Building sustainability: human aspects and territorial differences of agricultural buildings reused in tourism

György Ängelkott Bocz

(*Department of Rural Buildings and Animal Husbandry, Swedish University of Agricultural Sciences, Sweden*)

Abstract: This study examined how operators perceive the advantages and disadvantages of traditional agricultural buildings (ABs) used in tourism and whether territorial differences and the human aspect had an influence on the approaches of operators in the sustainable reuse of ABs from a building-related perspective. A combined questionnaire-based survey and comparative case study revealed that operators are clearly aware of the advantages and disadvantages when reusing ABs in tourism. Although sustainability was found to be a subjective term for many, building materials and construction technology were chosen according to sustainability principles. Education, personal background, upbringing and interests, work experience and world view of the owner were major factors in how building-related sustainability was approached. Drastic changes while reusing ABs, where absolutely necessary (utilities, etc.), were acceptable to operators provided attempts were made to fulfill modernisation and official requirements in a creative and well-conceived way. This prevented loss of value and building information and ensured sustainable reuse. Territorial differences emerged, mainly resulting from differences in the local society created by environmental and economic factors.

Keywords: rural, construction technology, material, vernacular, rural tourism, Sweden

Citation: György Ängelkott Bocz. 2012 Building sustainability: human aspects and territorial differences of agricultural buildings reused in tourism. Agric Eng Int: CIGR Journal, 14(3): 24−45.

1 Introduction

Traditional agricultural buildings (ABs) are part of rural heritage and impart character and image to the rural landscape (Arias et al., 2007; Ascard, 2000; García and Ayuga, 2007; Hernández et al., 2004; Swedish Association for Building Preservation, 1993). Their highly symbolic value and character form a link between the present and the past (Fuentes, 2010; van der Vaart, 2005). The decline in number of agricultural production units and therefore increasing number of abandoned and reused farm buildings are widely discussed in the literature in Europe and other industrialised countries (Candura, 2008; Fuentes, García and Ayuga, 2010; García and Ayuga, 2007; Tassinari et al., 2007; van den Berg and Wintjes, 2000; van Hoof and van Dijken, 2008), as is the appearance of rural pluractivity and multifunctional agriculture (Ilbery and Bowler, 1998; Ilbery et al., 1998; Wilson, 2007, 2008).

In the Swedish context similar trends are apparent (Ascard, 1996; Scania County Administrative Board, 2007a, 2007b, 2008; Swedish National Board of Housing, Building and Planning, 2008). While the size of the total Swedish AB pool is approximately 2.5 million (Lange, 1995), this figure includes agriculture-related buildings that are no longer owned and used by active farms. As regards origins, outbuildings form the majority of this volume and only roughly 450 000 of the 2.5 million ABs were built as dwellings. Outbuildings, all buildings connected to farm production and the related functions e.g. farm buildings, barns, stables, farm service buildings, sheds, etc. except for the farmer's house of dwelling. Therefore, dominate the agricultural landscape and our perception of it. Today there are only 72609 active farm units in Sweden (Swedish Board of

Received date: 2011-06-02 **Accepted date:** 2012-07-23
Corresponding author: György Ängelkott Bocz, E-mail: G.A.Bocz@slu.se

Agriculture, 2010), and the vast majority of former ABs are now being reused and used in areas other than agriculture.

The type and direction of AB reuse in a multifunctional agricultural regime strongly depends on macro-level factors such as geographical, demographic and economic characteristics, while local climatic and other site-specific factors can have a significant influence on the choice of construction technology and building materials when renovating and rebuilding constructions to fit new functions. On the micro level, the background of the operator (education, upbringing, etc.) and other factors such as personal finances set the level of reuse opportunities (Bocz, 2012). The term operator is used in this study as a collective term to describe owners and other decision-makers such as operation managers influencing the tourism enterprise, its activities and buildings. The reuse is further influenced by outside parties and forces exercising varying strength of power over the reuse process. On the macro level governmental- (e.g. farmers-union, national heritage board, agricultural extension bodies) and business organizations (e.g. quality control organizations of the tourism industry), NGOs (local heritage organizations) while on the micro level private businesses such as consultancy firms, designers and builders and their own cultural background also play an important role. Concerning reuse of former ABs e.g. the implementation of municipal policies, owners (and therefore human aspects) play a very important role (van der Vaart, 2005).

Tourism, especially small-scale rural (RT) and farm tourism (FT), is one of the primary contributors to rural development and to AB reuse (Bramwell, 1994; Roberts and Hall, 2001; Sharpley and Vass, 2006; Nielsen et al., 2010). RT is tourism that is rural both functionally and in its scale and takes place in the countryside. This type of tourism is based on small-scale enterprises, traditional social structures and ways of living, agrarian economies and the natural environment (Lane, 1994; Hall, Müller and Saarinen, 2009). FT is such a subcategory of RT, where various tourism related activities take place on working farms and in farming environments. These also form part of the tourism product itself (Clarke, 1999) and there is an emphasis on the host/guest relationship (Nilsson, 2002).

On the macro level, tourism reuse of AB, a form of heritage tourism, is the major source of non-primary sector-dependent income in the rural economy. It also helps community revitalisation and therefore has a positive effect on sustainability (Gössling and Mattson, 2002) and sustainable regional development (Lordkipanidze, Brezet and Backman, 2005). According to an OECD (1994) report, the historic built environment, including ABs, can benefit RT by providing economic advantages and a place for new functions, such as tourism.

On the micro level, tourism reuse of ABs allows people to stay on the farm and provides women, an exposed group in rural areas, with their own income (OECD, 1994; Busby and Rendle, 2000; Gössling and Mattson, 2002). The extra income gained from AB reuse in tourism can partly be used in the conservation of individual buildings, thereby serving society by preserving an important educational resource.

Negative effects of RT have been reported by authors, such as transport-related problems (Dickinson and Robbins, 2008), heritage value degradation or information loss, e.g. creation of an artificial rurality a so called disneyfication process (Latham, 2000b; García and Ayuga, 2007; Tassinari et al., 2010).

Sustainability was first defined in its threefold (environmental, social, economic) context by the Brundtland commission (Brundtland Commission, 1987; United Nations, 1987). In an AB-related context it is connected to several factors, firstly as the construction industry is responsible for a large proportion of pollutants, material and energy use world-wide (Bokalders and Block, 2010), and secondly as the qualitative characteristics of actual constructions create a long-term dependency on e.g. how energy-efficiently they can be used or how often maintenance/renovation is required. As a result of the embodied energy of constructions (Milne and Reardon, 2008), it is more sustainable to keep and renovate e.g. former ABs than pulling them down and building new ones. García and Ayuga (2007) point out that the only chance abandoned, redundant ABs have

for survival and conservation is through use, which in turn enhances landscape quality (Fuentes, 2010). Besides the aforementioned factors regarding ABs, in terms of sustainability it would be unacceptable to lose such a good and varied knowledge base (Tassinari et al., 2010) and social anchor of local societies. Zavadskas and Antucheviciene (2007) summarised these points when discussing regeneration options for rural buildings, stating that 'Regeneration of buildings should make a contribution towards sustainable construction, by incorporating the protection of natural and social environments, improvement of the quality of life and the implementation of economic goals.'

Hall, Müller and Saarinen (2009) pointed out that in the service production process of tourism, low levels of capital equipment but heavy investments in buildings are required. Buildings therefore form a primary focus area for operators concerning required capital investment, as key cost centres or assets that need to be managed and maintained. To date, however, only very limited attention has been given to how ABs reused in tourism are regarded by the owners (operators) or by the visitors (Pina and Delfa, 2005, 2009; Author et al., 2012). Furthermore the advantages and disadvantages of ABs in the view of the operators are largely unknown, as are the human aspect of operators (the combination of all those non-physical factors that originate from people, such as demographic factors, socio-economic background, and way of thinking or lifestyle). However, all these influence sustainability-related approaches in the building context.

The objective of this study was therefore to analyze if the human aspect and territorial differences influence approaches to sustainable reuse of ABs from a building-related point of view, e.g. concerning choice of construction technology and building material in the renovation and reuse process. ABs exist as part of their environment and they can only become sustainable together with their surroundings (e.g. farmyards, etc.) from which they are inseparable. As a result of lack of space though, only the buildings themselves were forming the subject of this study.

Geographically, a trifold setting was chosen. The Swedish urban fringe (Malmö-Copenhagen conurbation), a periurban (south-east Scania) and a deep rural (northern Värmland) context was examined, although in several areas the findings were found to be more widely applicable and parallels can be drawn to the wider Scandinavian and European context.

The study set out to answer the following specific questions:

1) What do operators consider building related advantages and disadvantages of former ABs reused in tourism?

2) Based on their conception of positive and negative characteristics of their buildings, how does operators' approach to sustainability manifest itself in reusing ABs?

3) To what extent does the human aspect influence the sustainable reuse of ABs concerning construction methods and building materials?

4) Do territorial differences influence approaches to sustainable reuse of ABs from a building-related point of view and if so, how?

In this study only ABs reused in RT and its subcategory FT were examined. ABs form the bulk of rural building stock and are therefore also used in RT. These are usually buildings originating from agricultural and forestry production, processing and support activities, but can also be the main residence of the proprietors of the businesses. Only those areas of sustainability that are strictly related to material and construction technology from environmental, economic and social aspects were examined here. The study only included the views of operators, not those of visitors or policymakers.

2 Materials and methods

2.1 Research design and method

In this multidisciplinary project, qualitative issues, sustainability and way of thinking were studied in relation to physical properties of ABs by relying on the combined knowledge base of four disciplines. ABs were first approached through their original uses and functions in agriculture, than their building related characteristics were studied using rural-architecture and sustainability disciplines which in turn were related to aspects of

tourism (and its sustainability). A mixture of three methods was used. A case study provided the backbone of the study, while questionnaire-based research and validated building inventory were used as auxiliary data collection methods.

The two-fold descriptive-explanatory comparative case study was chosen as main method, because it employs a pluralistic approach. The case study is preferred in examining contemporary events when the relevant behaviours cannot be manipulated. The case study's unique strength is its ability to deal with a full variety of evidence – documents, artefacts, interviews, and observations – beyond what might be available in the conventional historical study (Yin, 1994). The latter allows triangulation of multiple sources of evidence in describing a complex reality. According to Kernel (2005), the design of the case study makes it possible to obtain knowledge about the general characteristics and difficulties of working with sustainable tourism among different enterprises, due to the differences or likeness in their approach to sustainability and their interests in the development.

In parallel to this, it has to be noted here that the subjectivity of sustainability-related judgements has previously been reported in the literature to be a weakness. Assessments of sustainability are based on personal values considering the appropriateness of change (Lindberg and McCool, 1998). Empirical analytical tools are available for the measurement of individual, e.g. material-related, and more complex aspects of building sustainability. The former include e.g. Life Cycle Analysis tools, while the latter include such as the Swedish EcoEffect method (Glaumann and Malmqvist, 2007). These tools, when analysing sustainability, only focus on the physical aspects of construction and do not examine the connection between the non-physical entity of the owner, his or her way of thinking and the physical built environment with its complex properties. In the present study, non-physical, hard-to-measure "soft" data (collected by surveys, interviews and personal observations) were matched against "hard" physical evidence. The latter was collected by questionnaires and on-site at tourism enterprises with the use of a Martínez-type validated building inventory method (Martínez, 2007). The Swedish "Farm Holiday" register (Bo på Lantgård Riksförening, 2009) was a useful source of data for the questionnaire based part of the study, as the enterprises it lists rely heavily on ABs in carrying out their tourism-related activities. The strength of the research design of this study used in this study originates from combination of the approaches.

2.2 Case selection process

In the study, the whole of a AB-based tourism operation was considered the unit of analysis, a *de facto* case. To ensure external validity, literal replication pattern was chosen as a guideline in the selection process, namely cases that are highly similar to each other by certain criteria and give validated evidence. This method underlines any similar factors that work as a driver towards sustainability in these operations and to highlight key factors measured against territorial differences and human aspects.

Location and profile analysis of the businesses took the form of a three-phase filtering process. The Swedish 'Farm Holiday' register (296) (Bo på Lantgård Riksförening, 2009) together with enterprises found on the internet (15) and via proxy (8) provided a pool of 319 potential case study objects. In the first round of selection, the case study subjects were chosen from this pool of businesses according to the criteria shown in Table 1. Using the six groups of criteria, the selection process pinpointed three enterprises with as similar business and building profile as possible but located in three different areas.

Table 1 Criteria list of case choice

	Sahlströsmgården	Drakamöllans Gårdshotel	Flädie Vingård
Location	Deep rural	Periurban	Urban fringe
Enterprise and activities	Multifunctional rural enterprise with tourism as main source of income		
Premises	Traditional ABs to be used in tourism		
Size	Same -small- size (labour, turnover, premises, etc.), possibly family owned enterprise		
Sustainability	Estimated level of sustainability is to be high as assessed based on general sustainability and sustainable tourism related principles (WTO *et al.*, 1996)		
Other factors	Positive business development record, positive feed back from peers, positive-, communicative-, helping attitude from the proprietor in connection to the project, accessibility, etc.		

By the end of the first round, the original pool was reduced to eleven enterprises. Seven of these underwent a preliminary interview in order to select the three final cases that fitted the criteria for the comparative type multi-case study research. It should be noted, however, that although this study was mainly based on these three cases, information (e.g. statements of the operators, on site observations, etc.) from some of the preliminary selection interviews was also used.

2.3 Data collection

2.3.1 Questionnaire

The data collection for the project took place in two phases. In the first, questionnaire-based research module, the attitudes and views of operators were examined, with special attention to the advantages and disadvantages of their reused constructions. The questionnaire (see Appendix 1) was created with the use of the Total Design Method (Dillman, 1978), and other questionnaire design guidelines (Statistics Sweden, 2001; Walonick, 2004). It was administered by the internet-based Questionnaire Generator Program of the Swedish University of Agricultural Sciences. The questionnaire was sent to all e-mail addresses collected from the Swedish "Farm Holiday" register (296 enterprises) (Bo på Lantgård Riksförening, 2009) and contained questions relating to the following areas of interest:

1) Tourism-related activities carried out in reused ABs;

2) Age of ABs used in tourism enterprises (approximate time of construction of oldest building);

3) Style of ABs (traditional/modern) used in tourism enterprises;

4) Disadvantages of reused ABs in tourism enterprises as perceived by the owner/operator ;

5) Advantages of reused ABs in tourism enterprises as perceived by the owner/operator.

Fifteen e-mail addresses proved to be inactive. Of the 296 enterprises that received the questionnaire, 104 returned it (after one reminder), giving a response rate of approx. 35%, although only 97 questionnaires were found to be sufficiently complete to be included in the study.

2.3.2 Case study

In the second data collection phase, further evidence was collected by interviews with key informants (the owners). This data collection was carried out in accordance with the Case Study Protocol between October 2009 and April 2010. The two-stage interview process was based on the filled in questionnaires of the chosen subjects and were planned using Kvale's seven-stage method (Kvale and Brinkmann, 2009). The operator questionnaire was filled in, administered by the author, on the first visit to the case study object, just prior (2.0-2.5 h) to the interview with the owner of the enterprise. Further demographic questions were asked to gain detailed information about the background of the owner. A list of 10 semi-structured open ended questions was used together with the completed questionnaire as guidance during the interviews. In addition to the interviews with the owners informal talks were held with the staff using the same question list, in order to verify the gathered information (e.g. on the building related characteristics of reused ABs as seen by the users). With the use of comparative data tables (in the form of a comparison of the three cases) based on the first interview results, new questions were formulated that were used in the second phase. The second round of interviews (approx. 3-6 weeks after the first) took approximately 1 hour and was mainly used to complement the information gained during the first round. The interviews were recorded in both written form and digitally (sound). Photographic, technical, construction-related data collection was also carried out using a Martinez-Rodriguez type rural construction inventory (Martínez, 2007). The main phases of this were:

1) Ownership and use;

2) Surroundings of the constructions;

3) General observations concerning the buildings;

4) Detailed constructional aspects of the buildings;

5) Condition and conservation related aspects of the buildings.

2.4 Data processing

Data source triangulation (Patton, 2002) was the guiding principle in data collection, while multiple sources of information (questionnaire, interview/

transcript, photographic, printed and digital documents, personal observations) were used in the processing phase to establish chains of evidence. The collected data (background, questionnaire and interview data) were verified by the interviewees before further processing and by two independent peers to ensure internal and external validity. Two-stage 'pattern matching' as described by Campbell (1975) was then carried out. In the first stage of this, key words of the interviewees were collected and matched against the findings of the questionnaire. In the second stage, these were cross-tabulated with sustainability-related denominators in the literature in order to identify common points and discrepancies. The relevant aspects of sustainable reuse of rural structures were brought under the scope of this inquiry, from construction to building material issues in environmental, economic and social contexts.

2.5 Description of cases

In terms of location of the three cases (Figure 1), Flädie Vingård (FV) was situated in an urban fringe type periurban area, Drakamöllans Gårdshotell (DG) in an accessible rural (commuter/lifestyle type) periurban area as defined by Author et al. (2008) and Sahlströmsgården (SG) in a remote rural area.

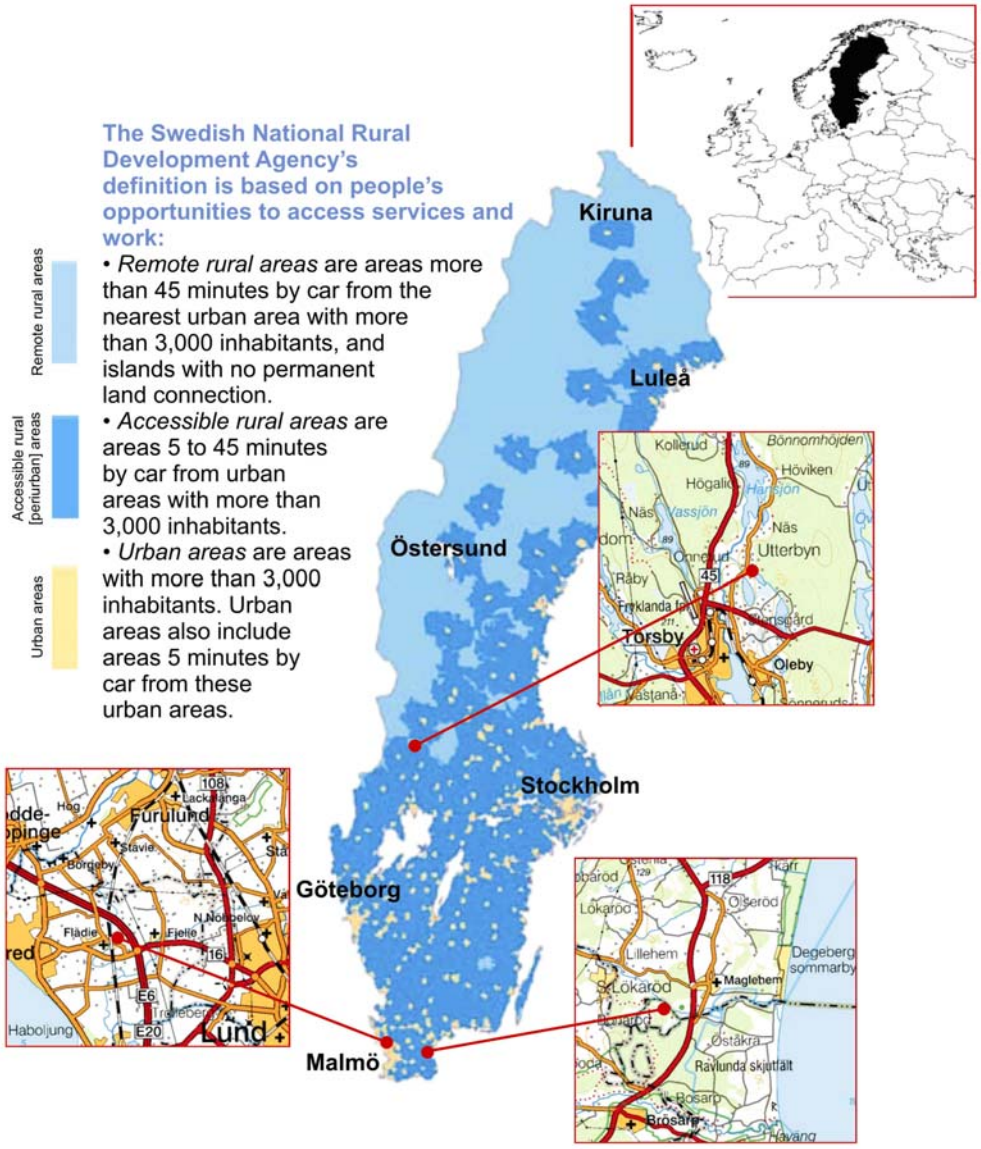

Figure 1 Location of the cases in relation to Swedish spatial characteristics

The three municipalities (thereby the three cases) have very different macro environments concerning geographical factors, economic structure and demographic set-up in relation to the national characteristics of Sweden. However, the microeconomic configuration of the three chosen enterprises in

terms of number of buildings owned, labour force, capacity and turnover, etc. was highly similar (Table 2).

Table 2 Macro- and micro-environmental information about the three study cases in relation to the national characteristics of Sweden

	Sahlströmsgården Torsby Municipality	Drakamöllans Gårdshotell Tomelilla Municipality	Flädie Vingård Lomma Municipality	Sweden
MACRO ENVIRONMENTAL FACTORS				
Municipality land area	4 189 sq km	399 sq km	56 sq km	410 335 sq km
Total crop area (in % of the total) in 2003*	0.9%	56.2%	62.3%	3 431 300%
Total grazing area (in % of the total) in 2003*	0.7%	15.6%	2.5%	3 230 000%
Total forested area (in % of the total) in 2003*	79.2%	19.8%	0%	23 888 600 ha
Population density in 2010	3.3 pers./sq km	32.4 pers./sq km	387.5 pers./sq km	23 pers./sq km
Population in 2010	12 414 pers.	12 914 pers.	21 559 pers.	9 340 682 pers.
Population change (2000-2010)	-9.5%	4.3%	19.5%	5%
Netto commuting structure for males (2007)	-114	-538	-2 548	-
Netto commuting structure for females (2007)	188	-454	-2 258	-
Most important workplaces in the municipality (2007)	Healthcare & Care (ca.27%)	Trade & Communication (ca.20%)	Education & R&D (ca.26%)	**Trade & Communication (ca.18%)**
	Mining & Production (ca.16%)	Mining & Production (ca.17%)	Trade & Communication (ca.19%)	**Production & raw material (ca.17%)**
	Trade & Communication (ca.14%)	Healthcare & Care (ca.17%)	Finance & business services (13%)	**Healthcare & Care (ca.16%)**
	Education & R&D (ca.11%)	Education & R&D (ca.12%)	Healthcare & Care (ca.11%)	**Finance & business services (15%)**
	Agriculture, forestry, hunting, fishing (ca.8%)	Consturction (ca.9%)	Production & raw material (ca.7%)	**Education & R&D (ca.11%)**
	Culture & services (ca.8%)	Agriculture, forestry, hunting, fishing (ca.8%)	Culture & services (ca.7%)	**Culture & services (ca.7%)**
Average income (2007)	199 000 kr	205 000 kr	325 000 kr	**239 000 kr**
MICRO ENVIRONMENTAL FACTORS				
Number of buildings	3	3	2	-
Origin of buildings	Traditional, area-typical farm buildings of stone and timber	Traditional, area-typical half-timbered farm buildings	Traditional, area-typical farm buildings of local bricks	-
Total number of rooms	30 rooms	11 rooms	9 rooms	-
Max. number of guests	150 persons	45 persons	160 persons	-
Number of employees	7=2+5 persons	5=2+3 persons	18=8+10 persons**	-
Turnover				
2006	4.9 m SEK	3.298 m SEK	11.138 m SEK	-
2007	3.8 m SEK	3.59 m SEK	12.508 m SEK	-
2008	4.4 m SEK	4.598 m SEK	14.491 m SEK	-

Note: * Areal comparisons are made based on data from 2003 as no statistics is available for forested areas on the municipality level after this year.

** The origin of the discrepancy conceming labor bet ween the three enterprises is that FV has an outside catering branch with a rather large temporary wstaff (e.g. waiters). This also produces a higher turnover.

Source: Key informants in the study cases; Swedish Companies Registry Office; Statistics Sweden 2008, 2009a, 2009b; Swedish Forest Agency, 2003.

2.5.1 Sahlströmsgården

SG is located near the town of Torsby (pop. 4 012), the administrative centre of the area. Recent developments in the countryside (changes in agriculture and transport, chemicals, IT, etc.) have affected living and lifestyles, with decreasing income and fewer employment opportunities, the closure of shops and schools, and a relative reduction in services and public transport (Gössling and Mattson, 2002). This in turn has resulted in decreasing attractiveness of peripheral areas, and younger population groups in particular are characterized by high migration rates, often leaving behind ageing rural societies (Lane, 1994). This is very much the case in Torsby and its nearest larger neighbours Sunne (pop. 4 903) and Malung (pop. 5 146), all of which have decreasing population figures. The larger urban node of Karlstad (pop. 58 544) is situated approximately 150 km away. Torsby is by far the largest of the three studied municipalities with low population density, located in the deep rural forest region of Sweden, where forestry, raw material production and associated services are of major importance. Tourism is highly seasonal; in the winter months there is skiing, while in the summer months adventure and activity-based tourism bring visitors into the area.

SG has a long history of culture and connectedness with historical personalities of major importance, together with a romantic atmosphere originating from the Swedish folk and national traditions (Torstensson, 2003). The site consists of three traditional buildings (barn, storage building, dwelling), with the oldest originating from the 18th century. The buildings are timber structures except for the barn, which is a stone block wall structure. The roofs are steel sheets on wooden frames, which are rather traditional for the area in their material, shape and colour. The buildings have undergone extensive renovation in three phases during the past 15 years. Insulation has been added and new utilities installed in the buildings.

New floors have been laid (poured, reinforced concrete) and covered with terracotta tiles or wooden floor boards, while the walls have been wood paneled or covered with rustic, rough rendering. Colours match the local Swedish traditional colour scheme. Traditional features have been retained where possible. Beams have been strengthened with modern materials (laminated beams) but still maintain a traditional appearance and the original windows have been given a layer of secondary glazing for added insulation. Several structural changes have been made to accommodate new features in the main building, such as the installation of an elevator and a wide staircase. The main building has also had two extensions in the form of a restaurant kitchen and a shop.

Figure 2 Sahlströmsgården

2.5.2 Drakamöllans Gårdshotell

DG (Figure 3) is located in south-eastern Sweden, in Tomelilla municipality.

Figure 3 Drakamöllans Gårdshotell

Tables 2 and 3 provided detailed information about DG and its environment. It can be seen that the area is intermediate to the other two, concerning population density, size of area, types of activities, land use and population. The level and condition of infrastructure is not as advanced and good as in the case of SG. There are no large urban centres in the vicinity of DG, the nearest larger settlements being Åhus (pop. ca.9 000), Kristianstad (pop. 33 083) to the north and Tomelilla (pop. 6 204) and Simrishamn (pop. 6 546) 30 km away to the south. Public transport connections are relatively poor and there are no train lines in the vicinity. Road infrastructure is adequate. The area is a well known tourist attraction, famous for its beaches, culture and heritage. In land use agriculture and forestry are of importance without serious conflicts, although as the area has a strong rural character more serious disagreements occur between tourists, the seasonal population (holiday home owners) and the locals.

DG is heavily reliant on its location's characteristics, i.e. the qualities of the nature reserve in which it lies. DG uses three traditional ABs, of which the oldest originates from the 17th century. They are built with traditional construction technology (wood-framework on rubble foundation) and materials consistent with the traditions of the area (mud-bricks, bricks and wood). The thatched roof is also typical for this part of the country. Multi-phase renovation and extension of the buildings has taken place since 1998. New reinforced concrete slabs have been poured and the buildings have been complemented with rock-wool insulation. The new extensions have been built with the use of Leca® blocks. The traditional appearance of the buildings has been retained by keeping the original thatched roof, using rough rendering on walls and applying typical features and colours for the area and the time during renovation. Structurally, the buildings have undergone only minor changes, with the loft of one building having been partially opened up to create a high ceiling room for the restaurant/lounge. Floors have been covered with new but traditional looking tiles and antique furniture was used to increase the traditional atmosphere.

2.5.3 Flädie Vingård

FV (Figure 4) is situated in the Lomma municipality,

situated on the Örestad megalopolis (Vicino et al., 2007) axis of Copenhagen – Malmö – Helsingborg, with a total population of well over a million.

Figure 4 Flädie Vingård

Lomma municipality has the highest population density of the three case areas, with 387.5 people per km^2 on its relatively small 56 km^2 area. The economy of the area and the available workplaces (for the mainly commuter population) are strongly influenced by the nearby large cities.

The area has excellent infrastructure in the form of transport, communication and public services. Fast national, regional and local commuter train networks are available, cycle paths connect nearly all important settlements and road infrastructure is also in excellent condition. Two international and two smaller local airports serve the area and Malmö, situated in the vicinity, even has a large port. The average income of citizens is very much higher than the Swedish average or that in the other two study areas. Tourism and recreational land use are significant, mainly as a result of nearby urban centres and the proximity to the sea. Land use is mainly characterised by agriculture and the new booming interest in housing developments is causing serious conflicts.

The FV enterprise is situated approx. 1 km off the main E4 motorway, just outside the small village of Fjälie, in open agricultural landscape. FV's main concept is built on an exotic attraction to most Swedes, its own vineyard. Some other important descriptive features of the business are compared with those of the other two enterprises in Table 3.

Table 3 Summarized environment related characteristics of the three cases

	Sahlströmsgården	Drakamöllans gård	Flädie Vingård
Climate	Inland taiga	Oceanic with inland influences	Oceanic
Landscape character	Hilly	Hilly on the edge of coastal flatland	Coastal flatland
Hydrology	Many streams, rivers and lakes in vicinity	Small stream and seacoast nearby	No surface water, seacoast nearby
Flora	Taiga like, predominantly coniferous woods	Mosaic landscape, predominantly deciduous woods	Industrial/agricultural landscape with few natural elements
Fauna	Nordic; all elements present, inclusive large carnivores (bear, wolf, etc.)	Nordic; all elements present, except large carnivores (bear, wolf, etc.)	Nordic; many of the area typical species are missing, except diverse birdlife.
Accessibility	Comparatively poor	Good	Excellent
By air	Poor	Poor	Very good
By train	Good	Poor	Very good
By road transport	Good	Good	Very good

The enterprise uses two buildings, both of agricultural origin (dairy farm, farm dwelling) from the 19th century. The building is based on traditional rubble foundations but during the last renovation new reinforced concrete slabs were poured. The material of the buildings is local brick and timber. The roof structures are wooden constructions and are covered with eternit sheets, a typical low-cost roofing material among others for farm buildings of the 20th century. The buildings were taken over in 2003 and extensive renovations were carried out. This included structural changes (rebuilding the animal houses), replacing all the doors and windows (double glazing in traditionally shaped frames), full-scale engineering features and installations in order to meet the new use and improve energy efficiency. Floors are covered with rural-inspired Mediterranean style terracotta tiles or wooden floor boards. The original character of the building has been maintained in the interior and

exterior, although modern elements have been used in the renovations. The interior furnishing is modern with period features (open beams, feeding trough, etc.) to improve traditional atmosphere.

3 Results

3.1 General observations

3.1.1 Results of the questionnaire

In the first phase of data collection, 92 enterprises stated that they carried out tourism-related activities and 59 of these had multiple activities. Almost 97% provided some form of accommodation (B&B, self-catering, room/apartment rental), 40% offered activities for visitors (fishing, hunting, organised walks, etc.) and 21% offered animal-related activities for visitors (riding, working with animals, petting zoo, etc.). In all, 8% of the operations had either a café/restaurant or shop on their premises and 76 enterprises (81%) provided answers concerning the age of their buildings Ca. 46% of the 76 answers received concerning age showed buildings that were from the 19th century. The second most populous group (ca. 34%) was 20th century onwards, while ca. 16% of the enterprises had buildings originating from the 18th century and only approximately 4% were from the 17th century or earlier.

Of the 96 enterprises which provided answers about building style, 89% reported that their ABs were of traditional style, while the remainder (11%) were buildings with modern features.

Because of the nature of the open answers, it was possible to harvest multiple factor-responses from operators (where one operator may have mentioned several disadvantages or advantages). This resulted in 98 answers on advantages (85 respondents, 11 missing) and 97 answers on disadvantages (84 respondents, 12 missing). The answers owners gave about the advantages of their reused ABs concerning tourism type use were presented in Table 4.

As can be seen from Table 4, the most factors scoring highest (five items) as advantages of reused ABs were connected to non-physical characteristics. In contrary to this physically related characteristics such as directly construction related advantages scored low. Age was only mentioned per se, unfortunately no detailed explanation was provided on why this was considered as an important factor. The owners also listed those factors that they found disadvantageous (Table 5).

Table 4 Advantages of the ABs' included in the study in the context of reuse in tourism

Factor	Number of answers	Percentage /%	Examples of descriptors used by respondents
Atmosphere	43	43.9	Cosiness, feeling, has a soul
Other	14	14.3	Old furniture and period fireplaces, high ceilings, how it fits in the landscape
Charm	11	11.2	Charm, character, style
Authenticity	11	11.2	Genuine, unique, 'personal'
Milieu	11	11.2	Traditional cultural milieu and historical environment
Construction-related factors	6	6.1	Visible beams, timber constr-uction, wooden floorboards
Age	2	2.1	
Total	98	100.0	

Table 5 Disadvantages of the ABs included in the study in the context of reuse in tourism

Factor	Number of answers	Percentage /%	Examples of descriptors used by respondents
Functional character	36	37.1	Not disabled friendly, difficult to renovate and maintain, difficult to meet authorities' requirements, difficult to furnish, inadequate storage space, difficult to clean, steep staircases, high thresholds, fire safety, form goes before function
None	18	18.6	
Bathroom/ kitchen	17	17.5	Difficult to install engineering
Room set-up	10	10.3	Worse floor plan than with newly built, non-rational room layout, distribution and size, shape of rooms
Heating and energy	10	10.3	Cold floors, draught, difficult to insulate, expensive to heat
Roof and ceiling	4	4.1	Too low ceilings
Floor	2	2.1	Uneven floors
Total	97	100.0	

Non-physically related characteristics also scored high concerning the disadvantages of ABs reused in tourism. In contrary to this, physical factors such as building materials were not at all mentioned per se, only the influence of these on their environment.

3.1.2 Interview results

The results showed the importance of developing a personal network in the building sector and strong,

long-term relationships with key people in order to be able to fulfill the criteria for sustainable renovation. These key people included:

1) Architects;

2) Engineers;

3) Craftsmen;

4) Specialist small businesses;

5) Retailers of building materials;

6) Artists.

Territorial differences were found to exist in approaches to create a sustainable reused AB which manifested in:

1) Personal participation, openness to learn and a jack of all trades approach were observed in all three enterprises, although the more rural the character, the more obvious this trait became;

2) Human factors and the social sphere were found to be strongly shaped by local economic conditions and the physical environment, e.g. the more rurally oriented areas had tighter knit communities and this has manifested more extensive use of the informal networks both in the private and the business sphere;

3) Local authorities had a closer (personal) connection to businesses in more rural areas;

4) There was also less 'visibility-related' pressure on the owner from the public, e.g. in choice of materials or construction method. Trends and fashions in the building context also seemed to have a lower impact the further away from the city the enterprise was situated;

5) The further away from urban centers the enterprise was situated the higher owners' awareness of transportation related issues and thereby difficulties were. This was manifested both in more organized procurement and transport behavior (personal and goods) in more rural areas to reduce costs, time spent on this activity and minimizing polluting the environment;

6) Higher cost levels (on building materials, fuel, etc.) were observed the further away from urban centers the enterprise was situated, as a result of lack of competition.

Concerning the choice and sourcing of materials, all three case study owners emphasized the use of natural, renewable materials that fit the character and style of traditional buildings and their environment, but also the importance of functionality and a structurally sound construction. The quality of the building materials was also pointed out as a significant factor. All three mentioned that cost is of secondary importance to aesthetics and the above-mentioned considerations. The owner of SG emphasized that local materials were used wherever possible, such as timber from his own forest (sawn in the local mill) and stones taken from his own land for the foundations and wall reparations. Natural paints (linseed oil, lime-wash, etc.) were used in all three operations wherever possible and practicable in terms of functionality. SG's owner has even developed his own paint (now sold as a product in the SG shop), as there was no adequate traditional-style product available on the market. However, DG's owner pointed out that traditional lime-wash could not be used in areas where there was heavy tear and wear.

The importance of resource saving on both material and energy consumption was pointed out by all three enterprises. The use of double and triple glazing, while keeping traditional appearance and wherever possible the original windows, highly effective heat-pumps, low energy light bulbs everywhere and adequate quantity and quality of insulation everywhere in the constructions are some examples of the observed resource savings.

The choice of construction technology and technical solutions in all three enterprises were in accordance with the traditional character of the ABs. Mentioned problem areas concerning these were:

1) Placement of modern equipment in a traditional milieu: obligatory fire ladders and escapes, signs;

2) Mandatory use of gypsum boards in certain places (hotel rooms), where it was difficult to hide the modern nature of the material;

3) Lack or complicated form of space in traditional buildings, which does not suit the placement of modern equipment, e.g. in kitchens.

Concerning the basic construction-related sustainability principle of reuse, refit and recycle, two of the three owners (SG and DG) have extensively re-used old furniture in the decoration process. While SG had a number of cupboards and shelves made out of refitted furniture, DG had used antique furniture as the focal point

in the decoration of rooms and shared areas. As a personal observation, this trend was also noted in early case selection interviews and compared with tourism enterprises that are situated in urban areas and in modern facilities. All three interviewees tried to retain as much of the original details and materials of the buildings as possible (e.g. fittings, flooring, etc.) during the renovation process and all three enterprises used full-scale recycling during the reconstruction process. The owners pointed out difficulties in the renovation and maintenance of old buildings, such as the lack of understanding of modern tradesman concerning old materials, their lack of knowledge of traditional building methods and the low availability and high price of suitable materials for sustainable renovations.

The difficulty in meeting the requirements imposed by the authorities was brought up during the interviews (SG and DG) and this was also pointed out in the answers to the questionnaires (five respondents) and observed on the field visits. These mentioned regulations concerned building regulations, fire protection and food-related health and safety rules. The changes required by these rules and regulations collided with the owner's interests of conservation and brought about radical changes, both structurally and in materials.

The answers defining sustainability in connection to their buildings, material and construction technology were not uniform among the respondents in the interview group. The nomenclature of sustainability was used interchangeably and sometimes inaccurately.

During the discussions, the personal and professional background of the interviewees was found to be of major importance in shaping their building-related sustainability approach. These included among others:

1) Education and family background (SG);

2) Work experience (DG);

3) World-view (DG, SG, FV);

4) Experiences during upbringing (folk tales and storytelling for the owner of DG, family traditions for the owner of SG);

5) Travel experiences (for the owner of FV).

This was physically strongly manifested in planning, choice of material and construction technology, but also in their whole way of thinking about the reused building. The building was de-objectified through their storytelling and it became an organic part of the enterprise, which in turn fitted snugly into its environment. This was demonstrated by owners' representations of the physical environment of their business, and thereby its buildings. For example, DG was referred to by its owner as 'a place where time stood still…'

3.2 Detailed results concerning buildings

3.2.1 Construction technology and structural elements

Structural issues were mentioned as a major problem when trying to reuse former ABs in a sustainable way. The seemingly illogical floor-plan of buildings, too low or too high ceilings, inappropriate room distribution and size for modern purposes were brought up during the interviews, in the questionnaire and was also observed during the on-site surveys.

3.2.2 Floors

Floors were found to be one of the major areas of importance concerning disadvantages, as experienced by the operators surveyed by the questionnaire. Respondents noted cold floors as a negative factor. In parallel to this, the findings showed that most operators interviewed had either kept the original flooring or had replaced it with new flooring material that resembled the style of the original floor. The appearance and material of surfaces were mentioned by the owners of DG, FV and SG as key factors in creating a suitable 'atmosphere'.

3.2.3 Walls and ceilings

People perceive walls and ceilings mostly by their colour and then by texture or because of additional features (e.g. open beams). Six out of seven operations (including the three final case study objects) visited in this study had tried to use environmentally friendly paints with natural origins. Lime-wash, linseed oil based and the traditional Swedish Falu-red paint were mentioned by both groups surveyed as preferred products from a sustainability point of view. However, the owners of DG, SG, FV and a questionnaire respondent as well pointed out the slightly inferior technical properties of these paints, including lack of resistance to rubbing (mechanical damage) and discolouration problems. Another sustainability-related problem mentioned (DG

and SG) was the lack of available paint products that fulfill sustainability criteria.

Traditional Swedish ABs now used in tourism (as a result of the characteristic type of construction methods used in those eras) often has visible beams and floorboards. The preservation of these and other wooden details was also mentioned as a problem concerning the choice of functionally and aesthetically suitable, but environmentally friendly, preservation materials. The proprietors of DG, SG and also one of the case selection interviewees have mentioned linseed oil, turpentine and a mixture of the two or wood tar as reliable materials that fit all the requirements of sustainable preservation of traditional buildings.

3.2.4 Roofs

Two of the properties visited had thatched roofs, one had eternit tiles, three were covered with terracotta/concrete roofing tiles and one building was roofed with corrugated steel sheets. Traditional roofing materials were found to be typical of both time and place for their environment; the more southerly enterprises had thatched roofs, while those more to the north had corrugated steel roof or tiles which in material and style accurately reflected the building's age. The structural parts of all buildings' roofs in the study (DG, SG and FV) were made of wood and were built and even renovated according to traditional construction techniques.

3.2.5 Utilities

During the interviews at SG, DG and one of the case selection interviewees described water and sewage installations in reused ABs as a problem area. Fitting sanitary ware and installing pipes were mentioned as problematic by questionnaire respondents as well, as was the size of the rooms available for these purposes. Electric installations were not mentioned as being problematic but the placement of electric appliances was.

Ventilation-related problems, such as obtrusive venting and sound disturbance, but also solutions, such as vents hidden or masked (DG and SG) or such as being built in a new extra "pillar" at one of the case selection interviews, were observed.

Fitting kitchens and bathrooms that fulfilled the requirements of the authorities was pointed out by the owners of DG, SG and FV together with two of the case selection interviewees as especially difficult in ABs. Here questions of floor plan-related problems and material-related issues were also raised, a point also stressed by the questionnaire results. The former included the existence of walk-through rooms, small rooms or rooms with a strange shape, non-vertical walls and strangely angled corners in which furniture did not fit. The material-related problems mentioned were the lack of available traditional building materials that fulfill the authorities' requirements while still being e.g. environmentally friendly, locally produced or non-toxic. Good examples of this were the polyurethane-based waterproofing membrane material for rooms where high humidity is expected or sheet materials with appropriate technical qualities. The comparatively higher cost and difficulty of renovating according to sustainability principles was mentioned by the owner of DG, SG, three of the case selection interviewees and 10 questionnaire respondents as a disadvantage.

In relation to energy savings, heating and insulation were mentioned by both the owners of SG and DG but also by 8 questionnaire respondents. Reused ABs was referred to as having cold floors and being draughty and expensive, if not nearly impossible to heat.

4 Discussion

4.1 General discussion

Buildings in RT generally tend to be older than those in urban or resort-based tourism (OECD, 1994). The age distribution of the ABs in this study confirmed this and showed a similar pattern to national trends concerning rural buildings in Sweden (Lange, 1995). Concerning tourism-related activities, farm enterprises providing alternative accommodation dominated the survey population, as reported previously (Ilbery et al., 1998).

Previous studies have shown the importance of "atmosphere" in tourism (Heide and Grønhaug, 2010; Bocz et al., 2012), and the findings of the present study confirmed this.

The importance of buildings and built tradition has been mentioned as something of a must for visitors (such

as see Venice and die), and key attractions include farm heritage buildings (Urry, 2008). All the interviews and a majority of questionnaire respondents in this study showed agreement with this statement. Old building character, charm, atmosphere, natural building materials and history were mentioned as the main differentiating factors compared with modern buildings. All interviewees (including the selection interviews) were in agreement on the importance of the traditional, aged nature of these buildings, with their interesting features being the actual attraction. This finding was undermined by the analyzes of the questionnaire, where physical building-related factors of ABs were largely overlooked as advantages. The fact that the two data sources differed may indicate unawareness by owners of their buildings' properties, or may have been due to the inability of the questionnaire method to grasp the way of thinking of the respondents.

All three case study owners interviewed pointed out that in their opinion, it is more sustainable to keep and renovate a building than to pull it down and build a new one lacking traditional characteristics. These findings were in line with previous findings (García and Ayuga, 2007). Owners considered themselves caretakers of their premises, a statement that showed a strong resemblance to the first guidelines of sustainability articulated by the Indian Chief Seattle in his speech in 1854 (Education for Sustainability and Global Learning, 2011).

Studies analyze success factors in cultural heritage tourism demonstrated the importance of authenticity (Hughes and Carlsen, 2010). Hughes and Carlsen (2010) while further referring to others' findings expand on this point and observe that tourists accept commercialisation of cultural heritage as long as the subjective traits of authenticity in the experience are perceivable. The findings in this study confirmed these observations. Operators in many different ways expressed both their own concern and that of visitors for this issue in a building context, by ranking uniqueness, the "personal touch" and similar differentiating factors as being of high importance.

Functional problems, such as seemingly illogical floor-plan of buildings, too low or too high ceilings, inappropriate room distribution and inadequate size for modern purposes, were the major disadvantages cited by operators. This is mainly the result of drastic changes in the requirements on users. These are universal problem areas when reusing ABs therefore can be considered valid even in an international context. Concerning the UK, Latham (2000a) points out the advantage of relatively modest service requirements of reuse, together with external considerations focusing on matching the proposed new use and existing external experience of the building. He also warns that reuse in the form of tourist accommodation and holiday lets seldom partners well with the structure of former agricultural constructions. Former ABs were often constructed to house animals or as dwellings for people who were much shorter in stature and also had lower hygiene requirements. Today's users, as DG's owner pointed out during the interview, need modern, large en-suite rooms, spacious bathrooms and kitchens that entail complicated installations (e.g. piping, wiring, under-floor heating) and appliances (toilets, baths, Jacuzzis). When these requirements (e.g. en-suite rooms) are not met, visitors were less inclined to rent the tourist accommodation and took their business elsewhere. These modern installations can bring with them other problems, such as increased humidity and therefore mould and mildew problems. In Friesland, Holland, three-quarters of reused ABs were reported to have had drastic changes made to their interior, leading to loss of the information value of these buildings (van der Vaart, 2005). This trend can be observed throughout the western developed world (among others in Sweden), especially in countries where urbanites are forcing modern lifestyle and values on traditional built infrastructure. This in turn arguably jeopardises a major sustainability principle, namely preserving valuable assets for the benefit of future generations. However, the only chance abandoned, redundant ABs have for survival and conservation is through reuse (García and Ayuga, 2007). From a sustainability point of view, it can therefore be argued that even drastic changes in the above areas are to be considered a necessary evil, as without these, reuse would most likely not take place. This finding has much

wider implications than would appear at first glance. For example, Garcia and Ayuga (2007) point out specific areas where derelict unused ABs can have severe counter-effects on sustainable development in rural areas. These include negative effects on the landscape and its development, the landscape integration of buildings, culture and history and dangers such as image loss through remnants of buildings.

The interviewees and the questionnaire respondents both mentioned the difficulty in meeting the requirements of authorities. These requirements for sometimes drastic transformations collided with the owner's interests of preservation (SG and DG) and resulted in loss of character and atmosphere. ABs impoverished in this way cannot provide future generations with the ability to have the same experience and knowledge base, therefore reducing their long-term sustainability. This result corroborates the findings of Tassinari et al. (2010).

Both concerning the advantages and disadvantages, physically related characteristics were found to be of lesser importance (Table 4 and Table 5). Most building elements, such as floors, walls, etc., building materials and construction technology were perceived by owners as a complex web of visual, kinetic, olfactory and thermal (e.g. heat/cold radiation) experiences. All of these experiences are not necessarily applicable to all building elements, as they may be e.g. out of reach or not directly in the view of the people using the buildings. The power of these factors either consciously or subconsciously influences the individual. For example, cold emanating from the floor is perceived as uncomfortable and connected to the temperature of the surface, while its material and texture (e.g. uneven or hard stone floor) may not be perceived as a reason for back pain. To summarize: material and construction technology are in principle invisible to the average user.

4.2 Detailed discussion concerning buildings

4.2.1 Floors and foundations

The importance of floors as structural elements was experienced very strongly by the operators. The fact that extra insulation was added in most cases when a floor was re-laid shows that this was a major area of savings and comfort improvement for all operators. Energy savings in turn worked towards improved sustainability. Interestingly, although the appearance of the floor was raised as a factor in this context, e.g. texture and hardness (walking comfort) were not, indicating only a partial understanding of floor material properties.

4.2.2 Walls and ceilings

Paint that fit sustainability criteria was mentioned repeatedly as a problem. As modern industrial paints often contain highly toxic ingredients e.g. volatile organic compounds such as benzene, cyanides, pigments, etc. (United States Environmental Protection Agency, 2012) and plastic-based binding agents, traditional paints can be considered the more sustainable alternative. Traditional paints also often rely on local raw materials such as solvents (linseed oil) or pigments (earth products) and are produced by local small industries with incomes generated and staying within the local economy. Wood tar and some cold-pressed or cooked linseed oil-based paints are still produced locally in Sweden.

4.2.3 Roofs

During the interviews it became clear that most operators were not directly aware of the environmental impact or the sustainability implications of different roofing materials or roof construction technology. Functional and aesthetic properties together with financial considerations guided the choice of roofing, both concerning technical solutions and material, and sustainability-related issues were not prioritized. One of the proprietors who owned thatched buildings took special pride in his roof and its renewable, environmentally friendly nature. He pointed out that he had helped in recent re-thatching and that it would last 25-35 years (with maintenance), how competitive thatch was compared with other roofing materials and the social effects of preserving old trades such as thatching when choosing roofing methods.

4.2.4 Utilities

Interviewees (DG and SG) mentioned bathrooms and kitchens as one of the most problematic areas concerning the application of sustainability measures in reused ABs. These findings were confirmed by the results of the questionnaire (14 respondents). The reason for this is that tourism-related enterprises have relatively high

requirements concerning the extent and complexity of sanitary installations compared with other types of reuse areas such as storage, office space, small business establishment or even private dwellings. This is largely due to the multifaceted nature of tourism, the large number of regulatory bodies (i.e. rules and regulations) involved in controlling the activities and the uniqueness of the built infrastructure used in heritage-related tourism (age, special material of buildings, etc.).

Concerning the sustainability of installing modern utilities in reused ABs, by its nature is a contested issue. Without modern facilities, these buildings might stand empty or even fall down, and this in itself would be against the sustainability principle, namely that it is better to reuse than to build new (Ruda, 1998; García and Ayuga, 2007; Zavadskas and Antucheviciene, 2007). Furthermore, as most utility-related changes require structural intrusion, hiding them is difficult. On the other hand, atmosphere was found to be one of the most important assets of ABs in tourism, just as this factor scored highest concerning the "advantages of reused Abs" in this survey. This shows that investments in atmosphere really pay off (Heide and Grønhaug, 2010), so changes that may result in loss of atmosphere and decreased building-related values thereby reduce sustainability in the long term. As installation of utilities is one of the most expensive parts of AB renovation, savings not directly benefiting sustainability will be made here.

The fact that sustainability-related definitions and nomenclature in connection to building materials and construction technology were unclear to most respondents is hardly surprising, given that even among researchers sustainability is said to be a subjective phenomenon and a vague concept (Lindberg and McCool, 1998; Roberts and Hall, 2001; Jacobsen, 2007). The interchangeability of expressions such as "sustainable", "environmentally friendly", "ecological" and "renewable" during the discourse with interviewees (seven interviews) signifies unclear understanding of terminology, possibly as a result of these terms mainly being learned by hearsay and not as solid factual definitions acquired from the appropriate literature.

Furthermore, the content of sustainable construction was unclear. Although materials were clearly identified as having implications for sustainability, labour requirement, reparability and maintenance need were not considered directly part of the term sustainable. As sustainability in a building-related context is a complex holistic threefold phenomenon with multifaceted subdivisions (areas that are not necessarily interesting or known to the public), it is not obvious to operators that these implications should also be included.

The strong influence of personal and professional background and similar individual-related factors on e.g. choice of housing or differences in the appreciation of certain aspects of tourist has been reported previously (Nordström and Mårtensson, 2001). The personal approach to building-related sustainability follows similar patterns. Figure 5 shows human factors and lifestyle dimensions as described by the AIO system of Plummer (1974) in relation to the findings of this study, where the actually found sustainability related connections were benchmarked to the figure created by Bokalders and Block (2010).

Territorial differences were found to exist in approaches to create sustainable reused ABs. As the number of business enterprises is less in more rural areas, local authorities have a closer, (e.g. personal) connection to businesses in such more rural areas. This may have a positive effect on the communication process between the business and the authorities, but also may slow down processes as a result of personal conflicts. The lack of high "visibility" and lower exposure to trends and fashion can be assumed to be primarily the result of demographic differences between rural and more urbanized areas, i.e. the lower access of population mass and thereby its reduced influence on more rural enterprises.

Although the study does not provide conclusive evidence for the why of having a greater "jack of all trades" approach in more rural environments, however, the result of lack of available skills and trades on offer in more rural areas together with personality characteristics offer a good explanation for this phenomenon. All three owners had a very open, eager to learn, hands-on attitude, which was coupled with a sincere interest in all aspects of

their business and the buildings.

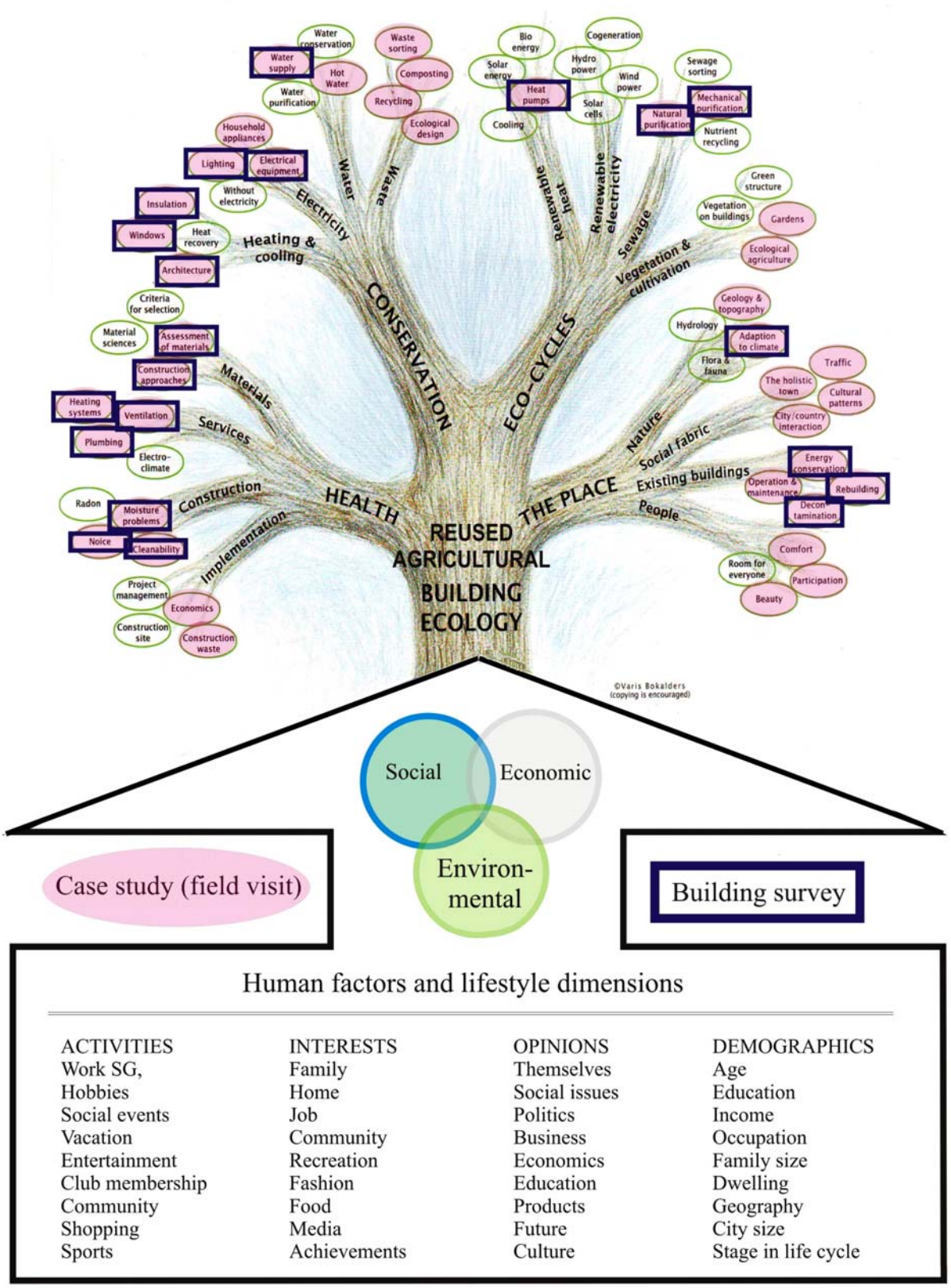

Figure 5 Sustainability, human factors and lifestyle dimensions in relation to the findings of the case study and the building survey/field visit

It is hardly surprising that the importance of a personal network in a building-related context increased in more rural environments, given that procurement of the materials and services needed for reuse of ABs becomes more difficult (as a result of the availability of a less wide spectrum of shops, products, service providers, etc.) with

increasing distance away from the urban centres and that renovations and reuse of ABs are not as easily carried out with available local resources. Other solutions used for this problem were the internet and the local informal economy (bartering). The internet bridges spatial geographical distances by offering the opportunity for cheap, fast and efficient e-business information, searches and communication. The local informal economy is based on personal connections and non-established commercial channels (such as bartering) built up over the years and offers highly reliable fast service, usually well below the price otherwise offered to outsiders.

5 Conclusions

This study set out to uncover whether territorial differences and human factors had an influence on the approach of operators in the sustainable reuse of ABs from a building point of view. A combined questionnaire and comparative case study approach was used to examine and analyze physical characteristics of buildings and operator responses to the demands of sustainable development.

Operators were aware of the building-related advantages and disadvantages of reusing ABs in tourism. They considered atmosphere and authenticity to be very important advantages of reused ABs, followed by interior decoration factors (mainly furnishings), milieu and charm. Building characteristics were considered only a minor advantage, although interviews indicated that the research method used may have failed to differentiate between conscious and subconscious perceptions. Operators built on the advantages of their ABs, actively using them in image creation and preserving them for future generations. All showed significant resistance to regulations (e.g. fire safety) that usually resulted in negative effects on these factors.

The main disadvantage mentioned was functional characteristics, although almost one-fifth of questionnaire respondents saw no disadvantages with reusing ABs in tourism. Other disadvantages were difficulties concerning bathrooms and kitchens, lack of space and energy and heating issues. Building-related disadvantages were overcome by adjusting functions to physical conditions and using some modern materials and technology in renovation. Drastic changes to ABs to fulfill the criteria of modernity and the authorities were acceptable to operators as long as these were creative and well planned, preventing loss of value and building information. Operators also made conscious efforts to understand their buildings and their history and adapt AB renovation to fit basic sustainability principles. Social sustainability (e.g. supporting local economy and society) was problematic due to lack of locally produced goods and the highly specialist nature of some renovation, although these services brought in financial resources from urban visitors and by using local service providers and tradesman redistributed it in the local society. The high visibility of these tourist enterprises in the local society also make them serve as fore runners for others both from a building/sustainability and entrepreneurial point of view. When SG was expanding, the owner invited local citizens in the decision-making process, thereby improving social cohesion. By owning, reusing and taking care of ABs, these enterprises are also keepers of a traditional knowledge base, thereby working as an educational, conservational platform of know-how for future generations.

Building materials appropriate for sustainable renovations (namely those that are produced in a socially responsible way with the least possible impact on the environment and health while fulfilling the criteria of construction and having an economically sustainable profile from a life-cycle perspective as well) are available on the market, but as expressed by the questionnaire respondents and interviewees are more expensive than conventional materials.

The human factor (owner and construction team) was of major importance in creating sustainable buildings, with education, personal background, upbringing and interests, work experience and world-view of the owner being critical factors. Sustainability nomenclature was used interchangeably and sometimes inaccurately, mainly as a result of depreciation due to frequent use, relative subjectivity and complexity.

Location was a major factor in sustainable reuse of ABs. The more rural the environment, the more

multifaceted operators became in their activities. Local authorities in more rural areas were also 'closer' to operators, creating better communication but also personal conflicts. Relatively lower "visibility" and exposure to trends and fashion in rural areas affected approach to sustainability e.g. through the choice of material and construction technology. The longer transport distance for building materials and narrower range available had negative effects on sustainability in more rural areas. However, some traditional building materials were available in more rural areas, e.g. timber from neighboring forests, as was labor from the local community. This usage played an important social role, served as a knowledge base and helped preserve traditional building methods in the local area.

Acknowledgements

The authors would hereby like to express their gratitude to The Royal Swedish Academy of Agriculture and Forestry (KSLA) for the financial support that helped to carry out this research project and sincerely thank the enterprise owners for participating in this project and for their time and efforts.

References

Arias, P., C. Ordónez, H. Lorenzo, J. Herraez, and J. Armesto. 2007. Low-cost documentation of traditional agro-industrial buildings by close-range photogrammetry. *Building and Environment,* 42 (2007): 1817-1827.

Ascard, K. 1996. Alternative use of old farm buildings. Paper presented at the CIGR. New uses for old rural buildings in the context of landscape planning.

Ascard, K. 2000. *Landsbygdsmiljöer - påverkan och utveckling av lantbrukets bygnader under de senaste hundra åren,* JBT, Alnarp.

Bocz, G. Ä. 2012. Reutilization of agricultural buildings, tourism and sustainability in the Swedish periurban context. *Advances in Food, Hospitality and Tourism,* 2 (1).

Bocz, G. Ä., S. Pinzke, and C. Nilsson. 2012. In the eye of the beholder. Swedish rural tourism operators' and visitors' perceptions on reused agricultural buildings. *Scandinavian Journal of Hospitality and Tourism,* 12(2): 140-163.

Bo på Lantgård Riksförening. 2009. Bo på Lantgård, *Bo på Lantgård*. Halmstad, Sweden: Bo på Lantgård Riksförening.

Bokalders, V., and M. Block. 2010. *The whole building handbook: how to design healthy, efficient and sustainable buildings* London: Earthscan.

Bramwell, B. 1994. Rural Tourism and Sustainable Rural Tourism. *Journal of Sustainable Tourism,* 2 (1-2): 1-6.

Brundtland Commission. 1987. *Report of the World Commission on Environment and Development: Our Common Future* Retrieved 09.01.2011, from http://www.un-documents. net/ wced-ocf.htm.

Busby, G., and S. Rendle. 2000. The transition from tourism on farms to farm tourism. *Tourism Management,* 21(6): 635-642.

Campbell, D. 1975. Degrees of freedom and the case study. *Comparative Political Studies,* 8: 178-193.

Candura, A., P. Dal Sasso, and G. Marinelli. 2008. Recovery and reuse of rural buildings: the spread out building case. *CIGR Ejournal,* 10(3).

Clarke, J. 1999. Marketing sturctures for farm tourism: beyond the individual provider of rural tourism. *Journal of Sustainable Tourism,* 7(1): 26-47

Dickinson, J. E., and D. Robbins. 2008. Representations of tourism transport problems in a rural destination. *Tourism Management,* 29 (6): 1110-1121.

Dillman, D. A. 1978. *Mail and telephone surveys: the total design method.* New York: Wiley & Sons, Ltd.

Education for Sustainability and Global Learning. 2011. Chief Seattle's Testimony. Retrieved 07.01.2011, from http://esd.escalate.ac.uk/1412

Fuentes, J. M. 2010. Methodological base for documenting and reusing vernacular farm architecture. *Journal of Cultural Heritage,* 11 (2): 119-129.

Fuentes, J. M., García, A. I. and Ayuga, F. 2010. Methodological approach to the study and reuse of old traditional agricultural buildings. In Proc. *AgEng2010 International Conference on Agricultural Engineering*. Cemagref, Clermont-Ferrand, France, September 6-8.

García, A. I., and F. Ayuga. 2007. Reuse of abandoned buildings and the rural landscape: the situation in Spain. *Transactions of the American Society of Agricultural and Biological Engineers,* 50(4): 1383-1394.

Glaumann, M., and T. Malmqvist. 2007. *Miljövärdering av bebyggelse - EcoEffect Metoden - Bakgrund och sammanfattande beskivning.* Stockholm: Högskolan i Gävle, KTH.

Gössling, S., and S. Mattson. 2002. Farm tourism in Sweden: sructure, growth and characteristics. *Scandinavian Journal of*

Hospitality and Tourism, 2(1): 17-30.

Hall, C. M., K. D. Müller, and J. Saarinen. 2009. *Nordic tourism: issues and cases* bristol: Channel View Publications.

Heide, M., and K. Grønhaug. 2010. Atmosphere: conceptual issues and implications for hospitality management. *Scandinavian Journal of Hospitality and Tourism*, 6(4): 271-286.

Hernández, J., L. García, and F. Ayuga. 2004. Integration methodologies for visual impact assessment of rural buildings by geographic information systems. *Biosystems Engineering*, 88(2): 255-263.

Hughes, M., and J. Carlsen. 2010. The business of cultural heritage tourism: critical success factors. *Journal of Heritage Tourism*, 5(1): 17-32.

Ilbery, B., and I. Bowler. 1998. From agricultural productivism to post-productivism. In B. Ilbery (Ed.), *The Geography of Rural Change*. Harlow: Longman: 57-84.

Ilbery, B., I. Bowler, G. Clark, and A. Shaw. 1998. Farm-based tourism as an alternative rarm. *Regional Studies*, 32(4): 355-364.

Jacobsen, J. k. S. 2007. Monitoring motoring: a study of tourists' viewpoints of environmental performance and protection practices. *Scandinavian Journal of Hospitality and Tourism*, 7(2): 104-119.

Kernel, P. 2005. Creating and implementing a model for sustainable development in tourism enterprises. *Journal of Cleaner Production*, 13(2): 151-164.

Kvale, S., and S. Brinkmann. 2009. *Interviews: learning the craft of qualitative research interviewing* London: Sage.

Lane, B. 1994. What is rural tourism? *Journal of Sustainable Tourism*, 2(1&2): 7-21.

Lange, U. 1995. Utrotningshotade hus - på spaning bland odlingslandskapets byggnader *Kulturmiljövård* (1-2): 59-64.

Latham, D. 2000a. *Creative Re-use of Buildings. Building Types: Selected Examples.*: Donhead.

Latham, D. 2000b. *Creative Re-use of Buildings. Principles and Practice*: Donhead.

Lindberg, K., and S. McCool. 1998. A critique of environmental carrying capacity as a means of managing the effects of tourism development. *Environmental Conservation*, 25 (4): 291-292.

Lordkipanidze, M., H. Brezet and M. Backman. 2005. The entrepreneurship factor in sustainable tourism development. *Journal of Cleaner Production*, 13(8): 787-798.

Milne,G., and C. Reardon. 2008. Embodied energy. Retrieved 28.01.2011., from http://www.yourhome.gov.au/technical/fs52.html

Nilsson, P. Å. 2002. Staying on farms: an ideological background. *Annals of Tourism Research* 29(1): 7-24.

Nielsen, N. C., M.-K. A. Nissen and F. Just. 2010. *Rural tourism - return to the farm perspective*. Paper presented at the 19th Symposium in Tourism and Hospitality Research. Retrieved from http://academia.edu.documents.s3.amazonaws.com/1857956/Rural_tourism_-_back_to_farm_perspective_101125.pdf

Nordström, M., and F. Mårtensson. 2001. *Att bo på landet är olika. En miljöspsikologisk studie av hur landsbygdsbor ser på beoendemiljö och byliv* Alnarp: Institutionen för Landskapsplanering.

OECD. 1994. *Tourism strategies and rural development*. Paris.

Patton, M. Q. 2002. *Qualitative research and evaluation methods*. Beverly Hills: SAGE

Pina, I. P. A., and M. T. D. Delfa. 2005. Rural tourism demand by type of accommodation. *Tourism Management*, 26(6): 951-959.

Pina, I. P. A., and M. T. D. Delfa. 2009. Tourist preferences for rural hoouse stays: evidence from discrete choice modelling in Spain. *Tourism Management*, 30 (2009): 805-811.

Plummer, J. T. 1974. The concept and application of life style segmentation. *Journal of marketing*, 38(1): 33-37.

Roberts, L., and D. Hall. 2001. *Rural tourism and recreation: principles to practice* Oxon: CABI Publishing.

Martínez, A. R. 2007. *Approximación a una metodología de reutilizacion de constructiones rurales* Doctoral Thesis. Universidad de León, León.

Ruda, G. 1998. Rural buildings and environment. *Landscape and Urban Planning*, 41(2): 93-97.

Scania County Adminsitrative Board. 2007a. *Det Skånska Landsbygdsprogrammet - ett utvecklingsprogram med landskapsperspektiv*. Malmö.

Scania County Adminsitrative Board. 2007b. *Det Skånska Landskapet - Kartor och Statistik*. Malmö.

Scania County Adminsitrative Board. 2008. *Strukturomvandlingen i skånska lantbruk*. Malmö.

Sharpley, R., and A. Vass. 2006. Tourism, farming and diversification: an attitudinal study. *Tourism Management*, 27(5): 1040-1052.

Statistics Sweden. 2001. *Fråga rätt: Utveckla, testa, utvärdera och förbättra blanketter*.

Statistics Sweden. 2008. *Yearbook of agricultural statistics 2008*.

Statistics Sweden. 2009a. Kommunfakta (Municipality Facts) - Lomma. Retrieved 23.01.2010, from http://www.h.scb.se/kommunfakta/

Statistics Sweden. 2009b. Kommunfakta (Municipality Facts) - Torsby. Retrieved 23.01.2010, from http://www.h.scb.se/kommunfakta/

Swedish Association for Building Preservation. 1993. *Jordbrukets byggnader. Kulturvärden i landskapet*. Stockholm: Swedish Association for Building Preservation.

Swedish Board of Agriculture. 2010. *Yearbook of agricultural*

statistics 2010. Jönköping: SJV.

Swedish Forest Agency. 2003. *Forest land by municipality 2003*. Retrieved 23.01.2010 from www.skogsstyrelsen.se.

Swedish National Board of Housing, Building and Planning. 2008. *Landsbygd i förändring*.

Tassinari, P., D. Torreggiani, G. Paolinelli, and S. Benni. 2007. Rural Buildings and their Integration in Landscape Management. *Agric Eng Int: CIGR Journal*, 9.

Tassinari, P., D. Torreggiani, S. Benni, and E. Dall'Ara. 2010. Research model for farm building design: General structure and physiognomic characterization phase. *Agric Eng Int: CIGR Journal*, 12(1): 47-54.

The National Rural Development Agency. 2008. *Rural Sweden: Facts and Figures*. Retrieved 23.01.2007 from www.glesbygdsverket.se.

Torstensson, H. 2003. *Konstnärsdrömmar i en värmlandsk verklighet* Torsby: Vildgåsens Förlag.

United Nations. 1987. *Report of the world commission on environment and development: our common future.* Retrieved 21.01.2010 from http://www.un-documents.net/wced-ocf.htm.

Urry, J. 2008. Leisure Places. In N. Hazendonk, M. Hendriks & H. Venema (Eds.), *Greetings from Europe: Landscape & Leisure*. Rotterdam: OIO Publishers.

United States Environmental Protection Agency. 2012. *An introduction to indoor air quality. volatile organic compounds.* Retrieved 2012.01.21, from http://www.epa.gov/iaq/voc.html

Van den Berg, L., and A. Wintjes. 2000. New rural lifestyle estates in The Netherlands. *Landscape and Urban Planning*, 48(3-4):169-176.

Van Hoof, J., and F. van Dijken. 2008. The historical turf farms of Iceland: Architecture, building technology and the indoor environment. *Building and Environment*, 43(2008): 1023-1030.

Van der Vaart, J. H. P. 2005. Towards a new rural landscape: consequences of non-agricultural re-use of redundant farm buildings in Friesland. *Landscape and Urban Planning*, 70(1-2): 143-152.

Vicino, T. J., B. Hanlon, and R. J. Short. 2007. Megapolis 50 years on: the transformation of a city region. *International Journal of Urban and Regional Research*, 31(2): 344-367.

Walonick, D. S. 2004. *Survival statistics*. Bloomington: StatPac.

Wilson, G. A. 2007. *Multifunctional agriculture : a transition theory perspective*: CABI Publishing.

Wilson, G. A. 2008. From weak to strong multifunctionality: conceptualising farm-level multifunctional transitional pathways. *Journal of Rural Studies*, 2008(24): 367–383.

WTO, WTTC and EC. 1996. *Agenda 21 for the travel and tourism industry: towards environmentally sustainable development*.

Yin, R. K. 1994. *Case study research: design and methods.* Thousand Oaks Sage Publications.

Zavadskas, E. K., and J. Antucheviciene. 2007. Multiple criteria evaluation of rural building's regeneration alternatives. *Building and Environment*, 42(1): 436-451.

Appendix 1. Questionnaire example

Adress	Street	ZIP	Place name .....
Totalt number of buildings on the property:			
Sex	Man		
	Woman		
Birth year			19
Present type of housing	Apartement		
(Mark with X the	Semi detached house		
alternative that fits	Detached house		
best!)	Farm		
	Other:	write here what and mark with X	
Highest education	Elementary school		
(Mark with X the	Trade school		
highest You have!)	Secondary school/highschool		
	University/College		
Current profession	write here what		
The total monthly income	-20.000kr		
of the family	20.000-40.000kr		
(Mark with X the	40.000-60.000kr		
income intervall that fits	60.000-80.000kr		
best!)	80.000-100.000kr		
	100.000kr +		
	Don't want to give out…		
Please list tourism activities in your enterprise!			
E.g. B&B, rental, fishing, horseback riding, etc.			
Please list the buildings in your tourism enterprise according to the following example!			
Use - style (traditional/modern) - ca. age EXAMPLE: "accomodation - traditonal - 18th century)			
In my opinion old/traditonal buildings have the following DISADVANTAGES in a tourism enterprise:			
Please list!			
In my opinion old/traditonal buildings have the following ADVANTAGES in a tourism enterprise:			
Please list!			
Total yearly icome from the tourism enterprise.			