

## **Rural Buildings and their Integration in Landscape Management**

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### **ABSTRACT**

If we accept that any project which brings about a change within a given area can--at least potentially--produce an alteration of its landscape, then it is clear that redevelopment and even more so the construction of new buildings can, both singly and jointly, result in significant transformations. It is therefore necessary to preventively evaluate how any building project will affect the appearance of the locality in question, i.e. whether it will enhance or detract from its landscape. The general problem of landscape quality must be taken into account at multiple stages and levels of the rural building design process. This means that considerations relating to the architectural quality of the rural built environment, and its interactions with the landscape, are complexly interwoven with the theoretical and practical scientific research in this field, and with the disciplines of land management planning and statutory regulations. The paper suggests a conceptual model about the relations among such domains, underlining their strengths and weaknesses and quoting current and ongoing methodological approaches. The paper performs thus a critical analysis of the role played by scientific research in rural building design, also by means of a critical review of the state of the art in the field, and discusses the main fields of research activity pertaining to the analysis of the landscape structure and to the formulation of design models of rural buildings satisfying requirements of landscape quality. The theoretical analysis of the above-mentioned relations, supported by specific closer examinations, also considers their effects on the final outcomes of the design process.

**Keywords:** Rural built environment, landscape integration, historical-typological consistency, scientific research.

### **1. INTRODUCTION AND AIMS OF THE STUDY**

Today we can still see some landscapes, in Italy and elsewhere, where an harmonious balance between natural resources, farming, and human settlement is preserved. However the changes of the past few decades (such as specialization and the industrialization of agriculture, deep changes in the other economic sectors, socio-demographic trends and urban sprawl) have in many other cases caused an abrupt and profound transformation in the relation between land and agriculture, and upset the balance between man-made constructions and the other components of rural landscapes which had remained virtually undisturbed up until the mid 1900s, thus leading to a simplification of the rural landscape.

Italy has been slow to react to these changes. It was only in 1985 that the Galasso Law (Legge n. 431/1985) introduced mechanisms for safeguarding the physical integrity of the territory by systematically protecting specific environments (rivers, lakes and sea coasts, mountains, volcanoes, forests, etc.). The specific national and some local regulations for protecting their

cultural identity and for promoting landscape quality, issued as part of the implementation of European landscape planning policy, are even more recent. In particular building codes aiming at a more appropriate integration of man-made constructions into their surroundings are not much common yet, and have thus even now not been fully adopted and implemented in general practice.

The formal and functional relations between rural buildings (both productive and residential) and the landscape have long been the subject of specific work by numerous researchers in Italy and other countries. Their results have led to the development of theoretical models, general in validity and scope, but calibrated to the building formats and technologies typical of rural areas, and to the definition and application of experimental research methods capable of extracting the distinctive attributes of the geographical areas under study. These tools have made it possible to analyse the essential characters of historical rural buildings, putting them in relation with those of other traditional landscape resources, and to examine how the more recent built environment fits into the present-day landscape mosaic, with the attendant cultural-perception aspects. This with a view to formulating guidelines for the design of contemporary rural buildings, based on a criterion of consistency with the historical architecture and landscape, and more generally on a criterion of optimal aesthetic-functional integration with the formal attributes of the environmental setting. More recently, advances in digital image processing techniques and the development of GIS-based tools for landscape modelling, simulation and three-dimensional analysis have significantly added to the instruments available, allowing for increasingly accurate and sophisticated analysis of the aforesaid relations.

The issue of architectural quality is increasingly coming to the fore, as testified by a greater awareness and attention on the part of public bodies, and growing calls within the population for better protection, enhancement and recovery of landscape resources. The scientific community must respond to this trend by committing to practically-oriented work, aimed at transferring the regulatory principles already developed in theory into forms appropriate for uptake by local planning authorities, architectural designers, and the community as a whole.

The objective of the present paper is therefore to analyse and examine how research can contribute to support the landscape-aware design and planning of one of the most important territorial resources: the rural built environment. The emphasis is on the importance of identifying the relevant domains of activity and of formulating suitable criteria and models for architectural design, with the primary aim of highlighting the interrelations between the various stages that make up the process leading to the design of rural buildings. Most issues that are examined in the paper, and first of all the theme of the poor architectural quality of recently erected and contemporary rural buildings, are common to several European areas. Nevertheless, the relations among regulations, land use planning and building design show lack of homogeneity in European countries. Thus, even if most discussions that are analysed can be considered sound in the majority of cases, the paper mainly refers to Italy, where land use planning has been rather recently extended to rural areas.

## **2. STATE OF THE ART**

The themes discussed in the paper are very complex and wide and would call for a detailed explanation of the state of the art outlined so far. For brevity's sake, we will not report the complete results of such analysis here, whilst they will be discussed in future works. However, the main citations of the above-mentioned theoretical models and experimental methods found in the scientific literature are explained below.

According to Schmitt, who analysed the situation of the Baden-Württemberg region in Germany (Schmitt, 2003), the poor landscape impact of much recent and contemporary rural architecture is chiefly due to the increasingly uniform conception of designs, with little consideration of the unique characteristics of the location and surroundings during planning and construction, heavy reliance on standardized design solutions and prefabricated building components so as to fulfil functional requirements whilst limiting both design and construction costs, little consideration of the relations between buildings and open spaces, and the failure to involve local construction companies and professionals with expertise in design. Schmitt, noting how such standardized buildings have spread across the country in an undifferentiated manner, superimposing themselves on the traditional built environment in which agricultural buildings were integrated into the cultural landscape, underlines that “... *the privilege to construct agricultural buildings in undeveloped outskirts makes rethinking by farmers and their advisors necessary ...*”.

Ayuga (1989) reviews the evolution of farm building design and construction during the last century in Spain in order to assess how the changes in rural landscape have been influenced by this type of building and to propose solutions for improving the control of future building design. He proposes the definition of guidelines and reference standards based on both the investigation of traditional building types and their materials and the study of up-to-date solutions. Ayuga (1989) and Di Fazio and Fichera (1989) also underline the importance of better landscape education and training for agricultural engineers and other technicians that have influence on agricultural buildings.

Di Fazio (1988), referring to field studies and in particular to the results of a systematic research carried out in eastern Sicily, describes the main factors influencing the appearance of agricultural buildings and suggests general design criteria for improving their visual impact on the landscape. The aspects considered are: correct siting in relation to the natural contours of the landscape (also in Schmitt, 2003), shape and form, materials, colours, textures, subdivision of volumes, relationship to existing buildings and groupings, organisation of the space surrounding the building which links the building to the landscape, construction details and finishing elements.

A fundamental observation is that good appearance is not something which can be added at the final stage of the design process, since it is strictly inherent in the conception of the building and is the result of structural, functional and economic choices (Di Fazio, 1989). And reconciling aesthetic quality with economic constraints is both necessary and possible, since improved appearance does not necessarily involve additional costs (Damm, 1982).

The criteria for correctly integrating rural buildings into the landscape cannot be fully determined by only considering the features of these buildings and how they have changed over time, i.e. through a comparative analysis, no matter how comprehensive and systematic, of present and past building types. This is because the changes in rural architecture have not occurred just because new building solutions and technologies became available. Rather, they reflect profound changes in the functional characteristics that the agricultural sector requires buildings to fulfil, and it is these underlying causes which must be analysed in order to fully understand the altered relation between farm buildings and the landscape. For example the radical transformation of farm utility buildings, at both the quantitative and qualitative level, with detrimental outcomes on the landscape, is essentially tied to fundamental changes in agricultural production methods, occurring as part of broader and more complex socioeconomic trends. A comprehensive and correct analysis must therefore also consider how the needs of agriculture and livestock farming have changed over time, the impact of

these new requirements on the specifications of buildings used in agriculture, and the costs incurred as a result, set against the trends in farming revenue. For instance, modern crop or livestock farming methods often call for substantially larger building volumes. But these higher specifications are being faced by an agricultural sector whose profitability has significantly declined, while the cost incidence of constructing farm buildings is still the same as in the 1990s, amounting to about one fifth of production costs (Heinrich and Kaufmann, 2005). The necessary cost reductions are thus achieved, in most cases, through the use of prefabricated components--often unfinished--and generally of materials not compatible with the landscape. As the budgets which farmers can allocate to new construction projects become ever tighter, any concerns over landscape impact are increasingly set aside, starting from the earliest stages of choosing a building designer and the materials, with the concrete risk that the problem of integrating buildings into their surroundings may be almost systematically ignored. A key professional figure for resolving these issues is that of the qualified building designer, able to reconcile the static, architectural and functional requirements of the building with the need to minimise costs. Offsetting the aforementioned trend--of farm utility buildings becoming ever more expensive to construct as agricultural productions require ever larger volumes, driven by structural changes in the primary sector--there is however now a growing awareness within society of the importance of landscape quality. The contraposition between these two trends can be expected to deepen in future, as the countryside continues to be filled with rural buildings often designed with little consideration for the setting in which they are located, so that they appear as disruptive elements to the common observer (Heinrich and Kaufmann, 2005). It is thus of high priority and strategic importance to devise means for reconciling these opposing needs, by working out and regularly implementing regulations aiming at harmonizing economic, juridical and landscape-protection needs, as part of the broader goal of following a sustainable development path. The BAULA project formulated a list of fundamental principles for the integration of agricultural buildings into the countryside, and creating a data bank containing what are considered to be good examples of rural buildings already constructed, as well as checklists and tables for consultation by building designers, technicians, and public authorities. It is worth pointing out that a building designed according to the BAULA principles of landscape compatibility can nevertheless have its own architectural character, so that it is at the same time distinctive and integrated into its setting.

The above suggest the need for a deep understanding of traditional architecture, which constitutes a reservoir of centuries-old building knowledge, so as to recreate--using the modern idiom, materials and techniques--that same consistency and harmonious relationship with the location (Rattray, 1988). In this regard, the research group of the Spatial Engineering Division of the University of Bologna has undertaken a participatory research project with the competent planning authorities and the agricultural, architectural and building trade associations. Based on a critical review of the technical-scientific literature on architectural approaches to design, with particular emphasis on the relation between buildings and their surroundings, the work identified historical-typological consistency as one of the possible architectural quality postulates to be adopted at the meta-design stage for new rural buildings (Tassinari et al., 2007). The in-depth study of the scientific literature about the general theme of visual and landscape impact represented the basis to develop and calibrate, with specific reference to the rural built environment, methodological paths aiming at identifying and comparing design solutions (Tassinari and Torreggiani, 2006) and at evaluating the potential that different typologies of corrective solutions may have to mitigate residual impacts of existing buildings (Tassinari, 2006). The methods consider both landscape and agricultural

characteristics, in order to investigate different design variables that have significant consequences on the overall visual impact of the building.

When it comes to evaluating the visual qualities of rural buildings with their surroundings, livestock farms present a particular problem because, although potentially able to enhance the visual appeal of landscapes if they are modern and well-managed, as yet they generally do not adapt or correspond well visually with landscapes. Some authors (Kaplan et al., 2006, with specific reference to İzmir province, Turkey) have noted how it is opportune, under the guidance of sound visual studies and regulations, to define correct tools for site selection (Hernández et al., 2004) and for the construction of any livestock farm through its visual adaptation to existing landscape patterns in appearance and physical structure.

On the institutional side, the problem of correctly integrating buildings into the landscape, and into rural settings in particular, is becoming more prominent within regional and landscape planning policies implemented at various levels. Different authors have described the evolution of the pertinent regulations, analysed the critical aspects of the statutory instruments currently in force, and formulated guidelines for the drafting of new policies. Just with reference to Italy and to its national academic group of *rural landscape and buildings*, to which the authors of the paper belong, among the most important researchers who analysed such topics the following ones can be quoted: Failla et al. (2005), Mennella and Menconi (2006), Manera et al. (1997), Leone (2007), De Montis et al. (2000), Bassi et al. (2005), and Dal Sasso and De Vita (1994). Some authors (Damm et al., 1989) have also examined the regulation and planning of farm buildings in relation to the ecological disciplines and the changes in agriculture, discussing, with reference to the German Federal Republic, the construction of farm buildings to comply with production requirements, constructional thinking and nature and landscape conservation.

### **3. RESEARCH, PLANNING AND REGULATIONS PERTAINING TO RURAL BUILDING DESIGN: STUDY OF THE RELATIONS**

The above state-of-the-art review, though concise, highlights how the problem of architectural quality of the rural built environment and its relations with the landscape is closely interwoven with the theoretical and practical scientific research in the field, as well as with the disciplines of land use planning and statutory regulations. The diagram in figure 1 thus places "architectural design of the rural built environment" at the centre of a system of relations with different hierarchical levels, and shows it as depending, first of all, on the contributions of scientific research in the relevant fields of study, and then also on land management and economic planning policies, and on the statutory regulations.

The relation of scientific research with the system is bidirectional, as it both receives inputs and generates outputs of theoretical and application knowledge, in an iterative loop that also takes in the economic and land policy instruments and the statutory regulations. In case the final aim of scientific research is to arrive at reference models or criteria for the design of rural buildings, the intermediate analysis and processing stages on the path linking the basic assumptions to the goal will themselves be part of smaller iterative cycles of redefinition and review.

With this in mind, we will now analyse the various ways in which research can contribute to the field of rural building design, beginning with a general introductory discussion of the relevant domains of activity, and following with a more specific description of the different conceptual stages that make up the design process.

It is worth to remark how research, planning and regulations influence the architectural quality of the rural built environment by means of several references that can be mandatory or adopted voluntarily. Practical design applications, scientific research and landscape planning about rural buildings should consider, each one for what concerns its own specific goals, landscape integration of man-made constructions into their surroundings. That is, the theme of interpreting the relations between building structures and their surroundings concerns all such domains. Furthermore, the results of scientific research also represent a source of theoretical and application knowledge for landscape planning and for the practical design applications.

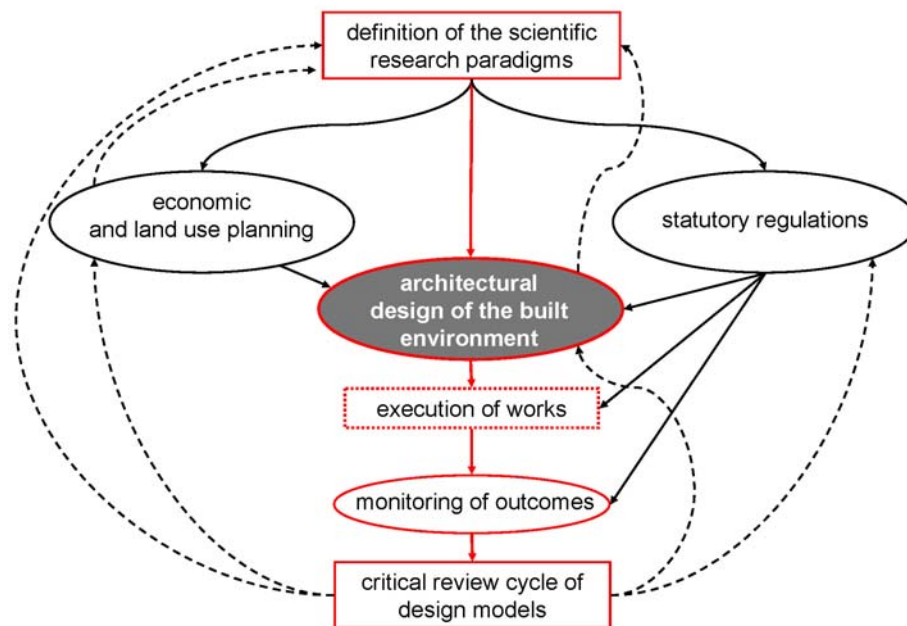


Figure 1. Design process of the rural built environment, from scientific research to planning policy and statutory regulations.

Moreover, not only should the design process refer to guidelines deriving from research and consider the landscape settings by means of elaborate procedures of interpretation, but it also must refer to mandatory technical regulations. Then it is clear that the analysis of the relations between buildings and landscape on the one hand, and the reference to the inputs and guidelines resulting from research about such relations on the other hand, call for different actions by the designer and may refer to different landscape scales.

After a synthetic description of the evolution of agriculture and of the social perception of its functions, the paper analyses the progresses in land-planning techniques that led to the modern spatial planning, which is analyzed also by considering several study cases on different scales. Then the paper focuses on the main fields of research activity about landscape quality of rural buildings, and in particular on the theme of the structural analysis of the landscape aimed at formulating criteria and models for building design, also with reference to possible postulates and objectives of the design path.

Limiting the discussion to the above-mentioned domains, and hence simplifying the links between them, provides a necessary simplification of the highly complex web of relations that actually exists. Such relations have the potential to generate several feedback mechanisms (represented in figure 1 using broken lines) at the different theoretical and application stages.

Substantial changes in recent decades have concerned the above-mentioned domains, thus influencing deeply how the rural built environment is designed.

The first important consideration to make is that rural buildings constitute a system, which as a whole has far greater impact on the landscape than the sums of its parts (i.e. the individual buildings or farm complexes), with important theoretical-practical implications for all the cited domains, and hence for the final outcomes of the design process.

In sketching out the general elements considered to be pre-eminent within these domains, it is useful to recall that not only has the role of agriculture evolved, from a purely productive to a multifunctional activity, but the social value attached to its role has also changed. The recognition that agriculture contributes to conserving and improving the environment and landscape, as well as to preserving cultural identity and the recreational fruition of natural areas, has led to a new awareness of the strategic value of this primary production sector. Adding to this strategic value is the ability of agriculture to widely implement the conservation and improvement policies emanated by land management and planning authorities, on a scale unmatched by any other production sector. There is today greater appreciation of the important environmental and land stewardship role which agriculture has traditionally performed, especially in the light of the widespread and profound disintegration of the rural fabric brought by the advent of a more simplified, specialized and standardized model of agricultural production. The metaphor of closing the stable door after the horse has bolted aptly depicts the situation in many parts of Europe, with landscape alterations due not just to changes in cropping and agricultural-water systems, but also to a socioeconomic pattern of broad, often ill-managed expansion of residential developments into the country. This has in turn made it necessary to enlarge and extend the penetration of infrastructure networks into rural areas, with destructive effects of landscape fragmentation much less reversible than those ascribed to the agricultural production sector.

This situation must be taken into account for a correct approach to building design, starting with the domain of scientific research work and its developments. In this regard, there is growing acceptance of the need for a transdisciplinary approach to rural building design (though this is still not sufficiently implemented in practice), with a further push in this direction coming from the recognition of the multifunctional role of agriculture.

The transformation of the landscape mosaic has elicited and stimulated a body of theoretical and practical research whose results and applications are progressively being adopted and disseminated. Some notable examples are the first typological studies on the architectural identity of the historical buildings of Caniggia (1965, 1970, 1976), Cataldi (1975, 1977) and Caniggia and Maffei (1979), which in Italy led the way for an ensuing generation of typological surveys that have been gradually incorporated into modern municipal planning practices. These types of studies today play a routine part in the conservation planning of the historical architectural heritage, and have branched out from their original urban contexts to find natural applications within the rural built environment as well.

### **3.1. Construction Projects and Land Use Planning: Overview**

It is clear--especially to those who work in this sector in various capacities--that the changes outlined previously have significantly raised the profile of agriculture and the rural landscape within planning policy. Consider in this connection the approach of the European rural development policy for the period 2007-2013, which states that *“Rural areas [...] face particular challenges as regards growth, jobs and sustainability in the coming years. But they*

*offer real opportunities in terms of their potential for growth in new sectors, the provision of rural amenities and tourism, their attractiveness as a place in which to live and work, and their role as a reservoir of natural resources and highly valued landscapes”* (Council of the European Union, 2006).

Another feature of the domain of the institutions responsible for planning, managing and regulating transformations of the rural landscape is its lively evolution over the past decade, with major regional framework legislation reforms leading to extensive changes in the planning tools deployed on a local and wide-area scale. The built rural environment has gradually come to be considered--by virtue of its historical aspects and the multitude of diverse local identities which it contains--a fundamental element of the conceptual and statutory frameworks drawn up by modern spatial planning for a structured approach to land management. The close ties between the content of these planning instruments and the scientific research once again highlight the interconnectedness of the previously cited domains, which all gravitate around the problem of architectural design of the rural built environment.

The study of design methodologies and models, and of how the results of research can best be culturally disseminated and implemented in technical regulations and planning policies, must in fact all be taken into account to obtain a system of design guidelines and constraints that is practicable and effectively able to positively influence the relation between the built rural environment and the landscape mosaic of which it is a part.

Architecture and landscape quality are clearly given great importance in European community documents. For example the Council Resolution on Architectural Quality in Urban and Rural Environments (Council of the European Union, 2001) asserts that *“architecture is a fundamental feature of the history, culture and fabric of life of each of our countries; it represents an essential means of artistic expression in the daily life of citizens and constitutes the heritage of tomorrow: [...] architectural quality is a constituent part of both the rural and urban environment”*. Along similar lines, the previously cited Council Decision on Community strategic guidelines for rural development (Council of the European Union, 2006), under points *“3. 1. Improving the competitiveness of the agricultural and forestry sector”* and *“3. 3. Improving the quality of life in rural areas and encouraging diversification of the rural economy”*, outlines multiple objectives, for which the architectural quality of the rural built environment becomes a key component of the overall quality balance. The policy documents of non-EU states likewise explicitly uphold the strategic relevance of rural architectural quality. For example the *“Swiss Landscape Concept”* (Swiss Federal Council, 1998) lists as one of its general aims to ensure harmonious development of the diversity, uniqueness and beauty of traditional rural landscapes, ensuring that their historical significance remains apparent. This same document then goes on to advocate forms of careful use and enhancement of land resources, based on diversity of use, moderation of land consumption, conservation of non-renewable landscape resources, and confinement of constructions and infrastructure to the minimum area.

Italy had the opportunity to send an important signal with the recent law on rural construction (Legge n. 378/2003), which included measures aimed specifically at encouraging the conservation and enhancement of the architectural heritage. Unfortunately the above law has proved to be (perhaps predictably) widely ineffective, due the inadequacy of the funding provisions in support of it. The approval of the Code of Cultural and Landscape Heritage (D. Lgs. n. 42/2004), which requires each Italian region to be regulated in accordance with a



landscape plan, provides a new set of tools for monitoring and encouraging improvements in the architectural quality of certain landscape resources, including the built rural environment.

At the level of the individual regions, Piedmont has for example produced a comprehensive volume on “*Criteria and guidelines for protecting the landscape*” which covers a wide range of possible construction projects (Regione Piemonte, 2003), and recognises that understanding and evaluating the landscape is an essential prerequisite for correctly designing and integrating buildings into their surroundings. This type of approach, which today appears largely self-evident, was in fact only rarely expressed in the literature up to a few years ago, and has even now not been fully adopted and implemented in general practice. At the local level, these considerations strongly influence the final stages of the building design process.

The province of Reggio Emilia, for example, has enacted a series of measures generally aimed at enhancing the rural landscape, also through the creation of synergies between agriculture, tourism and the environment. The underlying philosophy is that agriculture and its related activities play a fundamental role in conserving the historical-cultural, environmental and landscape heritage of communities and geographical areas, and that safeguarding these assets is not a "luxury" to be undertaken only in the absence of economic constraints, or when the market situation permits, or in view of immediate benefit. With specific reference to the rural built environment, the recently created "Service for supporting agricultural enterprises and protecting the rural landscape" has issued specific guidelines (Provincia di Reggio Emilia, 2006) for evaluating the compatibility of agricultural buildings with the landscape and their potential for enhancing and improving landscape quality. The results of this evaluation can then contribute to determine the eligibility of building projects for the funding made available under the new Regional Development Plan (Council of the European Union, 2005). This creates an objective and transparent system of incentives, in which projects are rewarded for abatement of environmental and landscape impact based on measurable parameters. Agricultural-utility buildings are evaluated on a grid that includes various qualitative-quantitative criteria relating to the architectural characteristics of the buildings (volumes, walls, roofs), the arrangement of outdoor areas (vegetation screens, hedges, tree cover), and the demolition of temporary constructions, as well as criteria for the construction of particular structures such as outdoor silos for food storage.

The planning and building regulations implemented at the municipal level also have an important role to play. The city of Asti's planning commission, for example, has decided to explicitly set out--and make known to all citizens--the quality criteria which it adopts for the review and approval of building projects, thereby fixing some basic rules for municipal technicians to follow. The above approaches follow the desirable route of disclosing and disseminating the rules and values which inform the planning process, taking into consideration both the views expressed by the local culture and advances in the theory and methods of the spatial sciences, in line with the recommendation of the European Landscape Convention (Council of Europe, 2000) that policy definition should be preceded by the definition of quality objectives. Nevertheless, even in situations of better awareness such as those described above, certain incorrect attitudes still exist: for example the buildings used in agricultural production are sometimes called using the same Italian word as for "industrial building", a term that that researchers in the field, as well as many rural building designers, consider to have negative connotations, also because it hampers cultural acceptance of the architectural dignity of these buildings.

We can thus observe an overall improved awareness of architectural quality issues at various levels of government, with some progressive operational planning frameworks already in

place that can encourage important shifts in both planning practice and cultural perceptions. This again is in line with the European Landscape Convention, which recommends that planning activities in the strict sense should be integrated with education and raising of public awareness. Umbria Region, for example, has been working on both these fronts in its process of drafting a landscape plan, as also Emilia-Romagna which, again as part of the activities connected with its regional landscape plan, has set up specific technical training workshops aimed at encouraging appropriate approaches to design and evaluation, recognising the importance of discourse between the knowledge and expertise internal and external to planning institutions.

The study of social perception primarily represents an important component of the multidisciplinary path of research. Also according to the European Landscape Convention, this contribution is fundamental to arrange quality objectives, consistent with the landscape features found. This study can be supported by techniques concerning social sciences, psychology, as well as by statistical study of people's expressions, opinions and behaviours, also with reference to physical and geographic landscape characters.

On the other hand, the procedures for the definition of land planning tools explicitly provide for specific modalities of consultation, that can be applied in case of participatory planning. Italy does not number many territorial contexts where examples of such method are actually implemented; moreover, these implementations are generally realized in the form of experiments.

A first step towards the promotion of public participation in planning choices can therefore be given by debating tables among public institutions, responsible for plans and regulations, their consultants (who in some cases belong to the research sector) and designers operating within the local context. In particular designers can contribute by bringing their professional knowledge and demands coming from their relationships with private subjects and--with particular reference to the issue under consideration--with farmers.

The activities of professional training, awakening and education, on one hand, and the consideration of social perception, on the other hand, are therefore essential both for the progresses in scientific knowledge, and for putting into practice the landscape planning policies. Such activities have remarkable spin-off--both direct and indirect--for the outcomes of rural buildings design.

### **3.2. Analysing the Landscape Structure and Formulating Design Models: Main Fields of Research Activity**

The rural built environment appears in all the spatial systems of land use which compose the anthropic processes and resources of rural landscape. Rural landscape itself is also repository of socio-cultural economic and historic values (fig. 2). The numerous and complex mutual relationships among the above-mentioned systems highlight as a consequence how the general problem of landscape quality is relevant at various levels to the design of rural buildings. The architectural quality of the rural built environment and its impact on overall landscape quality in fact depend on the correct conservation and recovery of the existing historical architectural heritage, as well on the correct design of new rural buildings.

Both new construction and the recovery of existing buildings pose the design problem of interpreting the relations between building structures and their surroundings. In the case of new buildings, the design process is also constrained by the objectives of architectural quality which the rural environment can and should seek to attain, especially in light of the new

multi-functional role today being assigned to agriculture. A case in point is the demand for architectural quality inherent in certain activities for supplementing farm income, such as rural tourism and farmhouse holidays. In the specific case of rural building design, we can thus distinguish two main fields of complementary research activity: structural description of the landscape under study, and formulation of models for building design (fig. 3).

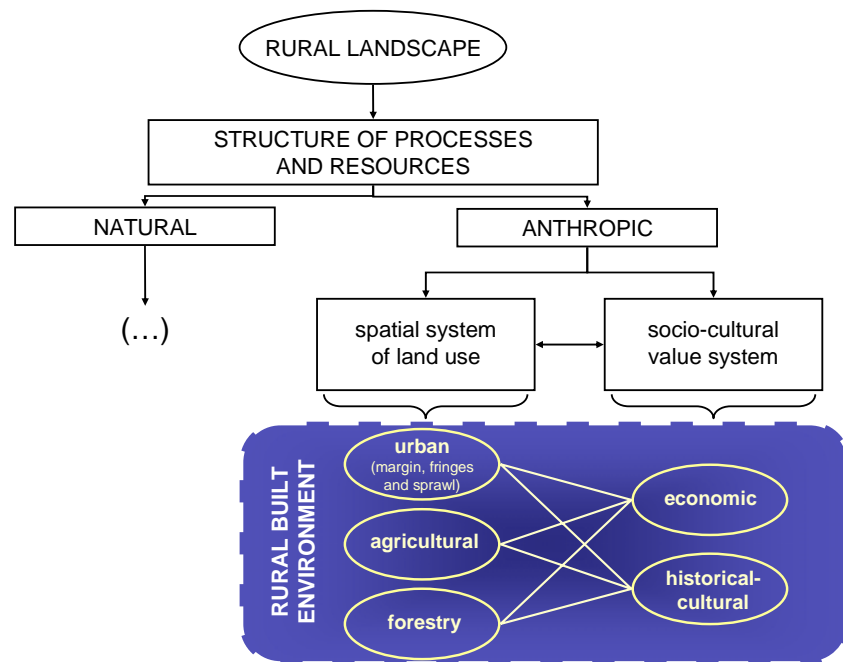


Figure 2. The built environment resource in the agricultural landscape.

The structure of the landscape is described in terms of its historical parameters (how the place was in the past), the current situation and processes (how the place is today) with the attendant potentialities, critical factors and constraints, and finally the most likely situations anticipated for the future (how the place will become). The likely future situations can be determined within the design process through an evaluation and interpretation of the socioeconomic trends and the agricultural, environmental and land management policies implemented at the local and supra-local level. In this connection, a relevant building design objective, which has been admirably fulfilled by much of historical pre-industrial rural architecture, is the criterion of functional adaptability. This does not so much refer to any physical convertibility of the building to meet changing needs, but rather to its inherent ability to accommodate and be architecturally compatible with different uses, without need for major conversions.

For what concerns the formulation of design models, this is based on a common general approach, which is then diversified based on the different weightings given to the main aspects under consideration (historical-typological, morphological-compositional, functional, technological-structural, material-colour and economic), and is in its turn determined by the aims of the building project and its design postulates, which give rise to the quality objectives adopted for conception of the building design (fig. 4).

From the above, it is clear that the quality postulates chosen for a particular building design model play a crucial role. They are necessary even at the stage of formulating the model itself,

and explicitly or implicitly present in any design or meta-design process. Within the research domain, the quality postulates must necessarily be explicitly stated, if the ensuing processes and results are to be intelligible and verifiable. Models developed based on a single postulate relating to one aspect obviously cannot, in and of themselves, exhaustively account for the organisation of a design process suitable for direct real application. Such topic-specific models must in fact be opportunely combined within the overall design process, to form the modules of a more general model which can then be used for outlining and developing the theory and applications (fig. 4).

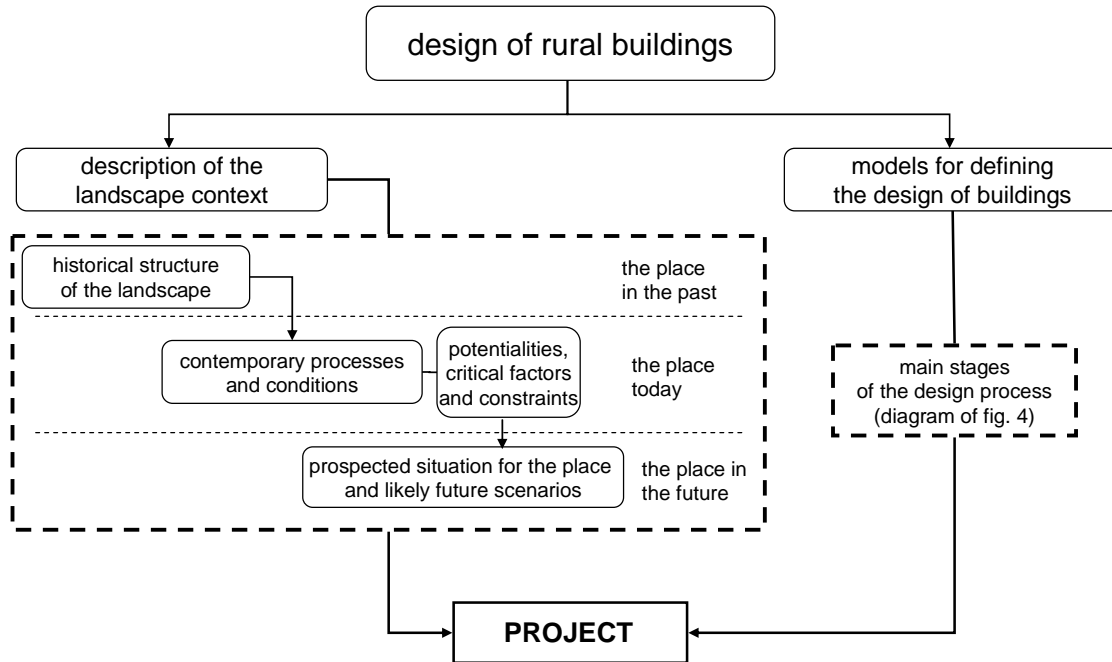


Figure 3. Fields of study relating to the design of the rural built environment.

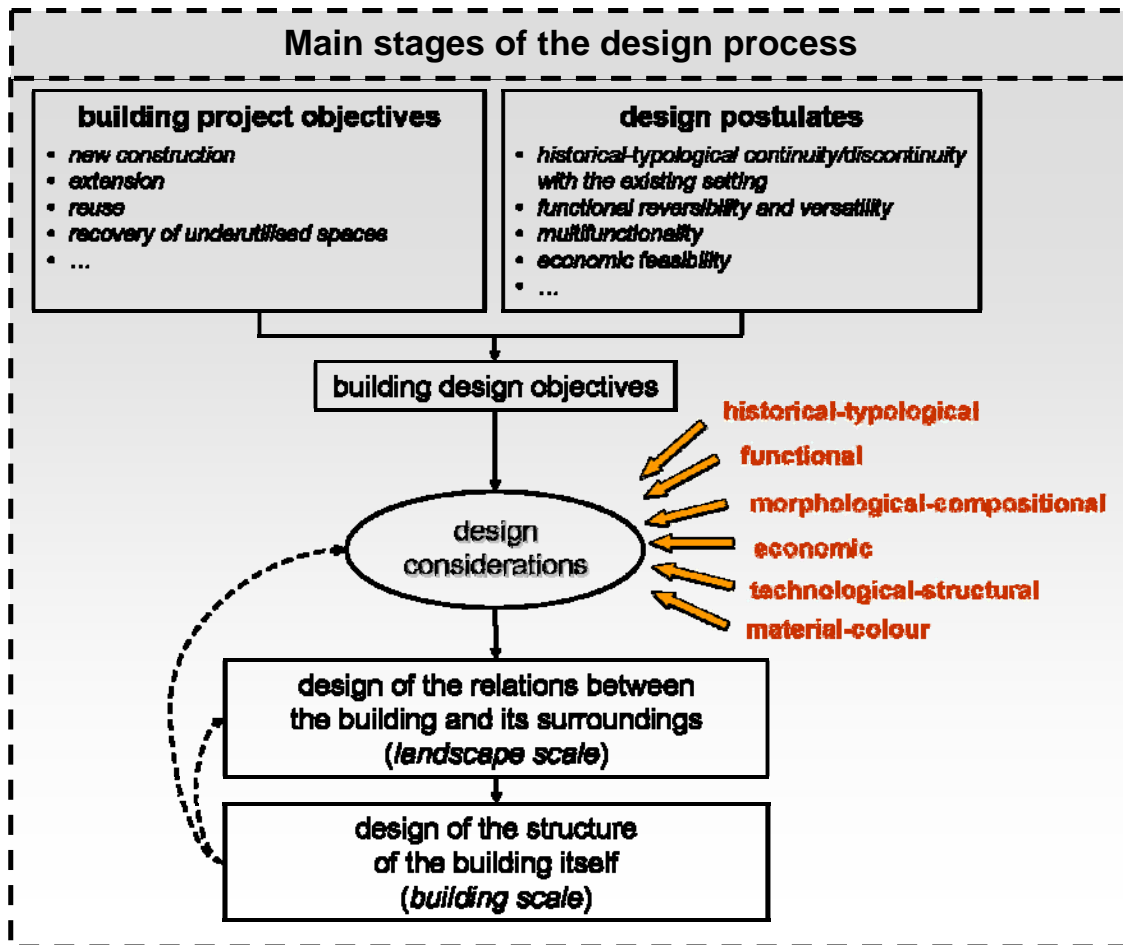
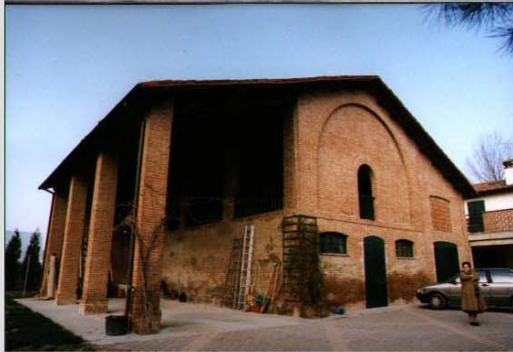


Figure 4. Fundamental elements of the design process.

The research group of which the authors are members has undertaken various studies in this area, investigating the general practicability, desirability and economic viability of using traditional historical rural buildings as a model for the design of new utility buildings (fig. 5), and in particular the approach of choosing historical-typological consistency with the local architectural setting as a design postulate.

Can rural buildings provide a template, and if so under what criteria, for the design of new utility buildings that are economically feasible?

What forms, proportions and arrangements of volumes can be adopted for new utility buildings?



Which materials and technologies can best ensure historical-typological consistency as well as economic feasibility?



Is it possible to create openings along the fronts of buildings so as to achieve historical-typological consistency whilst fulfilling contemporary functional requirements?



Figure 5. Design interpretations of the historical-typological postulate.

The rationale behind this postulate, as we have seen, is that the historical building heritage constitutes an accumulation of empirical knowledge broadly associated with high architectural quality, which could therefore serve as a template for modern building designs. To this end, a study (whose results are pending publication) was undertaken to identify specific design criteria inspired by the characters of traditional buildings, through analysis of an opportunely selected sample of historical rural buildings.

An original analysis methodology formulated by the authors was used to pinpoint the key components of the architectural "flavour" of historical buildings, and to translate them into meta-design and design level guidelines. The overall process following from the selection of



the postulate of historical-typological consistency, whose stages are shown in figure 6, was also necessarily influenced by numerous other variables, including technological, economic and functional considerations. In particular, the general diagram of figure 4 is further specified in figure 6, where a more detailed distinction of the design subjects underlines their distribution in two main components. The first one concerns the building requirements, needed to fulfil both specific building regulations and users' demands, and is common to the application of the several design postulates that may be adopted. The second component deals with the typological characters and is more closely linked to the adoption of the specific postulate considered. As few local authorities have worked out specific guidelines or codes to fulfil the principle of historical-typological consistency, main references for this field are represented by literature about traditional local architecture and by knowledge frameworks for land use planning.

The specific objectives of a rural construction project (fig. 4) can be usefully classified in the manner that follows, bearing in mind that there may also be composite projects which embrace more than one objective:

- Projects for recovering or redeveloping existing rural constructions.
- Projects for integrating existing rural constructions into the landscape, also including projects for mitigating the impact of more recent and modern constructions, or for enhancing areas of historical-cultural interest.
- Projects for the construction of new rural buildings.

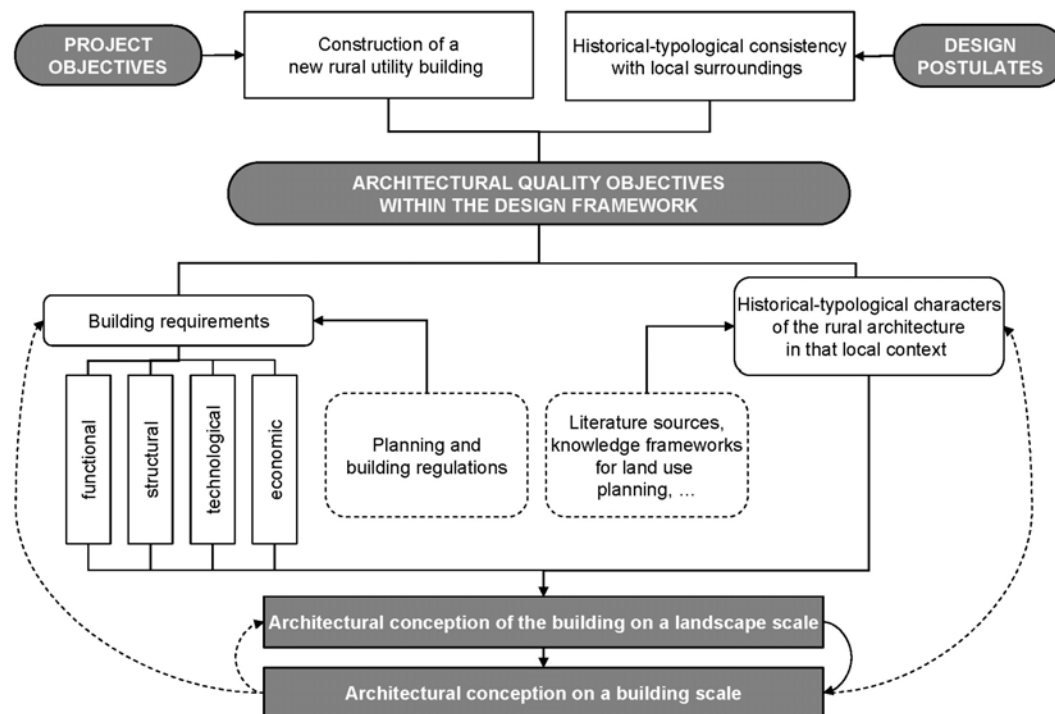


Figure 6. Stages in the design process based on the postulate of historical-typological consistency with the local architectural context.

The stage of evaluating the relations between the building and its surroundings (fig. 4) also includes consideration of the prevailing types of agricultural activity in the area where the project is sited. Intensity and typology of agriculture, also referring to its historical evolution, contribute indeed, together with relevance and integrity of natural and cultural landscape

features, to define the level of landscape quality and the consequent design objectives both on a local and on a wide-area scale. The locally predominant forms of agricultural activity must thus be understood and explicitly taken into account. However, the definition of homogeneous zones according to the different levels of landscape value acknowledged must not lead to an undesirable landscape "zoning" of the countryside, which would only aggravate the current trend toward homogenization and simplification of macro-areas according to their agricultural vocations, working against the possibility of diversifying, compensating, protecting and stabilising the landscape through a systemic approach to the rural environment.

Given the above premises, we can proceed to identify the different attributes and landscape dynamics of rural environments, proposing to draw a distinction between areas with predominantly productive, predominantly multifunctional, or predominantly compensatory, protective and stabilising function. Although this classification is chosen as a matter of convenience, it can nevertheless provide guidance for the various process stages, from planning to architectural design, and for the selection of fundamental quality postulates that are consistent and balanced.

#### 4. CONCLUDING NOTES

The various spheres of activity of basic and applied research, economic and land planning policy and architectural design of rural buildings are mutually linked into a tight web of processes, dynamics and relationships, which have been discussed from a theoretic point of view in the paper. It is clear how the system formed by the scientific research, regulations and guidelines, and practical applications, revolving around the central theme of architectural quality of rural buildings, at the same time also pursues the wider goal of landscape quality.

Successfully transferring the results of the research in this field to the practice of building design, which as we have seen takes place through cultural as well as planning, policy and regulatory channels, will therefore depend on how effective each of these individual spheres is as part of a more complex system. Since land planning policies can sensibly influence quality aspects of rural buildings only at the municipal level and since the design of the most widespread countryside constructions is carried out by each individual by means of direct housing projects, the above-mentioned integration may considerably vary according to each case. The discussion of the actual effectiveness of such system and hence of the aforesaid innovation transfer would thus call for several specific in-depth investigations. Some examples of interesting planning and design study cases have been discussed in the paper.

Italy, more than other countries, feels the effects of shortage of *extension services* capable of translating the outcomes of scientific innovation into the design practice, of supporting public institutions in transferring such research results into planning instruments, and of carrying out the knowledge transfer to the enterprises of the sector.

Thanks to the presence of personnel or consultants having adequate specific training, manufacturing companies of building components and systems have been developing for a long time--in urban, industrial and commercial fields--remarkable capabilities of independent innovation and of implementation and interpretation of research outcomes. Often, also industry-university collaborative ventures have been developed. As a consequence, such innovations have shortly become and are continuously becoming more and more widely adopted in the building practice, for both new buildings and renovations.



On the contrary, because of the moderate incidence of incomes deriving from the construction of rural buildings over the whole building business, and thus because of the consequent scarcity of building contractors specialized in such sector, industry has proportionally invested very little in the development of its own capacities of innovation and interpretation of the albeit numerous research outcomes in the field of rural building design. Solutions have often been spontaneously and empirically worked out mainly with the aim of reducing costs, by borrowing as much as possible the design knowledge already available and originally defined for the urban field. The industrial sector has thus little investigated in detail the possibility of achieving, although using inexpensive techniques and materials, excellent standards of architectural quality in rural building design, by focusing on a particular attention to the development phases and on a masterly design care, and also by means of economies of scale that may be developed over wide areas.

From the above, it is clear that education and professional training play a crucial role and that most of the above-described themes are referable to cultural aspects. In Italy, also because of segmentation and specialization of high school courses, the approach of agronomists, engineers and architects towards rural building design often becomes partial, and thus on the whole ineffective. This is due to the impossibility of correctly conceiving the design of a building by concentrating exclusively on the functions it shall perform, or on its architectonic ideation from a purely formal point of view. Certain constructions represent exceptions, such as some big wineries designed by--sometimes famous--architects, which are now frequent cases in Italy and elsewhere. Nevertheless such buildings do not actually belong to the category of rural buildings discussed in this paper, as they are for all practical purposes mainly aimed at fulfilling the--sometimes elite--needs and expectations of urban people, as well as other big commercial and service structures.

Farmers' unions have so far only partially played an active role in directing farmers' choices as regards building quality, whilst they have generally been involved in supporting their members with advice about the amount of buildable areas, as well as about production and financial matters. Moreover, effective policies and agreements aimed at capitalizing and catalyzing the bargaining power of the rural building sector, at developing economies of scale, and consequently at involving the construction companies in a real challenge for innovation based on the design quality of the rural built environment have hardly ever been carried out. Such challenge is both urgent and crucial, and should not turn into a deliberate and common acceptance of standard pre-validated clichés, whilst it should be meant as aiming at the development of basic solutions, by means of whom each designer may be free to express its own skills.

Institutions in charge of local land planning policies can have recourse to the technical advice of researchers expert in the field, or rather directly acknowledge innovations of national and international scientific literature, in case their staff has adequate professional competence or can afford skilled consultants. Scientific researches about the subject discussed in the paper are commonly sound in terms of general methodology and are often applied to specific territorial study cases; thus, they can not simply be extended to the various realities which are each time under consideration. Moreover, local institutions may thus commission researchers expert in the field to directly study in depth specific issues, such as the analysis of the rural building heritage in their own territories or the working out of design criteria specifically adjusted for their local realities, inspired by several basic postulates (consistency with or break from the historical architecture, functional flexibility, ...).

Research can contribute to further development and improvement of local land use planning techniques in the field of standardization of studies about knowledge, inventory and analysis of the rural built heritage, with the aim of defining references useful not only for preserving historic rural buildings, but also for designing new buildings. Various fundamental choices, all legitimate when resulting from conscious evaluations, can derive from these cognitive and decisional tools: directing the design of new rural buildings towards historical-typological consistency, or towards a break from tradition, or eventually towards scenarios of contemporary presence of both those principles.

Without a doubt, the concrete accomplishment of all the above-mentioned knowledge transfer will thus face some significant and crucial challenges arising from the practical implementation of planning policies for controlling the transformations of the built environment and of the rural landscape in general. One such challenge, with socio-political and hence also policy implications, is the great question of who should pay (and in what way) for the possible higher costs associated with improved architectural quality. The added burden clearly cannot be entirely ascribed to agricultural enterprises, in consideration of the broader environmental and social benefits of enhanced landscape quality, nor to the local administrations, which lack the territorial jurisdiction as well the economic power necessary to intervene at a system-wide level.

Is it possible for landscape quality improvement to be considered a social cost, in view of its ability to enhance the living environment of the population? If so, what design and dissemination tools could be used to effectively secure the support of the population? The European convention, in this respect, quite rightly considers "social perception"—referring to a cultural sense of the landscape, and not just a visual perception—to be a fully fledged structural component of the landscape itself. This because of the avowed failure of attempts at technocratic planning, which have the flaw of being divorced from the practical reality of the actors who locally and globally "make" and "live in" the landscape, in the sense that they directly participate in its evolution.

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