METHODFINDER

Practitioner's Guide:

Choosing Between Alternative Plans:
An Assessment Approach

An example from a country in
Northern Africa

Example:

Site selection for a new railway station:

The Railway Authority, in close cooperation with several departments of the local government proposed three different sites for a new railway station. Faced with the task of selecting one of the alternatives, the head of the local government requested the Planning Unit to develop and apply an objective selection process and then to present the results.

Short description of the three proposed locations:

Location A:
is the closest to the existing urban area and it is located to the south of the city. Currently the land is being used for intensive agricultural crop production. The area also includes a large farm. Sufficient groundwater is available. Land prices are high and speculative in anticipation of the expansion of the growth of the city to the south.

Location B:
is to the south of the water tank. The area has relatively high sand dunes, a fact that is reflected in the lower land prices. Urban growth is planned towards location B, including the planned relocation of the university. Current land use includes partial agricultural use, some palm trees and water wells.

Location C:
Presently, this area is not being used for agricultural purposes apart from the existence of a few palms. The area is very close to the planned industrial estate a fact that is reflected in the high land prices. Better linkages exist with other infrastructure, whereby the area also includes some salty marches

Example:

Selection Criteria:

The planning team agreed upon the following main selection criteria, that have already been clustered:

▶ **Criteria Group 1: Economic criteria**

1. **Cost of land leveling:** Estimated cost of ground leveling in relationship to the fact that the locations are in a predominantly sandy area (9= least cost, 0 = highest cost).

2. **Cost of site preparation:** Quality of soil and bedrock. For example, salty marches (sabkha) raises the cost of land preparation (9= least cost, 0 = highest cost).

3. **Leaving the location in its current land use:** Focus is on comparing current land uses. Costs of shifting agriculture are deemed high (9= least cost/no need to change land use, 0 = highest cost / relocating existing land use).

4. **Benefit for existing land use:** Expected benefit for the local economy as a result of the railway station as a transport node. Access for local industry to the transport node was ranked (9= easy access, 0 = poor / remote access)

5. **Benefit for planned land use:** Economic benefit taking into account the planned urban expansion (9= high expected benefits, 0 = low expected benefits)

6. **Network costs:** Costs involved in linking railway station to existing infrastructure (e.g. roads, electricity, telephone, water, waste water). Distance is an important factor (9= nearest to most of the existing infrastructure, 0 = farthest away from existing infrastructure)

▶ Criteria Group 2: Environmental criteria:

1. **Negative effects on agricultural land:** Potential negative effects on agricultural land, including aspects of pollution, changes in the soils and other negative environmental factors. (9= least negative effects, 0 = highest negative effects).

2. **Negative effects on palm trees:** Palm trees are an important characteristic of the area, they are also an important tourism trademark. Urbanization will also lead to more palms being cut down. (9= least effect on the existing palms, 0 = high risk for palms in terms of felling them).

3. **Negative effects on ground water:** Urban construction will negatively affect ground water and in turn the existing wells. Pollution of ground water is an additional negative effect of greater urbanization. ((9= low negative impact, 0 = high negative impact).

4. **Environmental compatibility:** Compatibility of railway station with existing and planned land use in relationship to the environmental effects (9= low expected negative environmental effects, 0 = high negative environmental effects).

5. **Impact on the scenery:** The extent to which the railway station is likely to affect the overall scenery. (9= least negative effect on view and landscape, 0 = Large negative effect on view and landscape).

▸ **Criteria Group 3: Urban development criteria:**

1. **Effects on urban growth:** Compatibility of planned urban growth in relationship to city master plan. (9= high compatibility with master plan 0 = low compatibility with master plan).

2. **Distance to urban development areas:** Relative distance to planned development areas (9= close to proposed development areas, 0 = far from planned development areas).

3. **Land prices:** Land prices are also an important factor since it will impact positively or negatively on the overall cost of the railway station (9= low land prices, 0 = high land prices).

Table 1: Application of selection criteria for different railway station locations

Railway locations Ranking by different groups	Location A: experts consulted										Location B: experts consulted										Location C: experts consulted									
	1	2	3	4	5	6	7	8	9	—	1	2	3	4	5	6	7	8	9	—	1	2	3	4	5	6	7	8	9	—
SELECTION CRITERIA																														
Economic Criteria																														
Cost of land levelling	4	4	5	6	6	6	5	6	6	48	5	4	5	3	3	4	4	3	4	35	8	7	8	9	9	9	8	6	8	72
Cost of site preparation	7	8	5	6	8	5	5	6	6	56	5	6	5	7	8	7	5	6	6	55	3	3	3	3	4	3	3	4	3	29
Leaving location as it is	3	5	5	4	3	2	2	3	4	31	6	7	5	7	7	6	5	6	7	56	8	9	8	8	8	9	8	7	9	74
Benefit pf existing land use	9	9	8	8	7	7	7	6	8	69	7	7	5	6	6	8	5	6	7	57	5	3	4	4	4	3	4	5	5	37
Benefit of planned land use	5	5	4	4	7	5	5	5	6	46	9	9	9	9	7	9	8	9	9	78	7	5	6	5	6	7	6	7	6	55
Network costs	4	7	8	7	7	5	6	5	6	55	6	7	6	6	6	5	5	6	6	53	6	9	7	6	6	7	6	7	7	61
Environmental Criteria																														
Negative effects: Agriculture	4	4	4	5	3	4	3	2	3	32	7	4	7	5	6	7	7	6	6	55	9	8	8	7	8	8	8	7	7	70
Negative effects: Palm trees	5	5	7	6	7	7	6	6	5	54	5	6	6	7	4	7	7	6	6	54	4	5	3	4	3	4	4	4	3	34
Negative effects: Ground water	5	5	4	4	4	4	5	6	5	42	7	7	5	4	6	6	7	6	6	54	8	9	8	8	8	8	7	8	8	72
Environmental compatibility	4	6	6	5	5	6	5	6	5	48	8	7	8	8	9	8	7	6	8	69	2	3	2	2	3	4	3	3	2	24
Impact on scenery	8	9	8	8	8	8	7	8	8	72	8	7	6	7	6	6	7	6	8	61	2	1	1	1	2	2	2	1	2	14
Urban development criteria																														
Effects on urban growth	6	4	5	3	3	4	4	3	5	37	9	9	7	7	6	8	7	8	8	69	7	6	5	6	6	5	7	7	7	56
Distance to urban dev. areas	4	5	4	5	4	4	5	6	4	41	9	9	8	7	8	7	6	8	6	68	7	7	6	8	7	7	7	6	5	60
Land prices	5	4	4	4	5	5	5	4	5	41	8	7	7	7	6	6	7	7	6	61	5	5	6	5	6	6	5	5	6	49

Table 2: Summary of results of selection process

| Criteria	Location A	Location B	Location C
Economic Criteria			
Cost of land levelling	48	35	72
Cost of site preparation	56	55	29
Leaving location as it is	31	56	74
Benefit pf existing land use	69	57	37
Benefit of planned land use	46	78	55
Network costs	55	53	61
Total	**300**	**334**	**328**
Percentage % of total score (486 points)	**62.8 %**	**68.7 %**	**67.5 %**
Ranking	**3**	**2**	**1**
Environmental Criteria			
Negative effects: Agriculture	32	55	70
Negative effects: Palm trees	54	54	34
Negative effects: Ground water	42	54	72
Environmental compatibility	48	69	24
Impact on scenery	72	61	14
Total	**248**	**293**	**214**
Percentage % of total score (405 points)	**61.2 %**	**72.3 %**	**52.8 %**
Ranking	**2**	**1**	**3**
Urban development criteria			
Effects on urban growth	37	69	56
Distance to urban dev. areas	41	68	60
Land prices	41	61	49
Total	**119**	**198**	**165**
Percentage % of total score (243 points)	**49.0 %**	**81.5 %**	**67.9 %**
Ranking	**3**	**1**	**2**

Interpretation of results

As far as the economic ranking is concerned the differences between the locations are not so accentuated, in fact the results are very close. However, marked differences exist between the individual economic criteria. For example, the cost of levelling of location B was seen to be higher while the cost of site preparation were seen to be high for location C. Greater differences appeared within the environmental criteria, with location B gaining the highest number of points. An even bigger spread appeared between the urban development criteria. The overall result of the application of the selection criteria depicts a clear choice for location B, having gained the highest ranking in each of the three main sets of criteria.
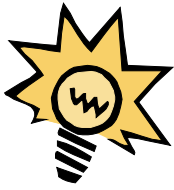
Weighting and final score

The experts from the sectoral line departments undertook a weighting between the three sets of criteria. The weighting agreed upon was as follows:

Economic criteria:	40%
Environmental criteria	30%
Urban development criteria	30%

To calculate the final score the percentage figure of the total score per criteria is multiplied by the weighted factor e.g. economic criteria for location A (62.8%) is multiplied by the factor 40 resulting in 2512 points (62.8*40 = 2512).

Even after applying the weighting system location B still remains the best choice. This location was then presented as the optimal location to the decision makers.

Table 3:   **Final weighted score**

Weighting x score / Criteria	Weighting	Location A	Location B	Location C
Economic	40%	2512	2748	2700
Environmental	30%	1836	2169	1584
Urban development	30%	1470	2445	2037
Total		**5818**	**7362**	**6321**
Ranking		**3**	**1**	**2**