



## ESTIMATION THE LANDSCAPED GROUPINGS PERIPHERAL IN A MOTORWAY SECTION IN THE EASTERN ALGERIA BY A MATHEMATICAL METHOD

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### Abstract

Under the land use planning, landscape studies are still needed and should be the prelude to any development. If such studies are done with art and appropriately in developed countries, they remain virtually absent in our country. The work we've done on this topic can be considered as a new experience. Indeed estimating landscape groupings peripheral section of motorway connecting Annaba El Hadjar responds to specific questions and achievable on the ground for eventual recovery of components of the landscape, visual field and sequences landscape devices at this section. We have quantified the values of current views from the points of view. The results serve as baseline data to consider when planning this area taking into account certain measures such as conservation groups interesting landscape on a visual level, recovery groups unsightly landscape by ad hoc adjustments and diagnosis on the changing landscape of these groups taking into account the socio-economic developments and their impacts on the environment. Our goal is not to arrive at a value determined the study area but earlier answer any questions on future developments such as changing the route, creating masses wooded location of stations' gasoline.

**Keywords:** Visual field; Length of the eye; Elements; Highway; Annaba; Algeria.

### 1. Introduction

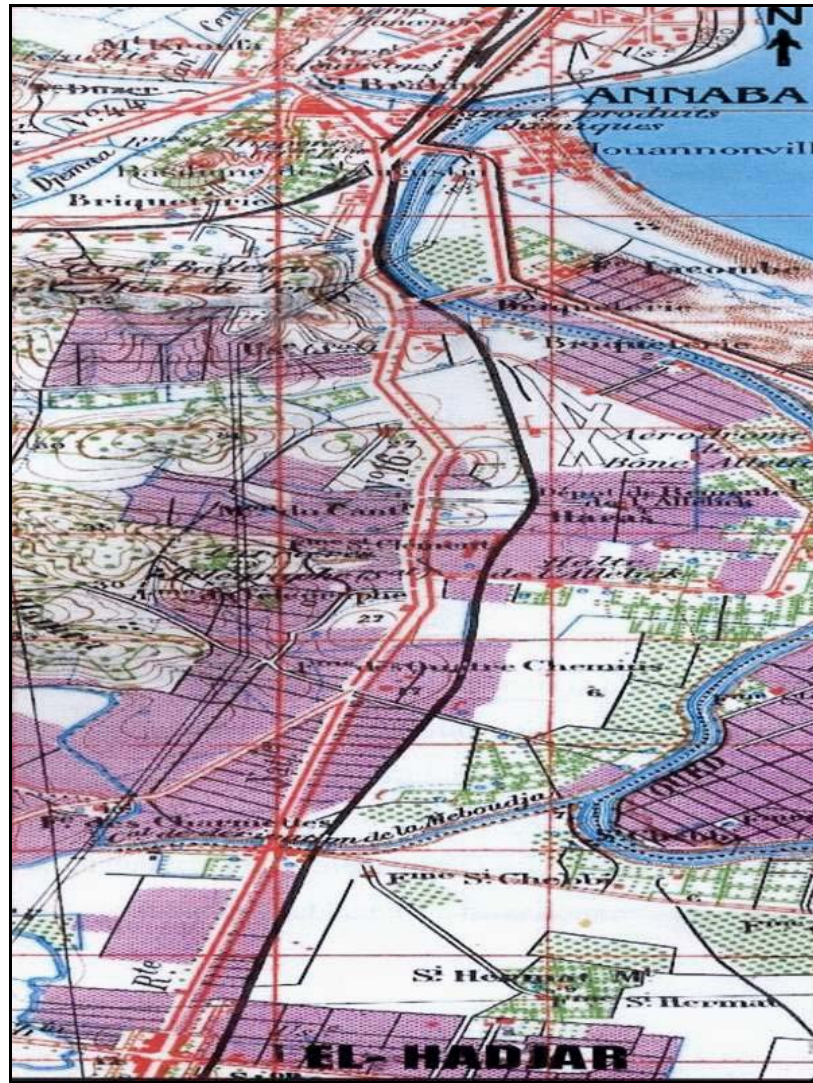
The natural landscapes of the Mediterranean basin are very threatened by the combination of a number of factors. Human influence is the most detrimental to the balance of our landscape that are already weakened by the topographic and climatic factors. In fact the improvement of the socio-economic situation marked with a large share of industrial development and on the other hand by the advent of extensive farming has created a structural and anarchic upheaval on our natural landscapes once. Thus, the development of means of communication, heavy infrastructure and the proliferation of signs and display is perceived as attacks on the integrity of our landscapes. Such a situation is typical of the wilaya of Annaba which remains a region of industrial, agricultural and touristic sectors [1]. This situation remains worrisome for a variety of reasons of which the most important in our view is the lack of landscape specialists able to establish a scale of value, which may reflect on the quality of the landscape in terms of the criteria of evaluation. Some approaches such

as Zube, Shafer, Fortin and Griselin [2, 3, 4, 5] are considered subjective because they prefer representations of estimation and value systems of spectators without giving importance to the role played by data spatial perception of the landscape. Other approaches such as the one used by Neuray, Fortin, Fadel [6, 7, 8] are considered objective, because they are using criteria that are dependent concrete forms of the landscape with a dominant share in its evolution.

#### Location and groupings landscape of the study area

The scope includes the study section of motorway between the towns of El Annaba Hadjar, occupies an area in a quadrilateral at the following coordinates:

6 ° East longitude - 6 ° East Longitude  
05 Latitude 41 ° North - 41 ° 05 North Latitude  
In terms of topography the perimeter study is fairly homogenous throughout its range. It provides a uniform set where the dip is relatively low understood from 0 to 5% (Fig.1).



Scale: 1/ 50.000

— Motorway section

**Figure 1:** Location and grouping landscape of the study area.

The highway of this section of motorway crossing the alluvial plain which was once exclusively agricultural. For four decades, the socio-economic change in this region has led to a real change groupings landscape both in their nature and in their vocation. They include:

- Agricultural fabric which is the most important because of its size. It presents a heterogeneous

- structure alternately perennial crops represented mostly by orchards and annual crops;
- The industrial units comprising several sources of multi-pollutants;
- Urban areas of Annaba, El Bouni and El Hadjar which revolve around this section are typically groupings artificial landscapes (Fig. 2)

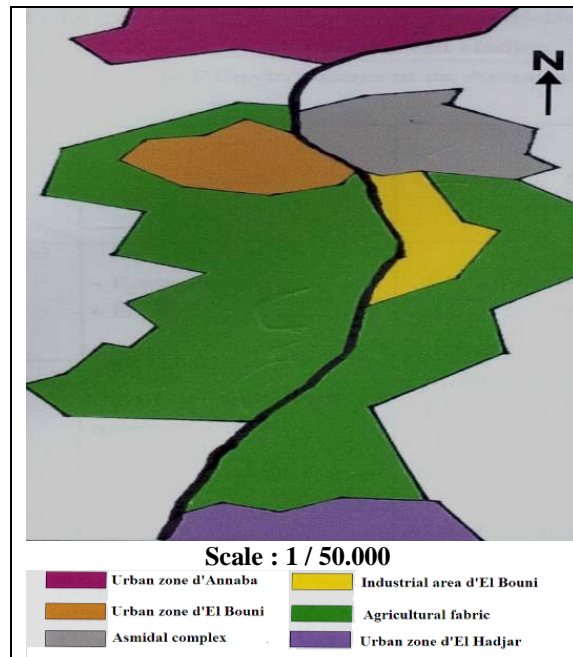


Figure 2: Groupings landscape study area.

2. Method of study

The study carried out on a ground need visual means and photographs from various points of view. The various visual fields on the existing motorway route linking Annaba to El Hadjar were inventoried and mapped during our trip by car from both directions of this axis. The points of view have allowed us to assess the overall value of

the landscape. Their location and their numbers are closely linked to the degree of the opening of the visual field [9, 10, 11]. As part of our work we found that the visual fields open and semi-open. Thus six points of views were reported on either side of this axis (Tab.1).

Location of points of view characteristic		Direction : Annaba towards El Hadjar						Direction : El Hadjar towards Annaba					
		Station 1 1 à 1,5 Km		Station 2 04 à 05 Km		Station 3 07 à 08 Km		Station 4 2,5 à 05 Km		Station 5 05 à 06 Km		Station 6 08 à 8,5 Km	
View direction		S	SW	S	SW	S	SW	N	NE	N	NE	N	NE
Length of the view(l) in hectometer		1,5	6,0	1,5	4,0	2,0	5,0	1,5	2,5	1,5	4,0	2,5	3,5
Has in degree Celsius	$\alpha$	40	40	00	00	00	00	00	00	00	00	45	45
	$\beta$	30	35	45	45	40	40	30	35	40	40	35	35
	$\gamma$	35	40	30	35	45	45	35	30	40	40	35	35
Made uneven perceived ( D ) in meter		05	05	00	00	00	00	00	00	00	00	04	04

Table1: Characteristics of views of motorway section.

The study method used to quantify groupings peripheral section of motorway is quite representative in determining the impact of this section of motorway on the quality of the visual fields. This method is widely used for quantification groupings rural landscape is best

suited for application to our study area, which includes an important agricultural fabric. It is a descriptive and static method. It can also be dynamic and forward-looking because it allows us to analyses the influence of any change to be undertaken on the views. This method described

by Neuray [6] uses the values of views which require prior listing of certain parameters such as:

- The length of the order  $L = \frac{1}{2} 10. \log_{10}.l$
- Calculating vertical dimensions views

$$R = 1 + \sin \alpha + \beta + \gamma + \sin d/100.$$

- Calculation of recovery  $S = 1 + 0, T.$

In awarding the key factors valued positively or negatively on 10 points and adding we get T.

-- Calculating the value of the elements ( $\Sigma_e$ ) quantified before or after development proposals. After calculating all the parameters above the basic value of the order is calculated using the following formula:

$$V = L \times R \times S.$$

The basic value of the order is a situation of the landscape seen from a point of view. The listing of the sum of the value of the items added to the basic value of the order gives the total value of the order according to the formula:

$$V' = L \times R \times S + \Sigma_e = V + \Sigma_e.$$

The sum of the value of elements taken into account their nature.

**Quantification of the sum of the values of the elements**

All landscapes may contain elements rewarding and degrading elements. The removal or the introduction of a single item in the landscape has an impact on the perception. Quantifying the value of the components could be positive or negative depending on the nature of the item and its integration into the landscape. The study conducted on the visual section of motorway, which connects Annaba to El Hadjar has allowed us to identify all the elements rewarding and degrading. The rewarding elements have been positive elements while the degrading or poorly integrated ones into the landscape are rated negatively. We have thus assigned to the elements rewarding +1 and -1 to the degrading elements (Tab.2).

Location of points of view Nature of the elements	Station 1		Station 2		Station 3		Station 4		Station 5		Station 6	
	S	SW	S	SW	S	SW	N	NE	N	NE	N	NE
<b>Elements rewarding</b>												
- Opening of the visual field	1	1	1	1	-	1	1	1	1	1	1	-
- Presence of successive planes	-	1	-	1	-	-	1	-	-	-	1	1
- Farm Cloth	-	1	-	1	-	1	-	1	-	1	-	-
- Shaft alignment or grove	-	1	-	1	-	1	-	1	-	1	-	-
- Wooded mountains	-	1	-	1	-	1	-	1	-	1	-	-
- Set the relief	1	-	-	-	1	1	-	-	-	-	1	1
<b>Elements degrading</b>												
- Closure of the visual field	-	-1	-	-	-	-	-	-	-	-1	-	-1
- Barriers and other metal	-	-1	-	-	-	-	-	-	-	-	-	-
- Industrial Units	-	-1	-	-	-	-	-	-1	-	-1	-	-1
- Electricity pylons	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
- Residential, urban areas	-1	-1	-	-	-	-	-	-	-	-1	-1	-1
- Relief uniform	-	-	-1	-1	-1	-1	-1	-1	-1	-1	-	-
<b>sum of the value of the (<math>\Sigma_e</math>)</b>	0	0	-1	3	-1	3	0	1	-1	-1	1	-2

Table 2: Highlights the value of the elements in the scope of study.

**3. Results and discussion**

Table 3, includes all the parameters of the six stations on the route chosen motorway Annaba - El Hadjar - Annaba. On this double-entry table, representing the various data that fall into the formula for the basic value and the views that are:

- View of the length (L).

- Vertical dimensions views (R)

- Recovery factors views (S)

The results of the calculations of the values of the views of six stations are recorded on table 4. They include both the basic value of the order (V) and basic value of the order to which is added the sum of the value of the ( $\Sigma_e$ ).

Location of points of view characteristic	Direction : Annaba towards El Hadjar						Direction : El Hadjar towards Annaba					
	Station 1 1 à 04 Km		Station 2 04 à 07 Km		Station 3 07 à 08 Km		Station 4 2.5 à 03 Km		Station 5 05 à 06 Km		Station 6 08 à 85 Km	
View direction	S	SW	S	SW	S	SW	N	NE	N	NE	N	NE
Length of the frame (l) in hectometer	1.50	6.00	1.50	4.00	2.00	5.00	1.50	2.50	1.50	4.00	2.50	3.50
Calculating the length of the order $L = 1.2 \log l$	0.88	3.89	0.88	3.01	1.50	3.49	0.88	1.99	0.88	3.01	1.99	2.72
Vertical dimensions of views (R)												
$\sin \alpha$	0.64	0.64	00	00	00	00	00	00	00	00	0.71	0.71
$\sin \beta$	0.50	0.57	0.71	0.71	0.64	0.64	0.50	0.61	0.50	0.57	0.57	0.57
$\sin \gamma$	0.57	0.64	0.50	0.57	0.71	0.71	0.57	0.50	0.64	0.64	0.57	0.57
$d = D \cdot 100$	0.05	0.05	00	00	00	00	00	00	00	00	0.04	0.04
$R = 1 + \sin \alpha + \sin \beta + \sin \gamma + d$	2.76	2.90	2.21	2.28	2.35	2.35	2.07	2.11	2.14	2.21	2.89	2.89
Enhancement factors of views (S)												
	03	02	03	05	03	07	04	03	03	07	06	01
- Dimensions of the qualities of open space	02	03	03	06	02	08	04	03	03	06	06	02
- Framing the view	02	03	04	06	02	08	03	04	04	05	07	02
- Distribution of elements in the landscape	03	04	02	07	01	08	02	02	03	04	07	01
- Distribution of elements in the background	04	05	03	08	03	08	03	04	04	05	06	02
- Visual Quality	01	04	03	07	01	07	02	05	04	05	07	02
- Integrity	01	07	01	07	01	07	01	02	02	04	06	03
- Presence of successive planes												
$T$	16	28	19	46	13	53	19	23	23	36	45	13
$S = 1 + 0, T$	1.16	1.28	1.19	1.46	1.13	1.53	1.19	1.23	1.23	1.36	1.45	1.13

Table 3: Parameter values: current situation.

Stations Value views	Station 1		Station 2		Station 3		Station 4		Station 5		Station 6	
	S	SW	S	SW	S	SW	N	NE	N	NE	N	NE
Base value of views $V = L \times R \times S$	2,8	14,4	2,3	10,0	4,0	12,5	2,2	5,2	2,3	9,1	8,3	8,9
Value views $V' = V + \Sigma_e$	2,8	14,4	1,3	13,0	3,0	15,5	2,2	6,2	1,3	8,1	9,3	6,9

Table 4: Value of the views of section of motorway Annaba - El Hadjar - Annaba

From this table, it is apparent that the values of views with the direction north and south are the lowest. By contrast those with north-east and south-west recorded the highest values. Indeed, the values of views stations 1, 2, 3, 4, 5 and 6 oriented in directions north and south remain relatively low because the orientations of these stations are confused with the axis of the visual field highway and therefore the spectator rather concentrated by the conduct can not appreciate or depreciate all items that fall within its field of vision. They recorded values equal to or inferior than those basic values of sight. Those who have a direction

north - east and south-west have experienced an increase or a decrease compared to baseline views. This positive development was recorded at stations 2, 3 and 4 oriented in the direction north-east and south-west. It is mainly linked to the presence of valuable elements which integrate harmoniously in the landscape of these stations (photos 1 and 2 in Fig.3). The stations 5 and 6 with a north-easterly direction have recorded the depreciation in the value base of sight due mainly to the elements that have had a negative impact on the visual level of these stations (photos 3 and 4 in Fig.3).



Figure 3: Views on elements of the highway landscape.

This devaluation increased the visual environment is the result of the implantation disorderly elements such as artificial electricity pylons, metal fencing, anarchical constructions that have degraded the landscape which was originally rural and well structured, which was easily grasped visually [12,13,14;15]. By comparing the results of the quantitative method for estimating quality which is a typical visual method, we note a fairly strong convergence between the results and visual assessment. Despite their vast differences in implementation, the results are practically the same as for the visual fields open and semi open. These similarities have been reinforced by previous work Fadel (1979), Richard (1985), Haou (1999) and Fortin (2004).

#### 4. Conclusion

The work we have done is in itself a new experience and an example to follow in the field of space management by all those who support the policy of regional planning. Indeed, the quantitative estimate of the peripheral groups landscaped section of motorway connecting Annaba to El Hadjar responds to specific questions and achievable in the field on a possible recovery of visual fields and the landscape sequences along the thoroughfare. The results of the value of views obtained can be considered when treating this area bearing in mind to put the necessary resources to enhance the landscape motorway given the socio-economic developments.

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