

Assessment of quality and attraction of the sandy beaches of Nador province - Morocco

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Abstract. In the framework of the European Commission funded SMAP III program, a pilot project dealing with the development of a Plan of Action for integrated coastal zones management in the province of Nador, Morocco, was implemented (2006-2009), by an International consortium with the local coordination of Ecole Nationale Forestiere d'Ingénieurs. The overall goal of the project was to contribute towards resolving conflict between different actors and developing 'win-win' situations for the prevailing conservation and economic activities. Local beaches which are mostly composed of sand are among the main attractions of holiday tourists to the area. This paper covers investigations of scenic quality evaluation and the application of the Bathing Area Registration and Evaluation technique (BARE) for the bathing area classification of 20 beaches in Nador province. Among the beaches studied, 17 are rural/remote areas, two are 'resort' and one is a 'village' place. Coastal Scenic Evaluation (CSE) criteria was used to assess scenic quality and identify places of highest tourist potential and application of the BARE technique was used to evaluate beaches with reference to a wide variety of beach types and beach user's preference and priorities. Five parameters (safety, water quality criteria, availability of facilities, hinterland scenery, litter) were evaluated by the BARE and each one was rated from A to D. Based on integration of the rating scores for the five parameters, an overall Bathing Area Classification which also takes into account beach type sensitivity, was derived based on criteria awarding 1 – 5 Star classification. The presence and abundance of litter in *all* sites brought down their star ratings. On the CSE scale, litter has high priority and the litter found adversely affected the quality value. This classification identified only one first Class site, but many others could be improved by ensuring that the beaches were cleaned litter.

Key words: Beach survey, BARE system, Coastal Scenic Evaluation, Nador Province

Résumé. Evaluation de la qualité et de l'attraction des plages sableuses de la province de Nador – Maroc. Dans le cadre du programme SMAP III, financé par la Commission européenne, un projet pilote relatif à l'élaboration d'un plan d'action de Gestion Intégrée des Zones Côtières (GIZC) dans le littoral de la province de Nador, Maroc, a été mis en œuvre par un consortium international coordonné localement par l'Ecole Nationale Forestière d'Ingénieurs, durant la période 2006-2009. Le but global du projet était de contribuer à la résolution de conflits potentiels d'usages entre différents acteurs et aider à développer des solutions 'gagnant-gagnant' favorables à la conservation des ressources naturelles et au développement d'activités économiques dans le littoral. Les plages locales qui sont dans en grande majorité sableuses constituent les principales attractions pour les touristes estivant. Cet article porte sur l'évaluation de la qualité paysagère des plages et l'application de la technique 'Bathing Area Registration and Evaluation technique (BARE)' pour la classification de 20 plages dans la province de Nador. Parmi les plages étudiées, 17 sont rurales/lointaines, deux sont des stations balnéaires et une est de type plage villageoise. L'évaluation paysagère côtière (CSE) a été utilisée pour évaluer la qualité paysagère des plages et identifier les sites à potentiel touristique élevé, et la technique 'BARE' a été employée pour catégoriser les plages en fonction d'un certain nombre d'indicateurs et selon les préférences des usagers de ces plages. Cinq paramètres (sûreté, qualité de l'eau, disponibilité des équipements, paysage, présence de déchets solides) ont été évalués par la technique BARE et chacun a été classé de A à D. En fonction des critères d'évaluation de ces cinq paramètres, une classification globale des zones de baignade prenant en considération également le degré de sensibilité des plages, a été développée en se basant sur des critères de classification de 1 à 5 étoiles. Sur l'échelle de 'CSE', la présence de déchets solides sur les plages constitue le critère le plus important qui a affecté leur qualité, et par conséquent une seule plage s'est vu attribuée la première classe, mais beaucoup d'autres pourraient voir leur qualité s'améliorer si elles étaient nettoyées.

Mots clés : Suivi des plages, Technique BARE, évaluation paysagère des côtes, Province de Nador

INTRODUCTION

Beaches are main attractions for the bulk of holiday tourists and consequently represent a highly valued resource and with increasing demand for leisure opportunities, beach environments figure highly in any social valuation of coastal recreational amenities. In this context, the impact of sound beach management can be seen as effective utilization of an increasingly valuable national resource. In practice, beach management

addresses socio-economic and environmental considerations as well as engineering aspects largely related to sediment dynamics. Beach rating procedures and award schemes tend to either focus on single or few issues of concern to beach users, or ignore the nature of varying beach types and individual beach type requirements. Repeated surveys have shown that five factors are extremely important in determining a successful beach holiday (Micallef et al. 2004, Williams 2011). These are: safety, water quality, facilities, scenery and litter. A novel

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system for beach evaluation – the Bathing Area Registration and Evaluation system (BARE), follows these findings and includes these five most important evaluation parameters (Micallef *et al.* 1999, 2004, Micallef & Williams 2002), i.e. safety, water quality, availability of facilities, scenery and litter. Their prioritization is a function of beach type. The choice and order of priority of parameters considered for the bathing area classification system was ascertained on results of literature surveys concerning beach management guidelines, together with view-points expressed by beach-user questionnaire/beach rating surveys (e.g. Chaverri 1989, Morgan *et al.* 1993, Williams & Morgan 1995, Morgan *et al.* 1995, Williams & Davies 1999, Micallef *et al.* 1999, Williams *et al.* 2000, Ergin *et al.* 2002, Williams & Micallef 2009).

The BARE approach differs from other beach rating/award giving schemes on a number of issues (Micallef & Williams 2002). It evaluates the bathing area as a whole; it considers a wider variety of beach types; it focuses on five main beach-related issues rating highly in beach user preferences and priorities for beach rating and subsequent classification; and it awards a bathing area classification, not as an incentive for enhanced advertising potential but primarily as a tool to identify priority needs in management.

The aesthetic quality of landscape is often assessed using checklists to rate different scenic characteristics. Checklists can be extremely helpful, and in this paper use was made of Leopold's (1969) seminal paper. Leopold (1969) arrived at a series of parameters that he claimed could assess the aesthetic value of a site. He ranked parameters on a 1-5 scale (bad-good) and produced several calculations and graphs depicting and rating the aesthetic ratings of the chosen sites. The Coastal Scenic Evaluation (CSE) methodology developed by Ergin *et al.* (2003) was used to assess scenic quality for developing conservation/management measures and help foster leisure activities, which rely on natural scenery and not on man-made activities. It has proven to be a valuable tool for landscape preservation, protection and improvements (Williams *et al.* 2011).

Beach tourism is one of the main income generating activities for local actors in the province of Nador, Kingdom of Morocco. This study was funded by the European commission under the SMAP III program, during the implementation of a project dealing with the development of a Plan of Action for Integrated Coastal Zones Management (ICZM) in Nador Province, locally coordinated by Ecole Nationale Forestière d'Ingénieurs, during the period 2006-2009. It covered investigations of scenic evaluations in the coastal area of this province, with the objective of selecting future potential tourist sites, together with the application of the BARE system for a bathing area classification. The study covered 20 sites (Fig. 1) in total. The BARE System allows an identification of management priorities required to improve the quality of individual beaches and therefore to increase income from tourism.

METHODOLOGY

The BARE system was applied to beaches (remote, rural, village, resort –no urban beaches were investigated) with the purpose of demonstrating method and ease of application to diverse beach environments. BARE incorporates a *Register*, used to collect a wide array of data pertinent for subsequent beach management purposes and a *Rating & Classification system* relating, in order of priority to safety parameters, water quality criteria, availability of facilities, beach surroundings and litter assessment.

The BARE technique defines these beach types as follows (Williams & Micallef 2009):

Remote: A bathing area largely defined by its difficult access and not supported by public transport, no public service facilities and very limited (0 – 5 if any) temporary summer housing and absence of safety-related facilities and “official” water quality monitoring.

Rural: A bathing area located outside the urban environment and not readily accessible by public transport and usually having no public service facilities. Housing at rural bathing areas may be limited in number (0 – 10), either of a temporary (summer) or permanent (year long) nature, but having no community focal centre such as local shops or cafes. At such bathing areas, public service and safety-related facilities and “official” water quality monitoring are not expected.

Village: A village bathing area is one associated with a small but permanent population reflecting organized but small-scale community services but located outside the main urban environment. Village bathing areas may be reached by public and private transport and would offer some basic safety-related facilities such as fixed safety equipment or safety related warning notices. Water quality monitoring would be expected at such bathing sites.

Urban: Urban bathing areas are sites within the immediate urban environment and may therefore serve large communities with well-established public services. Stringent safety-related facilities and water quality monitoring would be expected at urban bathing areas. *None* were found in the current study.

Resort: A resort bathing area is defined by its largely recreational orientation and usually, by an absence of any marine-based commercial activities. It is served by a wide variety of public service facilities such as large hotels, good camping grounds, restaurants, beach showers and beach-related recreational activities. Resort bathing areas are managed by the resort and are mainly opened for resident users. Stringent safety-related facilities and water quality monitoring are expected at resort bathing areas. Water quality is based on Government statistics or visual observation, while safety and facilities on a beach are easily recorded.

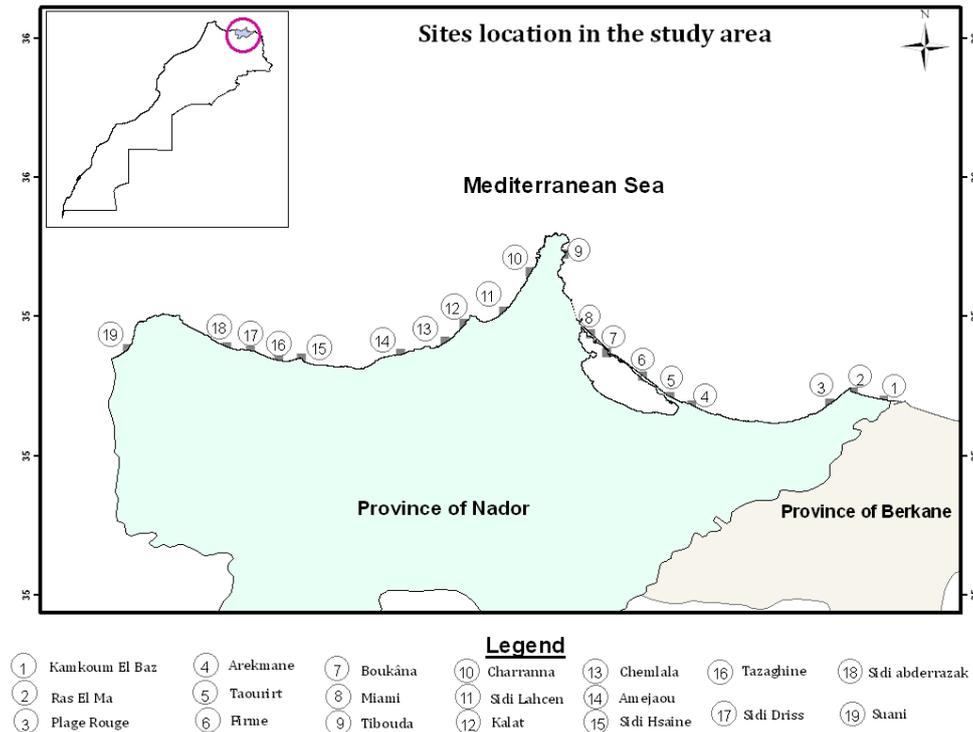


Figure 1: Sandy beaches location in the study area.

For each of the five parameters evaluated (safety parameters, water quality criteria, availability of facilities, hinterland scenery, litter), a rating scheme (sensitive to beach type requirements) was developed enabling a rating score A–D to be awarded for each parameter. By integrating the five rating scores awarded, an overall Bathing Area Classification that also recognizes beach type sensitivity is enabled based on criteria awarding 1–5 Star classification.

Safety-related parameters are recorded using a check-list approach which refers to presence/absence of lifeguards, fixed safety equipment, first-aid posts, swimming safety warning notices, emergency phone facilities, bather / boat zonation marker buoys and a safe bathing environment. Scoring of this criterion is carried out according to a rating scheme that distinguishes between beach type and safety equipment expected (Micallef *et al.* 2004).

Facilities utilize a checklist approach, the priority of facilities reflected known beach user preferences and priorities. This allows for identification of beach-user trends, for different times of the day that is relevant for determining operational management strategy for provision of services e.g. beach / toilet /shower cleaning and other supervisory operations. This data has strong management relevance in that it can be used to effective allocation of potentially limiting resources such as lifeguards.

Scenery involves assessing and rating 26 coast-related parameters, each sub-divided into five categories. Site evaluation involves a technique described by Ergin *et al.* (2002, 2003) who applied a Fuzzy Logic System approach in order to obtain an objective evaluation of an otherwise

subjective entity. The end-result provided a site evaluation table, which grades coastal scenery into 5 distinct classes, A – E, by virtue of a Decision parameter (D) value (Ergin *et al.* 2003, 2004). Five classes of scenery can be represented: Class I (extremely attractive natural site with a very high landscape value); Class II (attractive natural site with high landscape value); Class III (mainly natural with little outstanding landscape features); Class IV (mainly unattractive urban, with a low landscape value); and Class V (very unattractive urban, intensive development with a low landscape value). For this study, the two final classes (IV and V), were grouped together in order to present four grades (A-D) used in the BARE evaluation.

Litter was recorded and scored according to the EA/NALG (2000) Protocol, which involves surveying a 100m stretch of beach (50m each side of an access point), assessing the amounts of litter in the area between the high water strand line and the back of the beach (Table I). The sampler should assess the area behind the high water strandline, and then walk along the high water strandline and back between the two strandlines, recording the number of items in each category.

The classification scheme, based on four Grades A - D, describes the aesthetic quality as Very Good, Good, Fair and Poor respectively. The overall grade is the worst grade of the individual grades for each parameter. Litter items are graded on the total numbers counted in each category. Accumulations are graded according to the number of occurrences. Oil is assessed on an estimate of its presence or absence in the survey zone. The final grading is simply the worst grade for any of the above parameters. For example, if a beach is graded “A” for all parameters except

General Litter which was “B”, the overall grade assigned to the beach is “B”. In addition to the seven commonly occurring categories of beach litter (Table I), there will be occasions when other items will be found during a survey. While these are not included in the formal classification of the beach they should be recorded on the survey form. Examples of such items are, coal and other types of industrial waste.

For the public perception study, some 176 (124 male, 52 female) beach users were questioned as to what they

thought best exemplified attractive, and its corollary, unattractive, coastal scenery. Sixty eight people were in the 18-29 age group, 82 in the 30-44 bracket and 26 in the 45-65 bracket. In essence, field work consisted of checking a box (1 to 5 attribute scale – presence/absence or poor quality [1], to good [5]) for all listed parameters. This perception study, enabled weightings to be given to these parameters. To quantify any uncertainties and subjective pronouncements inherited in assessment parameters a Fuzzy Logic Assessment (FLA) approach was used as an appropriate methodology (Zadeh 1965).

Table I: Litter categories (after EA/NALG 2000).

Category	Type	A	B	C	D
1. Sewage related debris	General	0	1-5	6-14	15+
	Cotton Buds	0-9	10-49	50-99	100+
2. Gross Litter		0	1-5	6-14	15+
3. Genral Litter		0-49	50-499	500-999	1000+
4. Harmful Litter	Brokeb class	0	1-5	6-24	25+
	Other	0	1-4	5-9	10+
5. Accumulations	Number	0	1-4	5-9	10+
6. Oil		Absent	Trace	Nuisance	Objectionable
7. Faeces		0	1-5	6-24	25+

RESULTS AND DISCUSSION

Scenery

The calculated scenic values (D) for all sites gave the following results (Table II)

Class I

Kamkoum El Baz, was the only first class site seen. With respect to the physical parameters: spectacular cliff formations, beach characteristics, landscape features, natural vegetation features and dunes each scored scores maximum values. Human parameters (except the ubiquitous litter problem), obtained the highest attribute values. Litter was found on the full strand line.

Class II

Three sites fell into this category. Taourirt had excellent attribute values for its beach, even though no cliff/rocky shore existed. Several dunes were seen and its skyline form was very good. All human parameters were excellent except for litter and sewage evidence. Sidi Driss had a very good attribute score for its beach and valley parameters. With regard to human parameters, no sewage evidence was found and little urbanization has occurred. Litter had an attribute score of 1 with continuous accumulations being found. Plage Rouge - a small pocket beach, scored highly on its cliff, valley and beach parameters. Human parameters scored well apart for litter.

Class III

Eight sites were found. Natural parameters tended to be similar for all sites. Litter and urbanization were the common denominator for the lower scoring of the Bokana site. Investigations on the western and eastern environments revealed similar characteristics apart from the built environment factor. The eastern segment was rated a class III whereas the west was a class IV. The

former has had sensitive urbanization, whereas the latter had heavy industry (e.g. commercial port), which affected the rating. Kalat is a future resort site and as work is in progress here, results will undoubtedly change in the near future. Little litter was found here as a result of the construction process.

Class IV

A further nine sites fell into this group. Nothing spectacular was seen with respect to the physical parameters. Most all had no cliff/rocky shore and medium values for the rest. The low values were based in the main on litter and urbanization together with little natural vegetation.

Table II: Scenery D values for investigated sites.

Site	D Value	Class
Arekmane	0.14	IV
Amejaou	0.36	IV
Boukane East	0.44	III
Boukane West	0.27	IV
Charanna	0.36	IV
Chemlala	0.54	III
Firma	0.54	III
Kalat	0.40	III
Kamkoum El Baz	0.92	I
Miami West	0.09	IV
Miami East	0.09	IV
Plage Rouge	0.66	II
Ras El Ma	0.08	IV
Sidi Abderrazak	0.33	IV
Sidi Driss	0.61	II
Sidi Hsaine	0.55	III
Sidi Lahcen	0.47	III
Suani	0.09	IV
Taourirt	0.77	II
Tazaghine	0.43	III
Tibouda	0.48	III

BARE classification

Rural (Table III)

Fourteen sites fell into this category, and the dominant characteristic was that litter brought all sites (except Sidi Driss) down to a one star level. The amount of litter evident on the beaches was appalling. Especially apparent was the dominance of glass, which in many cases was then main cause of such low litter gradings. The main problem stemmed from litter accumulations at the rear of the beach, which inevitably was never swept clean and consequently accumulations were ubiquitous. Beaches in eastern Nador appeared to be in a far worse state than those to the west, although the whole coast was very bad. For examples, in the surveyed areas: Sidi Lahcen 86 glass items, Boukama East 64, Chemlala had 56, Charanna 54, Suani 44, Amejeau and Firma 35 each. Typical general litter counts were of the order of several hundreds, e.g. Boukama East

660, Charanna 710, with Amejeau being the lowest (284). The litter at Amejeau was ‘low’ by virtue of a cafe proprietor who swept the beach himself, but did not appear to bother with the rear beach. This was unfortunate as the beach as a whole was excellent. Nails hammered through planking also contributed to the low score, e.g. being counted at Tazaghene. Gross litter was not readily encountered but 15 items were recorded at Chemlala! No oil or faeces were recorded at any site and only small numbers of sewage items and accumulations were found. Scenic evaluations were graded C or D and these grades mainly concerned the litter encountered. Visual observation of water quality was carried out at all sites even though it was not needed for analysis and Charrana stood out as it failed completely due to floating debris. Cleaning of beaches, it cannot be stressed enough, would change ALL of the star grades.

Table III: Star rating for rural sites investigated

Site	Water quality	Scenery	Litter	Grade
Amejaou	A	D	D	*
Boukana East	A	D	D	*
Boukana West	A	C	D	*
Charrana	D	D	D	*
Chemlala	A	C	D	*
Firma	A	C	D	*
Miamai East & West	A	D	C	*
Sidi Driss	A	C	B	***
Sidi Hsaine	B	C	C	**
Sidi Lahcen	A	C	D	*
Suani	A	D	B	*
Taourirt	A	D	B	*
Tazaghene	A	C	D	*
Tibouda	A	C	D	*

Table IV: Star rating for remote sites investigated.

Site	Water quality	Scenery	Litter	Grade
Kamkoum El Baz	A	A	D	*
Plage Rouge	A	B	B	***
Sidi Abderrazak	A	D	C	*

Table V: Star rating for ‘Village’ and ‘Resort’ site investigated.

Site	Water quality	Scenery	Litter	Facilities	Safety	Grade
‘Village’ site investigated						
Ras El Ma	A	D	C	B	C	***
‘Resort’ site investigated						
Arekmane	A	D	C	B	B	*
Kalat	A	C	B	!	!	Unknown

Remote (Table IV)

Three sites were found. Sidi Abderrazak had 7 glass items and 380 general litter items, so could easily have obtained a B grade which would have given it a 3 star rating. Litter was essentially strand line so could easily have been cleaned. Plage Rouge, a small pocket beach had similar characteristics with 310 general items recorded and two accumulations. This could easily have been graded an A beach, and hence a 4 star rating. Kamkoum El Baz rated the highest value with respect to scenery (A), as the beach

is located in front of a spectacular cliff face fronted by dunes. However the amounts of general litter (775) and broken glass found (46) caused it to score a low litter grade.

Village (Table V)

Only one site was recorded. Safety wise no zonation markers were found or fixed safety equipment; the human resources re scenery were generally poor, which together with >750 general litter items, all conspired to give a poor

grade. Four sewage related items were counted as were 4 gross litter items and 1 nailed plank.

Resort (Table V)

Two were found. Kalat is an exception in that it is being made into a resort and construction is currently under way. This meant that no facilities or safety equipment is currently in the region so the grade cannot be given. Litter wise, 1 nailed plank and some 433 general litter items were counted, whilst the human parameters scored mainly in the mid- range. Arakmane, was an interesting location. Locals maintain that it is a 'resort' town', yet it has few of the characteristics of a standard resort. As regards safety, zonation markers were not evident; litter wise, sewage items, gross litter and general litter earned it a C grade. The question of zoning bathing areas is problematic. Throughout the northern Mediterranean, bathing areas are invariably zoned. In the case of Morocco, this does not appear to be the case, and these categories will invariably fail to reach an A grade under the current scheme.

CONCLUSION

The work carried out in this paper represents state of the art baseline information and involves innovative techniques. The study sites selected fell mainly in rural/remote areas and only two 'resort', one village and no urban site was seen. The overwhelming conclusion was that the appalling amount of litter found at all sites, dragged down star ratings. The CSE study identified only 1 Class I site, but many others could be upgraded by ensuring that the beaches were free of litter. The absence of litter is a high priority for beach users and cleaning up the beaches would be a start. However, this is not the answer, as cutting off litter at source is the key to successful control. This necessitates a long gestation period and involves culture, education, the home environment and peer pressure.

Some suggestions, in no particular order are given. The lagoon area - a Ramsar site -, has a very clear issue. It has a serious water pollution problem and also a huge litter problem, and the whole of the investigated area has this litter issue. Tourism, an economic potential, can easily be developed for the areas west of Nador. The area has a natural beauty, has easy access and little urban and industrial development. For any sustainable development, some tools for success are eco-tourism, controlled urbanization, controlled tourism development, eco-agriculture, handicrafts etc.

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