Evaluation of cattle and sheep buildings with their surroundings using 'visual quality assessment' technique

T. TAŞKIN[1], A. KAPLAN[2], A. ÖNENÇ[1], C. C. HEPCAN[2]

[1]*Ege University, Faculty of Agriculture, Department of Animal Science, İzmir, Turkey*
[2]*Ege University, Faculty of Agriculture, Department of Landscape Architecture, İzmir, Turkey*

ABSTRACT: This study was conducted to assess visual quality of cattle and sheep housings with their surroundings across the seven districts of İzmir province, located in western side of Turkey. A total of 58 animal farms consisting of 31 cattle and 27 sheep farms were investigated. After watching the videos of all animal housings with their environs, each sample lasts for approximately 60 seconds, the 250 photos derived from the video scenes were evaluated by an expert group of 30 respondents in one panel. The respondents were asked to rate visual quality of each photo and its features on a five-point scale in order of district and farm type (cattle or sheep). The results showed that efficiently constructed and managed animal farm buildings in compliance with their surroundings were rated higher than the ones that are built on an ad hoc basis as well as irrelevant to their environs. Visual quality scores increased directly with natural landscape features (topographic attributes such as hill and plain, the presence of plant cover) and decreased with the mostly presence of man-made elements (transformer and electric lines, road, water channel, settlement) besides unplanned layout of the buildings and its facilities, proximity to highway and urban/rural settlements, worse manure management.

Keywords: animal building; visual quality assessment; cattle and sheep farms; agricultural landscape

Increasing number of animal farms, proximity to rural and (semi) urban settlements and highways have been leading some major environmental and visual pollutions or constraints (SULLIVAN et al. 2004). Socio-economic based land use decisions and poor management in animal production areas caused to decrease the overall visual quality of the landscape and its features. Rural and urban fringed landscapes have recently become the setting of the most intense growth and change in the majority of both developing and developed countries (FRIEDBERGER 2000). One consequence of this new development is that non-farm residents increasingly come to live in close contact with animal farms. Such a close association often results in conflicts that reduce the likelihood of a satisfying co-existence between farmers and non-farm residents (DANIELS 1999; HAMMOND 2002). However, urbanites outside of central cities enjoy the open space, bucolic environment of the agricultural landscape and modern farms. They often find themselves annoyed by dust, noise, slow traffic, and odours that accompany farming operations (KENDALL 1993; HAMMOND 2002).

Visual assessment as an essential component of Environmental Impact Assessment (The Landscape Institute, Institute of Environmental Management Assessment, 2002) is beyond the scope of just assessing landscapes and their natural and cultural features visually and/or aesthetically. As a tool, it embodies a full range of measures including the surveying of existing landscapes and its elements, development projects, and anticipating some detrimental effects of some possible investments incurred in either rural or semi urban areas. These are all in close affinity with designating proper site for animal husbandry and its buildings within agricultural landscape, otherwise buildings on an ad hoc basis could concern neither animal production planning, waste management, animal welfare nor visual intrusions across the landscape that could be measurable through a wide range of visual quality assessment techniques.

However, visual studies majoring in rural and urban landscapes have not yet been employed at the level of animal buildings and their surroundings across Turkey although animal production especially cattle and sheep husbandry is very important in Ege region, western part of Turkey (SIS 2002). Environmental and visual problems have been steadily growing in the densely urbanised regions non-farm residents endure some discomfort conditions. However, changes in the landscape patterns and their ecological functioning are not yet prioritised in a wide variety of planning pursuits. New approaches have been required for assessing the impact of animal housing layout and its adaptation with the environs. Besides, for the identification, prediction and evaluation of animal farms' environmental effects, various information should be gathered to reduce negative effects of animal housing on animal and human welfare during the project feasibility phase.

The aim of this study was to assess the visual quality of each cattle and sheep housing and its facilities, and the relationship between the animal farm building as a corporate body and its surrounding. This work may thus be the first of its kind in visual studies to allow visual

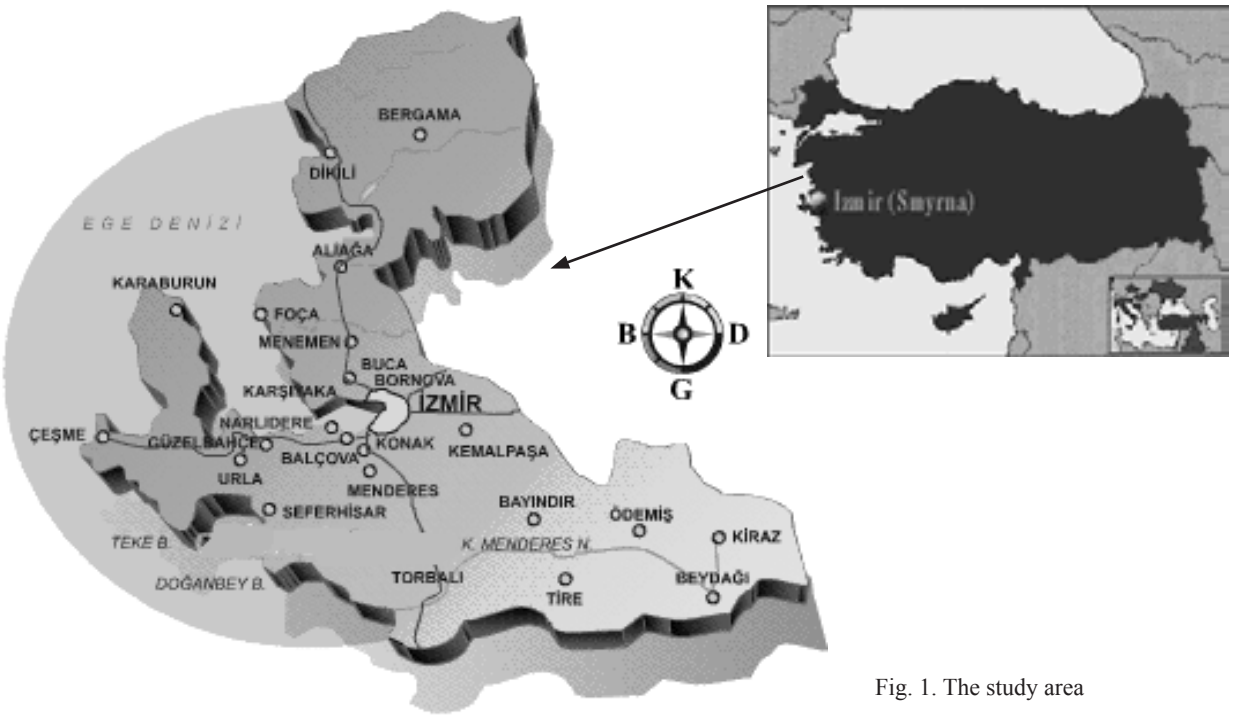

Fig. 1. The study area

quality assessment as a tool that should be engaged into the inception of proper site selection process through the layout of animal building within the ongoing project feasibility phase.

MATERIAL AND METHODS

The study material is İzmir province with their seven districts (İzmir center, Menemen, Torbalı, Bayındır, Tire, Ödemiş and Seferihisar), located in western of Turkey. İzmir is the biggest province of Ege region and the third biggest province of Turkey (Fig. 1). Rural activities in these districts include primarily livestock farming (both cattle and sheep husbandry) and other agricultural pursuits.

Studies in the region were carried out between April and May 2004 due to the vegetation period that enabled us to observe and analyse all kinds of natural and cultural landscape features explicitly. Approximately 20 animal farms were visited every week and a total of 58 animal farms consisting of 31 cattle, 27 sheep farms were selected due to that they represent or display the most common characteristics in terms of both animal building and landscape diversity.

Animal buildings and the most relevant features of the landscapes were filmed using a digital video camera (Sony 700× Digital zoom, optical 20 × Hi8/8mm playback with USB streaming digital handy cam) on clear days. Five minute-colour video displays were taken from each sample including animal farm and its surrounding to show the most relevant features of landscape. Following the complete field study, videos were edited by computer-aided image-capture technology using Ulead Video Studio 6 SE Basic software. Each of five minute-colour video was trimmed to one minute-video and colour pictures were selected from these video displays presenting all significant details for each farm building and its environmental attributes (crops, fields, mountainous areas, plain, sky, man-made elements – transformer and power lines, roads, channels, borders, fences …). Videos and pictures were then exported to MS PowerPoint presentation media.

Videos and afterwards slides (photos) displaying each animal building and its environs were presented in order of district and farm type (cattle or sheep). A questionnaire was previously designed to measure the evaluation of the expert group on the selected photos. The questionnaire sheet consisted of two basic questions about slides. Participants were first asked to rate the overall visual quality of slide(s) – one to three pictures-projected on the screen, displaying separately either animal building with some units or complete establishment with its vicinity consecutively. Positive or negative effect of each perceived landscape attribute or element (sky, hill, plain, plant cover, settlement, transformer and power lines, road and highway, water channel, buildings, manure mass and agricultural machines, border or fence) and each facility of animal building and its units (construction material, manure pit, feed storage and silage pit) contained in photos were then asked to be fixed by the participants.

A total of 58 min video and 250 selected photo-based 58 slides were evaluated by 30 participants in one panel. Panel was conducted at the studio of Landscape Architecture Department in Ege University following standard visual assessment practices (SMARDON et al. 1986).

Participants (respondents) consisted of graduate students and researchers at landscape architecture or animal science departments who were well-informed on visual studies and animal housing topics. The rated slides were exposed for 60 s which was found to be sufficient time to comprehend the slides. To refresh all the participants,

three breaks – each 10 min – were given during the panel. Total panel period took approximately 150 min (58 min video + 58 min photo-based slides + 30 min break = 146 min). Before the panel, the respondents were informed on the study and the procedure of filling out the questionnaire sheet and rating scale.

Respondents were asked to watch one minute-video, later evaluate the photos. The evaluation was based primarily on the visual aspects of the setting other aspects such as sound and other environmental constraints or opportunities as BALLING and FALK (1982) suggested. Likewise several researches indicate that video images and sequences contributed significantly to the perception of slides by the respondents. Each preference was recorded by a five-level rating system which indicates the pleasure or satisfaction experienced by the individual in the following terms: Very High = 5, High = 4, Moderate = 3, Low = 2, Very Low = 1. In this study, as VINING and STEVENS (1986) stated, scenic beauty of the setting and the effect of the intensity of landscape attributes and elements via observer preferences were assessed.

Statistical analyses

Data were analysed using the linear model (GLM) procedure of SPSS (1999). The following statistical model was used for analysing of each visual quality score.

$$Y_{ij} = \mu + a_i + b_j + e_{ijk}$$

where: Y_{ij} – individual visual quality score,
μ – general mean,
a_i – effect of i^{th} district (i = 1, 2, 3, 4, 5, 6, 7),
b_j – effect of j^{th} farm type (j = 1, 2),
e_{ijk} – residual error normally distributed with mean 0 and variance σ_e^2.

The model was designed to determine the effect of district and farm type on visual quality score. Data were split into districts, the effect of farm type in each district on visual quality score was also determined. Means of visual quality score were calculated for all variables in the study and the LSD test was used to determine significance of difference. Proportional values of each score were calculated for each farm type in each district. Pairwise linear correlations were carried out to identify the relationship between the landscape attributes, building features and visual quality scores.

RESULTS

Some photos relating to cattle and sheep buildings and environs presented on the panel were given in Figs. 2–5.

Visual quality scores for animal buildings

Descriptive statistics of visual quality scores (VQS1) for animal buildings are shown in Table 1. VQS1 were influenced significantly by district and farm type ($P < 0.001$). VQS1 also differed significantly by farm type in each district ($P < 0.05$). In this research, mean VQS1 was 1.92 ± 0.87, rated low (score 2) and varied from very low (score 1) to moderate (score 3). Mean VQS1 of cattle buildings was 2.24 ± 0.89, rated low and varied from very low (score 1) to moderate (score 3) while mean sheep buildings was 1.58 ± 0.70 rated low and varied from very low (score 1) to low (score 2). In general view, as in Table 1, VQS1 in sheep farms have been influenced much more from the lack of maintenance, and conventional buildings than that of cattle farms. In other words, cattle husbandry has been operated in fair management. Animal buildings in Menemen rated slightly high due to that the district had better facilities while Ödemiş and İzmir centre were rated low due to that these districts had conventionally designed buildings and lack of maintenance. For cattle buildings, Menemen had significantly higher visual quality score (2.80) as compared to other districts. The lowest score was given to the cattle buildings in Seferihisar (1.90) and İzmir centre (1.91). For sheep buildings, Menemen had significantly higher visual quality score (2.04) whereas Seferihisar had lower score as compared to other districts (1.35).

Proportional values of visual quality scores for animal buildings by district and farm type are shown in Table 2.

Table 1. Visual quality scores for animal buildings by district and farm type

Farm type		Districts								
		İzmir centre	Menemen	Tire	Ödemiş	Torbalı	Bayındır	Seferihisar	General	*P*
Cattle	Farm (*n*)	3	6	4	7	4	3	4	31	
	Mean	1.91^{c}	2.80^{a}	2.27^{b}	1.98^{c}	2.30^{b}	2.40^{b}	1.90^{c}	2.24	0.001
	Std. dev.	0.90	0.84	0.83	0.73	0.96	0.84	1.04	0.89	
Sheep	Farm (*n*)	4	3	3	5	3	4	5	27	
	Mean	1.53^{b}	2.04^{a}	1.91^{a}	1.44^{c}	1.44^{c}	1.60^{b}	1.35^{c}	1.58	0.001
	Std. dev.	0.77	0.71	0.70	0.64	0.59	0.64	1.08	0.70	
General	Farm (*n*)	7	9	7	12	7	7	9	58	
	Mean	1.72^{c}	2.42^{a}	2.09^{b}	1.71^{c}	1.87^{b}	2.00^{b}	1.63^{d}	1.91	0.001
	Std. dev.	0.85	0.87	0.78	0.75	0.92	0.83	0.66	0.87	
	P	0.02	0.001	0.02	0.001	0.001	0.001	0.001	0.001	

^{abc}Different letters within rows differ significantly ($P < 0.05$)

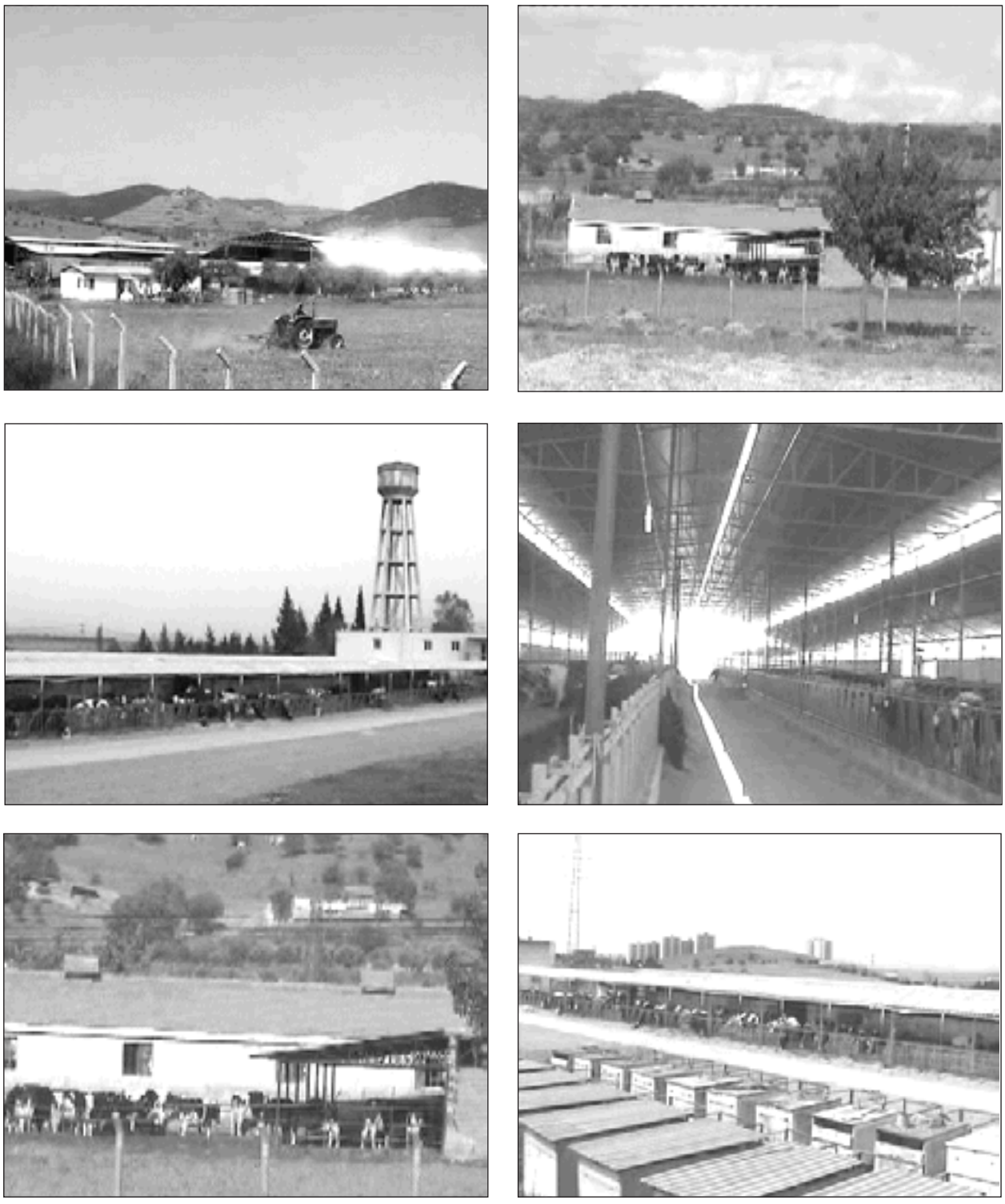

Fig. 2. Selected pictures from outside and inside cattle buildings

Majority of the respondents rated the animal buildings between 1 and 2 (very and low visual quality, 74.1%) whereas the minority scored 4 (high) and 5 (very high) (4% and 0.1%). The greatest percentage of 3 and 4 scores was in Menemen, Tire and the minority percentage of 3 and 4 was in Seferihisar and Ödemiş. Menemen was scored also 5 for both cattle and sheep buildings by the respondents. As in Tables 2, 3 and 4 scores were higher in cattle buildings compared to sheep buildings. However, none of the respondents rated 4 score for sheep buildings in Tire, Ödemiş, Torbalı and Bayındır districts.

Visual quality scores for animal buildings with their surroundings

Descriptive statistics of visual quality scores for animal buildings with their surroundings (VQS2) are shown in Table 3. VSQ2 were influenced significantly

Fig. 3. Environs of some cattle farms

by district and farm type ($P < 0.001$). Also significant differences were found for farm type in each district ($P < 0.05$) except İzmir centre and Tire. In this research, mean VQS2 was 2.22 ± 0.81, rated low (score 2) and varied from low (score 1) to moderate (score 3). Mean VQS2 for cattle buildings and their surroundings was 2.35 ± 0.80, rated low and varied from low (score 2) to moderate (score 3) while mean VQS2 for sheep buildings and their surroundings was 2.08 ± 0.80, rated low and varied from very low (score 1) to low (score 2). In general view, cattle buildings are slightly more in compliance with their environs than sheep buildings.

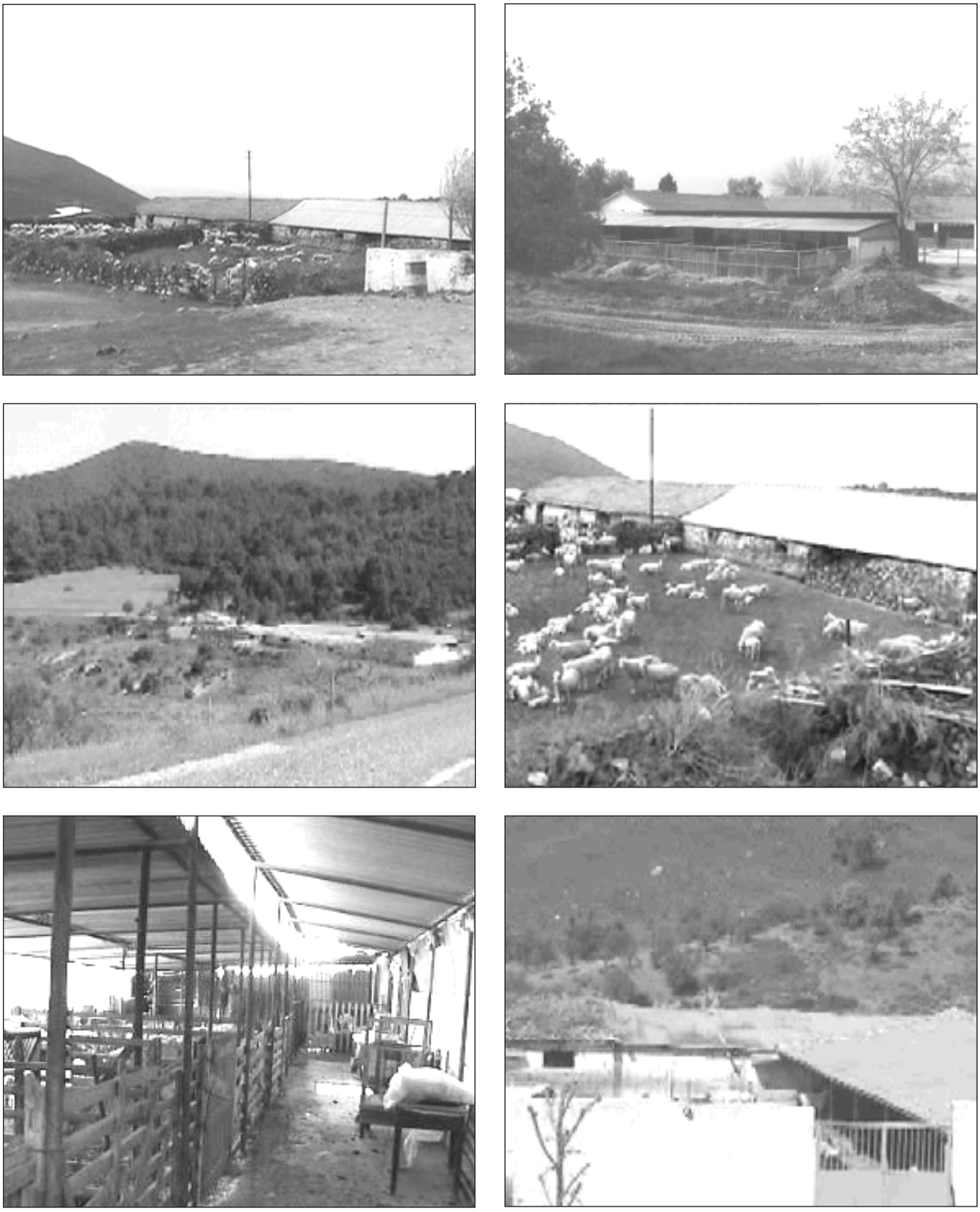

Fig. 4. Selected pictures from outside and inside sheep buildings

Tire had 0.62 (Tire-İzmir centre) and 0.12 unit (Tire-Bayındır) higher score than the other districts. Visual quality score in İzmir centre was upper than very low (1.82). For cattle buildings and their surroundings, visual quality scores in Tire, Torbalı and Bayındır were close to moderate whereas in the other districts they were low. Visual quality score for sheep buildings and their surroundings was low in all districts. Tire had significantly higher visual quality score whereas İzmir centre was lower than other districts.

Proportional values of visual quality scores for animal buildings and their surroundings by district and farm type are shown in Table 4.

Majority of the respondents rated 2 score (low, 43.4%) across İzmir province whereas the minority scored 4 and 5 (4.5% and 0.1%). The greatest percentage of 3 and 4

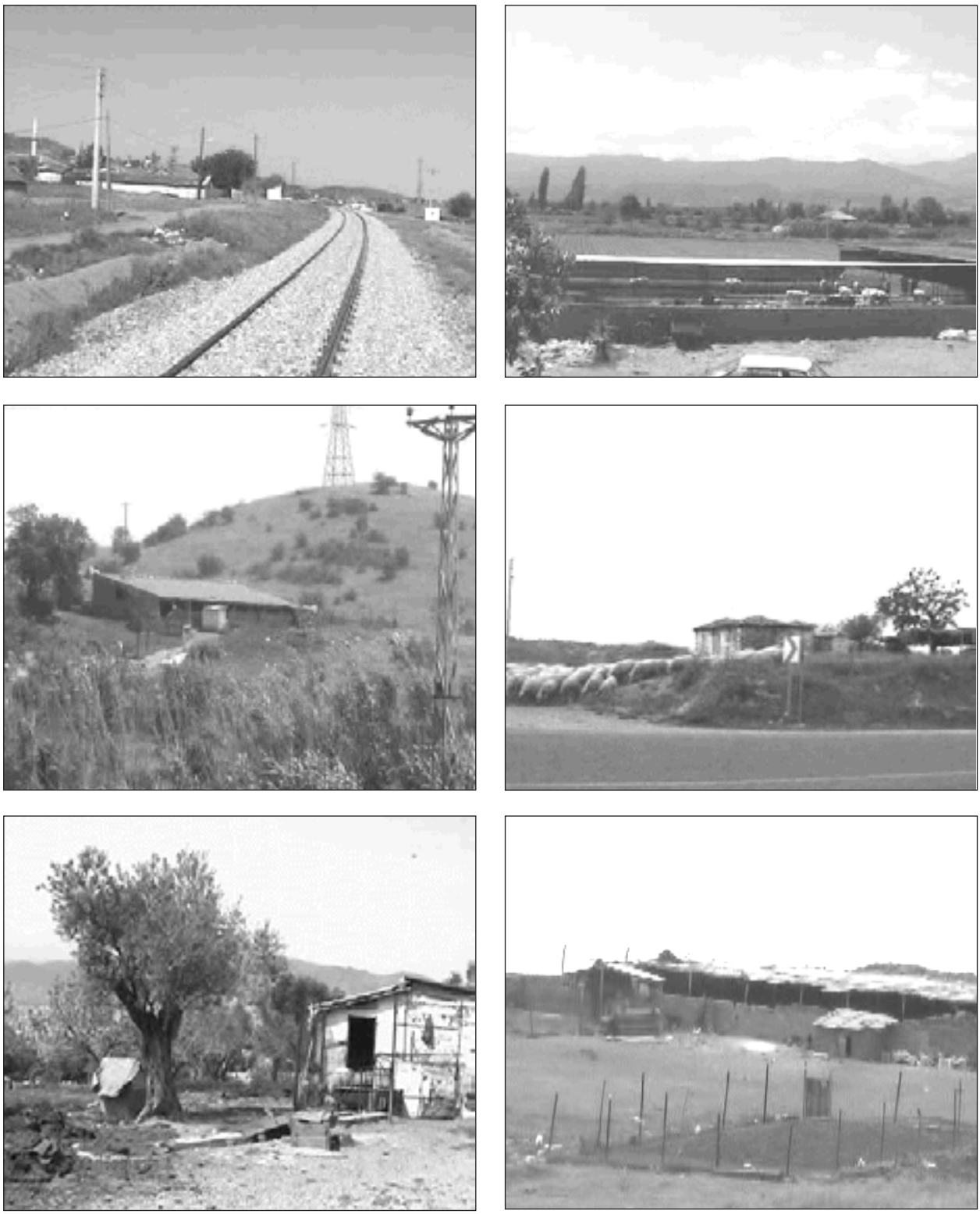

Fig. 5. Environs of some sheep farms

was in Tire (8.6%) and the smallest percentage of 3 and 4 was in Torbalı and Bayındır (2.9%). Tire was rated also 5 by the 1.0% of the respondents. However, none of the participants rated 4 score for İzmir centre. As in Table 4, cattle farms with 3 and 4 scores were higher than that of sheep farms. However, only sheep farms were rated very high in Tire.

Correlations between visual quality scores and landscape or building features

The correlation coefficients between visual quality scores and landscape or building features by district and farm type were given in Tables 5 and 6. There was a statistically significant positive correlation between

Table 2. Frequency of respondent's evaluations for animal buildings by district and farm type

Farm	Score	Districts (%)							
		İzmir centre	Menemen	Tire	Ödemiş	Torbalı	Bayındır	Seferihisar	General
Cattle	1	42.2	4.4	18.3	26.6	23.3	13.3	40.3	22.5
	2	26.7	32.2	40.0	49.5	35.0	42.2	35.1	38.1
	3	28.9	43.3	38.4	22.9	30.0	35.6	24.6	32.3
	4	2.2	19.0	3.3	1.0	11.7	8.9	–	6.9
	5		1.1	–	–	–	–	–	0.2
Sheep	1	61.6	20.0	28.9	64.0	60.0	48.3	70.7	53.3
	2	25.0	57.8	51.1	28.0	35.6	43.3	25.3	36.1
	3	11.7	20.0	20.0	8.0	4.4	8.4	2.7	9.9
	4	1.7	2.2	–	–	–	–	1.3	0.7
	5	–	–	–	–	–	–	–	–
General	1	53.3	9.6	22.8	42.2	39.1	33.3	57.6	37.0
	2	25.7	40.7	44.8	40.5	35.2	42.9	29.6	37.1
	3	19.1	35.6	30.5	16.7	19.0	20.0	12.1	21.8
	4	1.9	13.4	1.9	0.6	6.7	3.8	0.8	4.0
	5	–	0.7	–	–	–	–	–	0.1

visual quality scores of the relationship between animal buildings with its surroundings (VQS1) and visual quality scores of animal buildings and its facilities (VQS2). This means that better constructed and organised animal buildings are fully in compliance with their surroundings. According to these results, VQS1 significantly increased, as expected, with some natural landscape features such as plant cover, sky, hill and plain. On the other hand, VQS1 significantly decreased with the presence of man-made elements such as roads, transformer and electric power lines, water channel, settlement. Hence, these farms were rated low by respondents. In this study, correlation coefficients among building features, VQS1 and VQS2 were positive (Table 6). It reflected that well-designed animal buildings tended to have high scores. Negative correlation among VQS1, VQS2 and manure pit reflects that poor manure management decreased visual quality of both farm type.

DISCUSSION

As several researchers (PARSONS 1995; VAN DEN BERG et al. 1998; HENDRIKS et al. 2000) reported that little research has been done on the relationships between landscapes at farm level and regional level. These researchers have also stressed the need for more research on possible conflicts between environmental aesthetics and ecological sustainability.

The results of this study demonstrated statistically reliable differences in visual quality ratings by district and farm type. Respondents gave generally higher scores to the modern and well-designed buildings. These findings support other studies (JACOB, VAN DER VAART 2003; RONCHI, NARDONE 2003).

This research confirms that comparisons of mean preference ratings can provide valuable additional insights as HERZOG et al. (2000) reported. Our results agree

Table 3. Visual quality scores for animal buildings with their surroundings

Farm type		Districts								
		İzmir centre	Menemen	Tire	Ödemiş	Torbalı	Bayındır	Seferihisar	General	*P*
Cattle	Farm (*n*)	3	6	4	7	4	3	4	31	
	Mean	1.84[b]	2.42[a]	2.45[a]	2.42[a]	2.48[a]	2.53[a]	2.10[b]	2.35	0.001
	Std. dev.	0.74	0.82	0.83	0.70	0.72	0.73	0.95	0.80	
Sheep	Farm (*n*)	4	3	3	5	3	4	5	27	
	Mean	1.80[c]	2.00[b]	2.42[a]	2.07[b]	1.84[c]	2.10[b]	2.31[a]	2.08	0.001
	Std. dev.	0.73	0.67	0.92	0.78	0.77	0.68	1.08	0.80	
General	Farm (*n*)	7	9	7	12	7	7	9	58	
	Mean	1.82[b]	2.21[a]	2.44[a]	2.25[a]	2.16[a]	2.32[a]	2.21[a]	2.22	0.001
	Std. dev.	0.73	0.80	0.87	0.75	0.81	0.73	0.89	0.81	
	P	0.76	0.03	0.87	0.02	0.001	0.002	0.102	0.001	

[abc]Different letters within rows differ significantly ($P < 0.05$)

Table 4. Frequency of respondent's evaluations for the animal buildings with their surroundings by district and farm type

Farm	Score	Districts (%)							
		İzmir centre	Menemen	Tire	Ödemiş	Torbalı	Bayındır	Seferihisar	General
Cattle	1	35.6	11.1	11.6	9.5	10.0	6.6	31.7	15.3
	2	44.4	45.6	41.7	41.9	35.0	40.0	31.7	40.4
	3	20.0	33.3	36.7	45.7	51.7	46.7	31.7	38.7
	4		10.0	10.0	2.9	3.3	6.7	4.9	5.6
Sheep	1	38.3	22.2	15.5	21.3	35.6	18.3	20.0	24.2
	2	43.3	55.6	37.8	56.0	46.6	53.3	36.0	47.0
	3	18.4	22.2	37.8	17.3	15.6	28.4	37.3	25.4
	4			6.7	5.4	2.2		6.7	3.2
	5			2.2					0.2
General	1	37.1	14.8	13.3	14.4	21.0	13.3	25.2	19.4
	2	43.8	48.9	40.0	47.8	40.0	47.6	34.1	43.4
	3	19.0	29.6	37.1	33.9	36.2	36.2	34.8	32.5
	4		6.7	8.6	3.9	2.9	2.9	5.9	4.5
	5			1.0					0.1

with the results of other researchers (ULRICH 1991; REAL 2000; OHTA 2001; ARRIAZA 2004) who found that man-made features play a key role in determining the visual quality. Visual quality score increased the attractiveness of nature and also had a strong influence on evaluation (KAPLAN et al. 1998; ARRIAZA 2004). In addition, respondent felt significantly more satisfied and more excited when encountering plant cover, sky and plain than other types of objects. However, our findings disagree with the results of HULL and STEWART (1995) who found that views containing mountains or hills and valleys were rated as being more scenic than views containing ephemeral features, plant cover or vegetation. Our results also showed that visual quality of landscape features are enhanced at non-urbanised areas. The respondents of the present study expressed their strongest positive preference for well-designed animal buildings. As in the STRUMSE (1994), JACOB and VAN DER VAART (in KALTENBORN, BJERKE 2002) studies, modern farming elements (silo, machines) were the least preferred as reported in the present study. We support SULLIVAN et al. (2004) who suggest that the use of buffers on farms would be a favorable alternative for both farmers and residents at the rural-urban fringe. Buffers can reduce a number of environmental problems including noise pollution, livestock odors, and also improve the visual appearance of the landscape without reducing the rural character of the area. Introducing new building techniques and more open stables may be acceptable also in terms of animal welfare (RØNNINGEN 2002). On the other hand, not only the natural sources itself is important, but also rural landscapes and even some rural or urban-fringed built-up areas which usually encompass the farms.

CONCLUSION

Although the study area had very important animal production capacity, visual quality of animal buildings (with their surroundings) rated low in general. However, this study does not confirm the common agricultural extension approach which asserted that the animal farms should be located as close as to the market and connected with the major transportation network. The study also revealed that animal buildings established with this conventional approach in mind effect their environs negatively not only with odour, waste, sound and visual intrusions but also is subjected to the challenges of the environs vice versa such as traffic congestion or noise, urban or rural solid waste, unplanned development of built-up areas that all have reversed impacts on both human and animal welfare as well as animal husbandry.

Visual quality assessment as a tool, in this study, unveils all the above mentioned negative effects in visual context. Through which location of animal farms and their adaptation to landscape, and all kind of negative factors experienced in visual manner could be measurable in a systematic approach just like in this study.

All these features need to be engaged into developing urban fringed or rural planning pursuits, which should be sensitive to both humanistic values and environmental concerns, by examining the existing animal buildings with their environs in the region and designating suitable sites for animal farms in the future and determining their structural characteristics in visual context. Future researches following this study might also focus more directly on the conflicts and visual preferences between experts and different groups such as farmers, residents, visitors.

Table 5. Correlations between visual quality scores and landscape features by district and farm type

Districts	Cattle	VQS 1	Landscape features								
			Sky	Hill	Plain	Plant	Settlement	Transformer and electric lines etc	Road	Water channel	Farm buildings
İzmir centre	VQS 1	0.46**	0.27*					–0.44*			0.50**
	VQS 2		0.25*	0.15			–0.17	–0.18	–0.21*		0.54**
Menemen	VQS 1	0.60**	0.18	0.38**		0.16					0.44**
	VQS 2		0.12	0.24*					–0.32**		0.51**
Tire	VQS 1	0.53**	0.19	0.04	0.17	0.47**	–0.14	–0.13	–0.13	–0.17	0.32*
	VQS 2			0.11		0.31*	–0.12	–0.15	–0.19		0.47**
Ödemiş	VQS 1	0.24*	0.12	0.15	0.13	0.18					0.23*
	VQS 2							–0.17	–0.21*	–0.15	0.33**
Torbalı	VQS 1	0.64**		0.23*	0.11	0.29*		–0.11			0.28*
	VQS 2			0.13			–0.24*	–0.17			0.41**
Bayındır	VQS 1	0.24*	0.16	0.14	0.17	0.15	–0.28*	–0.20	–0.39*	–0.31*	0.23*
	VQS 2		0.16			0.36*		–0.26*	–0.27*		0.36*
Seferihisar	VQS 1	0.72**	0.11	0.12	0.38**	0.16	–0.23*	–0.19	–0.14	–0.25*	0.32*
	VQS 2			0.21*	0.39**	0.19			–0.13	–0.21*	0.40**

VSQ1: visual quality scores of the relationship between animal buildings with its surroundings
VSQ2: visual quality scores of animal buildings and its facilities
* $P < 0.05$, ** $P < 0.01$

Districts	Sheep	VQS 1	Landscape features								
			Sky	Hill	Plain	Plant	Settlement	Tranformer and electrict lines etc	Road	Water channel	Farm buildings
İzmir centre	VQS 1	0.61**	0.14			0.29*		–0.19	–0.20		0.55**
	VQS 2		0.30*			0.35**	–0.14	–0.45**	–0.18		0.65**
Menemen	VQS 1	0.43**	0.19		0.20	0.38**	–0.25		–0.32*		0.54**
	VQS 2		0.23				–0.31*	–0.14	–0.42		0.52**
Tire	VQS 1	0.70**	0.18	0.42**	0.20	0.12					0.47**
	VQS 2			0.36*	0.27		–0.13				0.37*
Ödemiş	VQS 1	0.29*	0.35**						–0.14		0.12
	VQS 2		0.19		0.12						0.51**
Torbalı	VQS 1	0.41**		0.25		0.19			–0.13		
	VQS 2		0.17			0.30*		–0.11			0.37*
Bayındır	VQS 1	0.36**			0.21	0.32*			–0.10		0.14
	VQS 2		0.13	0.14	0.16	0.25				–0.18	0.25
Seferihisar	VQS 1		0.12	0.12	0.12	0.21					0.30*
	VQS 2				0.25*		–0.22	–0.11			0.41**

* $P < 0.05$, ** $P < 0.01$

Table 6. Correlation coefficients between visual quality scores and buildings features

Districts	Cattle	Building features						
		Construction features	Feed storages	Silage pit etc	Manure pit and manure mass	Soil and sand mass	Agr. machines	Borders or fences
İzmir centre	VQS 1	0.39*	0.13	0.22*	–0.12		0.26*	
	VQS 2	0.90**		0.33*		–0.14	0.11	–0.22*
Menemen	VQS 1	0.36*	0.15	0.12	–0.12	–0.12		0.27*
	VQS 2	0.71**					0.23*	0.34**
Tire	VQS 1	0.53**			0.13	–0.11		0.14
	VQS 2	0.85**						0.22*
Ödemiş	VQS 1	0.11						
	VQS 2	0.79**	0.26*	0.38*	0.26*	0.18	0.13	0.22*
Torbalı	VQS 1	0.39*	–0.32**	–0.28*	–0.28*		–0.27*	0.21*
	VQS 2	0.59**	–0.24*		–0.24*			0.41**
Bayındır	VQS 1		0.18	–0.25*	–0.14	–0.18	–0.14	–0.26*
	VQS 2	0.78**	0.37**	0.31*	0.39**	0.13	0.20	0.35**
Seferihisar	VQS 1	0.46*	–		–0.18			0.41**
	VQS 2	0.45**	–		–0.30*		0.15	0.45**

* $P < 0.05$, ** $P < 0.01$

Districts	Sheep	Building features						
		Construction features	Feed storages	Silage pit etc	Manure pit and manure mass	Soil and sand mass	Agr. machines	Borders or fences
İzmir centre	VQS 1	0.60**	0.19	0.25*	0.23*	0.32*	0.15	
	VQS 2	0.72**	0.21*	0.22*	0.16	0.28*	0.13	0.45**
Menemen	VQS 1	0.45**	–0.24*			–0.11		
	VQS 2	0.79**	–0.12			–0.24*	0.36*	–0.17
Tire	VQS 1	0.56**	–0.14			–0.11		–0.32*
	VQS 2	0.75**	–0.10		–0.10	–0.18		–0.37*
Ödemiş	VQS 1							–0.20
	VQS 2	0.47**				–0.12		0.20
Torbalı	VQS 1	0.21*		0.22*		–0.24*	–0.24*	–0.10
	VQS 2	0.63**	–0.17		–0.12		0.15	
Bayındır	VQS 1	0.33*			–0.30*	0.24*		–0.18
	VQS 2	0.56**		0.18	–0.14	–0.17		–0.17
Seferihisar	VQS 1	0.38*			–0.10	0.13		–0.19
	VQS 2	0.73**	–0.15		–0.12	–0.16	–0.19	–0.29*

* $P < 0.05$, ** $P < 0.01$

Acknowledgements

This research was undertaken as part of a larger study of visual quality assessment of animal buildings and landscape preferences in İzmir province (Project No. 2003-ZRF-038) and was funded by Ege University Research Fund. The authors are grateful for the cooperation of experts.

References

ARRIAZA M., CAÑAS-ORTEGA J.F., CAÑAS-MADUEÑO J.A., RUIZ-AVILES P., 2004. Assessing the visual quality of rural landscapes. Landscape Urban Plann., *69*: 115–125.

BALLING J.D., FALK J.H., 1982. Development of visual preference for natural environments. Envir. Behav., *14*: 5–28.

DANIELS T., 1999. When City and Country Collide: Managing Growth in the Metropolitan Fringe. Washington, D.C., Island Press: 377.

FRIEDBERGER M., 2000. The rural-urban fringe in the late twentieth century. Agric. Hist., *74*: 502–514.

HAMMOND S.V., 2002. Can city and farm coexist? The agricultural buffer experience in California. Great Valley Center Agricultural Transactions Program, University of California Cooperative Extension Program. Modesto, CA. Available

on-line at:http://66.42.64.231/publications/agpubs/buffer study.pdf.
HENDRIKS K., STOBBELAAR D.J., VAN MANSVELT J.D., 2000. The appearance of agriculture: An assessment of the quality of landscape of both organic and conventional horticultural farms in West Friesland. Agric. Ecosyst Envir., *77*: 157–175.
HERZOG T.R., HERBERT E.J., KAPLAN R., CROOKS C.L., 2000. Cultural and developmental comparisons of landscape perceptions and preferences. Envir. Behav., *32*: 323–346.
HULL R.B., STEWART W.P., 1995. The landscape encountered and experienced while hiking. Envir. Behav., *27*: 404–426.
JACOB H.P., VAN DER VAART, 2003. Towards a new rural landscape: consequences of non-agricultural re-use of redundant farm buildings in Friesland, Landscape Urban Plann (article in press). In: KALTENBORN B.P., BJERKE T., 2002. Associations between environmental value orientations and landscape preferences. Landscape Urban Plann., *59*: 1–11.
KAPLAN R., KAPLAN S., RYAN R.L., 1998. With People in Mind: Design and Management of Everyday Nature. Washington, D.C., Island Press: 239.
KENDALL P., 1993. It isn't always green acres when urban and rural meet. Chicago Tribune, June 24, 1993, Section 1: 1–2.
REAL E., ARCE C., SABUCEDO J.M., 2000. Classification of landscapes using quantitative and categorical data, and prediction of their scenic beauty in north-western Spain. J. Envir. Psychol., *20*: 355–373.
RONCHI B., NARDONE A., 2003. Contribution of organic farming to increase sustainability of Mediterranean small ruminants livestock systems. Lives. Prod. Sci., *80*: 17–31.
RØNNINGEN K., 2002. Multifunctionality: Applying the OECD Framework, A Review of the Literature on Environmental Commodities and Rural Viability in Norway. OECD, Directorate for Food, Agriculture and Fisheries, Paris.
OHTA H., 2001. A phenomenological approach to natural landscape cognition. J. Envir. Psychol., *21*: 387–403.
PARSONS R., 1995. Conflict between ecological sustainability and environmental aesthetics: conundrum, canärd or curiosity. Landscape Urban Plann., *32*: 227–244.
SIS, 2002. State Institute of Statistics. Statistical Yearbooks. Published by the State Institute of Statistics, Ankara, Turkey.
SMARDON R.C., PALMER J.F., FELLEMAN J.P., 1986. Foundations for Visual Project Analysis. New York, John Wiley and Sons: 374.
SPSS (1999): SPSS 10 for Windows. SPSS Inc.
STRUMSE E., 1994. Perceptual dimensions in the visual preferences for agrarian landscapes in western Norway. J. Envir. Psychol., *14*: 281–292.
SULLIVAN W.C., ANDERSON O.M., LOVELL S.T., 2004. Agricultural buffers at the rural-urban fringe: an examination of approval by farmers, residents, and academics in the Midwestern United States. Landscape Urban Plann., *69*: 299–313.
The Landscape Institute, Institute of Environmental Management Assessment (2002). Guidelines for Landscape and Visual Impact Assessment. London, Spon Press: 166.
ULRICH S.R., SIMONS R.F., LOSITO B.D., FIORITO E., MILES M.A., ZELSON M., 1991. Stress recovery during exposure to natural and urban environments. J. Envir. Psychol., *11*: 201–230.
VINING J., STEVENS J.J., 1986. The assessment of landscape quality: Major methodological considerations. In: SMARDON R.C., PALMER J.F., FELLEMAN J.P. (eds.), Foundations for Visual Project Analysis. New York, John Wiley and Sons: 167–186.
VAN DER BERG A.E., VLEK C.A.J., COETERIER J.F., 1998. Group differences in the aesthetic evaluation of nature development plans: A multilevel approach. J. Envir. Psychol., *18*: 141–157.

Received for publication September 11, 2004
Accepted after corrections December 8, 2004

Hodnocení staveb pro skot a ovce a jejich okolí pomocí techniky určování vizuální kvality

ABSTRAKT: Studie byla provedena s cílem zjistit vizuální kvalitu stájí pro skot a ovce a jejich okolí v sedmi okresech provincie Smyrna, ležících v západní část Turecka. Celkem bylo hodnoceno 58 farem živočišné výroby, z toho 31 pro chov skotu a 27 pro chov ovcí. Po shlédnutí videozáznamu všech farem včetně jejich okolí (každý vzorek byl promítnut přibližně 60 sekund) vyhodnotila formou panelu expertní skupina 30 respondentů 250 fotografií pořízených z videonahrávek. Respondenti byli požádáni, aby zhodnotili vizuální kvalitu jednotlivých fotografií a jejich vlastnosti pomocí pětibodové stupnice pro jednotlivé okresy a typy farem (chovu skotu nebo ovcí). Výsledky ukázaly, že efektivně vybudované a řízené stavby pro chov hospodářských zvířat, projektované v souladu s jejich okolím, dosáhly vyššího bodového hodnocení než stavby postavené ad hoc a bez vztahu k okolí. Kladné hodnocení vizuální kvality rostlo přímo s pozitivními vlastnostmi krajiny (topografické přednosti jako vertikální členitost krajiny, její pokrytí rostlinami) a snižovalo se většinou přítomností prvků, vytvořených člověkem (transformátory a elektrické rozvody, komunikace, vodní kanály, osídlení), kromě neplánovitého uspořádání staveb a jejich příslušenství, blízkosti silnic a městských nebo venkovských sídel, špatného řízení hospodaření s odpady živočišné výroby.

Klíčová slova: stavby pro hospodářská zvířata; hodnocení vizuální kvality; farmy pro chov skotu a ovcí; zemědělská krajina

Corresponding author:

Assoc. Prof. Dr. TURGAY TAŞKIN, Ege University, Agriculture Faculty, Department of Animal Science,
TR-35100 Bornova-Izmir, Turkey
tel.: + 90 232 388 18 67, fax: + 90 232 388 18 67, e-mail: taskin@ziraat.ege.edu.tr