areas per objective

Create new joint objectives where logically sound



Discuss Combining Factors

Are these useful approaches?

Need another approach to combining factors in ranking analysis?