

University of Groningen

The influence of place identity on perceptions of landscape change

Peng, Jianchao; Yan, Siqi; Strijker, Dirk; Wu, Qun; Chen, Wei; Ma, Zhiyuan

Published in:
Land Use Policy

DOI:
[10.1016/j.landusepol.2020.104891](https://doi.org/10.1016/j.landusepol.2020.104891)

IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.

Document Version
Publisher's PDF, also known as Version of record

Publication date:
2020

[Link to publication in University of Groningen/UMCG research database](#)

Citation for published version (APA):

Peng, J., Yan, S., Strijker, D., Wu, Q., Chen, W., & Ma, Z. (2020). The influence of place identity on perceptions of landscape change: Exploring evidence from rural land consolidation projects in Eastern China. *Land Use Policy*, 99, Article 104891. <https://doi.org/10.1016/j.landusepol.2020.104891>

Copyright

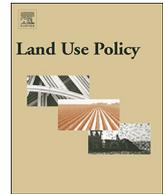
Other than for strictly personal use, it is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license (like Creative Commons).

The publication may also be distributed here under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license. More information can be found on the University of Groningen website: <https://www.rug.nl/library/open-access/self-archiving-pure/taverne-amendment>.

Take-down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Downloaded from the University of Groningen/UMCG research database (Pure): <http://www.rug.nl/research/portal>. For technical reasons the number of authors shown on this cover page is limited to 10 maximum.



The influence of place identity on perceptions of landscape change: Exploring evidence from rural land consolidation projects in Eastern China



Jianchao Peng^{a,*}, Siqi Yan^{a,*}, Dirk Strijker^b, Qun Wu^a, Wei Chen^c, Zhiyuan Ma^a

^a Nanjing Agricultural University, College of Public Administration, Department of Land Resources Management, Weigang 1, Nanjing, 210095, China

^b University of Groningen, Faculty of Spatial Sciences, Department of Cultural Geography, Landleven 1, 9747AD, Groningen, P.O. Box 800, The Netherlands

^c Northwest A&F University, College of Economics and Management, Department of Agricultural Economics, Taicheng Road 3, Yangling, 712100, China

ARTICLE INFO

Keywords:

Landscape perception
Place identity
Rural land consolidation
Structural equation modelling
China

ABSTRACT

China's land use policies have largely discounted the significance of the relationship between landscape changes and residents' geographical cognition. Rapid urbanization has generated the double pressures of ensuring the protection of farmland and meeting rising demands for urban construction land. The propulsion of top-down rural land consolidation (RLC) projects by the Chinese government has been unprecedented in recent years. In the context of RLC, local governments have focused on the expansion of areas of cultivated land and on generating new construction land quotas. However, perceptions of the changes that large-scale RLC projects bring to rural landscapes among local residents, whose place-based identities (often referred to as place identity) are forged through lifelong associations with these landscapes, have received little attention. Consequently, we explored how place identity influences rural residents' perceptions of landscape changes in RLC areas in Eastern China, which has undergone rapid urban expansion and dramatic changes in its rural landscapes. We developed a structural equation model to analyse the effects of place identity, the intensity of RLC projects, and their quality on perceptions of landscape changes. A stratified sampling approach was used to collect data, and a good fit was found between the model and the sample data. The results of the model indicated that place identity, in conjunction with the quality of RLC projects, play a significant mediating role in relation to perceptions of positive landscape changes. Intensive RLC projects may induce positive perceptions of landscape changes. However, the quality of such projects may also be evaluated as being poor, which partially undermines the former effect. Positive evaluations of the quality of a RLC project can contribute to strengthening residents' positive perceptions of landscape changes, which are significantly enhanced through the mediating effect of place identity. We discuss and interpret these findings by incorporating them in China's governance system in relation particularly to land-use planning and rural revitalization.

1. Introduction

Place identity in rural areas across the world has long been a hotly debated issue within disciplinary fields such as regional geography, rural development and environmental psychology (Downey et al., 2017; Paasi, 2003; Pretty et al., 2003; Haartsen et al., 2000; Proshansky, 1978; Raagmaa, 2002; Rijnks and Strijker, 2013; Xu et al., 2015; Peng et al., 2020). The social constructivist theory of place identity sheds light on individuals' subjective perceptions of geographical space, providing valuable insights for the study of human–land relationships (Haartsen et al., 2000). Specifically, the notion of place identity captures the public's attention when they face dramatic and accelerated changes in physical environments (Reid et al., 2020; Knez et al., 2017; Chow and Healey, 2008; Nijman, 1999; Proshansky

et al., 1983). Rural areas are challenged with service deprivation, geographical isolation, youth out-migration, population ageing, urbanization and climate change. These pressures have constantly pushed the change of rural landscapes, sometimes in a radical way, such as rural land consolidation (RLC) aiming at readjustment and rearrangement of fragmented land parcels and their ownership. Physical landscape changes are impacting rural residents' place identities which have been shown in recent relevant studies to influence attitudes and behaviours in diverse contexts, for example, the negative evaluation of a village supermarket closure (Christiaanse and Haartsen, 2017) and the considerations on retirement from farming (Downey et al., 2017). In fact, since the concept of place identity was initially introduced by Proshansky (1978), as broadly acknowledged, the research in this domain has witnessed an evident highest concentration on the role of

* Corresponding authors.

E-mail addresses: pengjianchao@njau.edu.cn (J. Peng), yansiqi@njau.edu.cn (S. Yan).

<https://doi.org/10.1016/j.landusepol.2020.104891>

Received 8 January 2019; Received in revised form 7 April 2020; Accepted 29 June 2020

0264-8377/© 2020 Elsevier Ltd. All rights reserved.

place identity in social actors' attitudes and behaviours in the transitional world with environmental depredation, climate change, urban renewal, and increasing and complex human needs (Peng et al., 2020). However, few empirical studies have carefully examined the role of place identity in rural residents' attitudes towards large landscape changes.

The significance of the relationship between changes in the landscape and residents' place identities is often discounted in decisions on land management (Wester-Herber, 2004; Reid et al., 2020). In the context of China, social conflicts or public objections are likely to be encountered during the process of implementing land use policies, such as RLC or rural land requisition, which has led to the government's requirement of ex-ante social risk evaluations being conducted for most projects relating to land use. One of the main reasons for such public opposition is the failure of policymakers and local governors to appreciate fully the subjective perceptions of concerned stakeholders relating to compulsory changes in land use and their emotional connections to their living environments (Devine-Wright, 2005; Wester-Herber, 2004; Reid et al., 2020). To formulate effective policies on rural land use, policymakers need to be knowledgeable about the relationship between changes in rural landscapes and residents' geographical cognition. Proactive and effective incorporation of the thoughts and wishes of the public within land use policies and management is necessary to ensure the steady advancement of China's current phase of urbanization (Li et al., 2018). Exploring the influence of place identity on residents' evaluation of landscape changes can deepen our understanding of the role social actors' bonds with the environment play in shaping their attitudes and behaviours and help to improve the efficacy of land use policies.

This study focuses on rural residents' place identities in areas where dramatic landscape changes are underway. Extensive changes in a landscape can prompt changes in professional activities and induce a sense of loss or grief among many inhabitants, who feel that their social, cultural, or economic ties to their surroundings have been broken (Wester-Herber, 2004; Wang and Chen, 2015). Individuals may change their attitudes and behaviours towards the 'new' environment if the changes are perceived negatively (Wester-Herber, 2004). Research to explore the roles or functions of place identity has been ongoing since its concept was first introduced (Peng et al., 2020). Most of the research on place identity has demonstrated its positive influences, which include preventing negative environmental perceptions, providing support for public land use policies, and strengthening the commitment of residents to improve their homes and neighbourhoods (Bonaiuto et al., 1996; Altman and Low, 1992; Chow and Healey, 2008; Kyle et al., 2003; Brown et al., 2003). However, the strong emotional bonds that individuals have with particular places also have a potentially less positive side. A sense of place identity may be a factor that promotes resistance to development projects or initiatives. For example, local residents may oppose the designation of protected natural areas within their community if they have a strong sense of identification with the community (Stoll-Kleemann, 2001; Bonaiuto et al., 2002). The diverse and even inconsistent findings of previous studies have shown that the influence of place identity is highly determined by local contextual factors, which can be social, political, cultural, or economic. Therefore, in this research, we discussed the background of the study area in detail and explained the results based on the local and wider context of the area.

This study explored the influence of place identity on perceptions of landscape changes in Eastern China, where economic growth on a massive scale has coincided with an influx of migrant labour. This region has been experiencing fast-paced urban expansion and dramatic changes in rural landscapes. Rapid urbanization that is strongly propelled by economic growth and conjoined with the deployment of 'top-down' strategies for regulating and managing land use is a prominent trend in contemporary China. The government is solely responsible for the launch of extensive RLC projects that lead to significant changes in

China's rural landscapes, and it also assumes much of the responsibility for their implementation and evaluation. The aim of this study was to develop an in-depth understanding of how residents of areas where such projects are implemented in a non-consensual manner perceive large-scale landscape changes in relation to their place identities. We investigated the intensity of readjustment and rearrangement of land parcels and land rights which can cause direct changes in landscapes, and the quality of RLC project operation which may not have a direct impact on the physical landscape changes but can partially reflect the characteristics of the 'top-down' deployment of RLC projects and influence residents' attitudes towards landscape change. The role of place identity in affecting rural residents' perceptions of landscape changes was examined with a structural equation model. The intensity and the quality of RLC project were incorporated in the model. The findings of this study are expected to contribute to strengthening and safeguarding the well-being of rural residents within land use policies (Knez et al., 2017).

2. Rural land consolidation in China

2.1. Top-down policies driven by rapid urban growth

With rapid urbanization processes underway worldwide, including in China, large numbers of rural residents are migrating to cities. China's urbanization rate increased from 36.22 % in 2006 to 59.58 % in 2018. Meanwhile, a large proportion of agricultural land was converted into urban construction land. During the period 2006–2015, a total of 15,962.53 km² of rural land were requisitioned across the entire country while the area of urban construction land expanded 1.62 times, increasing from 31,765.70 km² to 51,584.10 km². In recent years, in a context of what the government refers to as 'double pressures', namely the pressure to achieve economic development and the pressure to protect cultivated land, the propulsion of comprehensive RLC projects has occurred on an unprecedented scale in China. For example, from 2012 to 2016, 78,775 RLC projects were completed across the entire country, covering a total area of 12.8662 million ha and accounting for 9.5 % of China's total cultivated land area in 2015.

Within RLC projects, new areas of cultivated land are reclaimed from natural land, or 'unused land', such as ponds, hills, paths within fields, and grassland. Some areas are reclaimed from rural constructed land, especially residential land acquired through the demolition of villages and the relocation of villagers into high-rise apartments (Yep and Forrest, 2016). The reclamation of rural constructed land not only enables the creation of new cultivated land but it also contributes to the acquisition of a reserve of constructed land for use in urban regions where the total annual quota for construction land is strictly regulated by land-use planning departments. RLC projects in China are usually initiated by the government that assumes most of the decision-making, implementation, and supervision responsibilities relating to these projects. Consequently, a characteristic feature of these projects is that they are strongly top-down, which enables their completion within a relatively short period. Land use policies such as comprehensive RLC projects and those entailing the centralization of rural residences (Wang et al., 2016; Yep and Forrest, 2016; Zhang et al., 2018) have prompted dramatic and rapid changes in rural landscapes. These changes significantly affect rural residents' farming and livelihood practices as a result of revisions to or transformations in farm size, land rights, landscapes, job availability, and housing and neighbourhood connectivity.

Accelerated processes of transformation of living environments in rural areas could be expected to improve farming on the one hand, and to impact on residents' existing ties with the environment on the other hand. Therefore, it is necessary to know how residents who are strongly identified with their villages would perceive impending changes in the landscape brought about by RLC projects to accommodate their interests in the implementation of these projects. To date, few empirical



(a) Small, fragmented arable plots around village houses before the implementation of an RLC project.



(b) Agricultural land consolidation project.



(c) Reclamation of rural construction land.



(d) New plants, concrete ditches and roads introduced in a RLC project.



(e) A post-RLC resettlement village.



(f) Post-RLC agribusiness land.

Fig. 1. Examples of landscape changes prompted by RLC projects in China. The first image (a) is sourced from Google Maps. Pictures (b), (d), (e), and (f) were taken by the authors. Picture (c) was obtained from the Internet.

studies in China have incorporated the subjective factor of geographical cognition when exploring issues relating to rural land policymaking or attempted to apply the theory of place identity to explain the influence of rural residents' subjective bonds with living environments on their perceptions of the compulsory changes of the environments induced by top-down land-use policies.

2.2. Landscape changes in rural land consolidation project areas

RLC has assumed prominence as a land use policy that is driving landscape changes in rural China (Long et al., 2010; Long, 2014). Proponents of land consolidation have widely argued that it can solve existing problems of extensive fragmentation of farmland and inefficient agricultural production. Its purported benefits include

promoting large-scale farm operations and the aggregation of rural residences as well as improving productive outputs, living conditions, and ecological environments within rural areas. Among the many changes and benefits that land consolidation brings, the expansion of areas of cultivated land and the generation of new construction land quotas are of particular importance for local governments.

As shown in Fig. 1, RLC-related activities can be categorized broadly into three types, depending on the kind of land that is to be rehabilitated. The first type entails consolidation of agricultural land, which refers primarily to the comprehensive consolidation of fields, water, roads, forests, and villages, with the aim of improving agricultural production facilities and rural ecological environments and increasing areas of cultivated land. The second type entails the reclamation of construction land, primarily comprising converted rural

residential land, low-output or abandoned land allocated for township enterprises, rural public facilities, and service land, and the conversion of such land into cultivable land or other types of agricultural land. The third type of RLC relates to the conversion of natural areas into cultivable or other types of agricultural land through the reclamation of hills, barren land, deserted beaches, water bodies, land overgrown by weeds, and other types of wildland.

All three types of RLC activities can lead to the expansion of areas of cultivated land. Moreover, the reclamation of construction land can reduce or preserve the area of rural construction land, which is a key supplemental benefit sought by local governments. China's land use policies foreground the protection of cultivated land and the regulation of construction land. Two major tasks associated with general land-use planning at all administrative levels in China are to maintain the dynamic balance of the total amount of cultivated land and to closely regulate the amount of land used for urban construction. Under the provisions of land-use planning and associated regulations, if, on the one hand, a RLC project has resulted in the expansion of the area of cultivated land, a local government can use cultivated land that is of the same area as the increased amount of land generated by the project to build houses, factories, roads, and other infrastructure elsewhere. If a RLC project results in a reduction in the area of rural construction land, then local governments can carry out construction elsewhere on land that is of the same area as the area of reduction. In the latter case, the new construction land quota generated by reducing rural construction land is primarily allocated for the resettlement of the original inhabitants of the area prior to the project's implementation, and the remainder of the land (if any) is usually reserved for urban development. Obtaining the above two benefits has become a key incentive and even the purpose of implementing RLC projects for local governments (Tang et al., 2015). For example, a plan was issued in 2013 in a megacity in Eastern China to implement an RLC project encompassing more than 30,000 ha. The underlying aim of the plan was to generate a new construction land quota of over 840 ha and to increase the cultivated land area/quota by over 537 ha, to balance the proportion of built-up land.

In some areas, particularly those evidencing relatively low levels of development, low demands for construction land can sometimes lead to surplus quotas of construction and cultivable land generated by the RLC project after land has been allocated for local uses. In such cases, local authorities have adopted a policy innovation whereby the surplus quota can be traded within a certain region. Areas with deficits in the two quotas can purchase surplus quotas from other areas. Initially, this trade in quotas was only permitted within a particular district of a city. However, the scope of this trade gradually expanded, initially covering a city and subsequently extending to the entire province. In March 2018, the General Office of the State Council of China issued a policy permitting trading of these two quotas to be transacted across provinces. With the development of trading markets for the two quotas, competing demands for them have intensified. At the same time, the difficulties and costs relating to the creation of the quotas through RLC projects are increasing because, in general, easy projects which cost less and have good potentials to obtain more of the quotas are pre-arranged. Consequently, the prices of the two quotas have been gradually inflated. It is conceivable that the enthusiasm for RLC projects in different regions of China will further escalate. Less developed regions will be able to obtain development funds through sales of their surplus quotas while relatively well-developed regions will strive to explore the implementation of RLC projects in the face of costly quotas. By this stage, changes in China's rural landscapes will have intensified further.

3. Theoretical framework

The European Landscape Convention defines the term 'landscape' as 'a zone or area as perceived by local people or visitors, whose visual features and character are the result of the action of natural and/or

cultural (that is, human) factors' (Hanley et al., 2009, p. 1044). A landscape does not simply refer to the physical appearance of an area; it also refers to how social actors express their cognition of that area (Aranzabal et al., 2008). An area's landscape identity fosters a sense of belonging to that area and, consequently, to a particular group among its residents (Rijnks and Strijker, 2013). Landscape is closely connected to place identity (Nogue and Vicente, 2004; Pinto, 2000; Williams, 1999). Landscape plays an important role in constructions of place identity for residents (Wheeler, 2014). Place identity can substantially influence residents' visions relating to changes in the landscape (Stewart et al., 2004). Previous studies have found that landscape dynamics can be modelled at various scales, focusing on different areas (Rounsevell et al., 2003; Houet et al., 2010), and changes in individuals' perceptions of the quality of a landscape can be predicted from visible and/or measurable characteristics of that landscape (Mougiakakou et al., 2005; Palmer, 2004; Haartsen et al., 2003). However, the influence of latent subjective human-environment bonds, such as place identity, on how individuals perceive landscape changes has not been carefully investigated in empirical studies.

In the context of RLC, if we want to check the role of place identity in residents' attitudes towards landscape changes, the intensity and the quality of RLC projects cannot be overlooked. In practice, the trading mechanism pertaining to the two quotas generated by RLC entails transactions of land development rights between different regions in China. Both the trading mechanism and the project implementation process reflect the strong top-down characteristic of China's land use policies. RLC projects in China assume diverse forms because of differences in, for example, their sources of funds, operation modes, and objectives. Although the types of RLC projects vary, the intensities of different projects have a lot in common from the perspective of rural residents. As shown in Fig. 1, the intensity of RLC projects is apparent at two levels. First, at the village level, the extent of changes in the structure of land use varies according to the investments and scales of such projects, and land rights may be adjusted accordingly, entailing revisions of farm boundaries. At the second level of the farming household, the situation is slightly more complicated. The purpose of many RLC projects is not simply to enlarge farms. In some areas, a small number of farmers or enterprises avail of the opportunity provided by RLC projects to develop large-scale agricultural operations or modern agricultural production, requiring the transfer of most of the farmers' land to them. Consequently, a large number of previously contracted farmers may cease farming after a land consolidation project has been implemented. Moreover, in some RLC projects, the boundaries of the newly formed large plots are not delimited after the clearance of the boundaries of the original small plots. Consequently, the farmers' contracted farmlands cannot be located after the project's implementation; only their rights and interests bound to the area of the original contracted land are recognized, as verified by receipts of annual rent from the transfer of management rights of the contracted land. Various intensities of the readjustment and rearrangement of land parcels and land rights of RLC projects at both of the two levels may result in different scenes of landscape changes, which should be considered as a vital background for analysing the role of place identity on rural residents' perceptions of landscape change (Wheeler, 2014; Long, 2014).

For the quality of an RLC project, it is defined in this study as the ability the project has to perform satisfactorily and deliver outcomes that are suitable for its intended purpose. The quality of RLC projects may not cause direct physical changes in rural landscapes, but it can influence rural residents' attitudes towards RLC projects and their consequences (Luo and Timothy, 2017). It is very reasonable to assume that the quality of RLC projects would have the possibility to join place identity to impact residents' perceptions towards landscape change. The quality of RLC projects varies widely and can normally be assessed through ex-post project evaluations. Both the quality of the outcomes of a project on land use and the quality of the implementation process are

important (Woltjer, 2000), with the latter generally being overlooked in top-down systems. Our literature review and field survey revealed that the most frequently mentioned indicators of the process quality of RLC projects in China are public participation, and sometimes the project cycle, which may raise uncertainty and anxiety if it is prolonged (Luo and Timothy, 2017). The most important aspect of the quality of project outcomes for rural residents is whether the situation of households, and especially their economic situation, improves and whether they obtain benefits, in general, from the project.

In articles about place identity over the last forty years, versatile meanings of place identity can be witnessed and they are intertwined in shaping the knowledge base of place identity theory (Peng et al., 2020). It is useful to distinguish between two dominant meanings of place identity within empirical studies (Paasi, 1986, 1991, 2003, 2009; Rijnks and Strijker, 2013; Peng et al., 2020). The first relates to the identity of a place that is associated with those features of nature, culture, and people that are deployed within diverse discourses and classifications formulated within science, politics, cultural activism, regional marketing, tourism, governance and political or religious regionalization to distinguish one area from other areas (Paasi, 1986, 1991, 2003, 2009). The second meaning refers to individuals' identification with a place, defined as 'the individual's personal identity in relation to the physical environment by means of a complex pattern of conscious and unconscious ideas, feelings, values, goals, preferences, skills, and behavioral tendencies relevant to a specific environment' (Proshansky, 1978, p. 155). These two aspects of place identity are not separate; rather, they are mutually interactive (Paasi, 2003, 2009). Individuals' cognition of places is indicated when they ascribe identities to those places that have played important roles in their lives. Such cognition is rooted in their interactions with the places where they live that are consequently imprinted in their identities. Thus, individuals' identification with places is reflected in the identities that they ascribe to these places that are subsequently incorporated into their own identities (Rijnks and Strijker, 2013). Despite the proliferation of studies on place identity, few of them have distinguished the two aspects of place identity described above. Given the complex interactions of these two aspects of place identity, their undifferentiated analysis within the literature leads to confusion. In this study, we followed Proshansky's (1978) definition and focused on rural residents' place identities that form in traditional agrarian communities.

Within the context of top-down implementation of RLC projects in China, we assumed that the intensity as well as the quality of land consolidation projects would affect rural residents' perceptions of landscape changes. Based on the background of changes in China's rural landscapes in recent years and theories of the functions of place identity, we aimed to explore whether place identity influences rural residents' perceptions of landscape changes in RLC project areas. Fig. 2 depicts the overall research scheme. The intensity of RLC projects is indicated by the readjustment of physical land-use and the rearrangement of land rights within these projects, which are directly linked to

rural landscape changes. The quality of an RLC project refers mainly to the project's implementation process and to the possible benefits that residents may receive from the outcomes of the project. The quality of RLC projects impacts rural residents' satisfactions with the projects and may serve as a mediator, influencing residents' perceptions of landscape changes. Fig. 2 identifies three paths, as coloured in purple, green and red, that indicate the possible roles of place identity and the quality of RLC projects can play in affecting rural residents' perception of landscape changes. In the next section, a structural equation model is built according to Fig. 2 to verify these paths.

4. Methods

4.1. Structural equation modelling

Structural equation modelling (SEM) has been widely used in the field of environmental psychology. It focuses on an analysis of the relationship between latent variables. SEM is often used as a tool for verifying theories. Basically, it comprises two parts: a measurement model and a structural equation. The first part measures the validity of latent variables, and the second focuses on the causality of latent variables, that is, verification of the theoretical hypothesis. As a type of social construct, place identity cannot be directly observed. Accordingly, it can be considered as a latent construct, and manifest indicators can be used to measure it indirectly, which fits well with the SEM approach (Carrus et al., 2005; White et al., 2008; Xu et al., 2015). Therefore, we applied the SEM method in this study.

4.2. Measurements

Many studies have attempted to measure place identity either qualitatively or quantitatively. Individuals often do not become aware of their place identities until they are perceived to be threatened (Proshansky et al., 1983). Measurements of place identity are often conducted after residents move elsewhere or in the event of drastic environmental changes. Chow and Healey (2008) interviewed 10 students twice over a 5-month period to assess the extent of changes in their place identities. These students had relocated from their homes to attend university. To examine how the respondents' place identities evolved during their transition to a university environment, the authors identified a number of mediating variables. The method of ranking place-related self-categorizations has been used to assess place identity across different countries (Lewicka, 2008). Research participants are asked to rank items in a list of possible places of identification, such as a city district, city, region, country, Europe, the world, and finally a human being, according to the extent of their identity relating to each place. Likert scale statements for measuring place identity are also used widely. Examples of such statements are: 'I would really rather live in a different town. This one is not the place for me' (Pretty et al., 2003); 'I have a special connection to the place and the people who live and visit

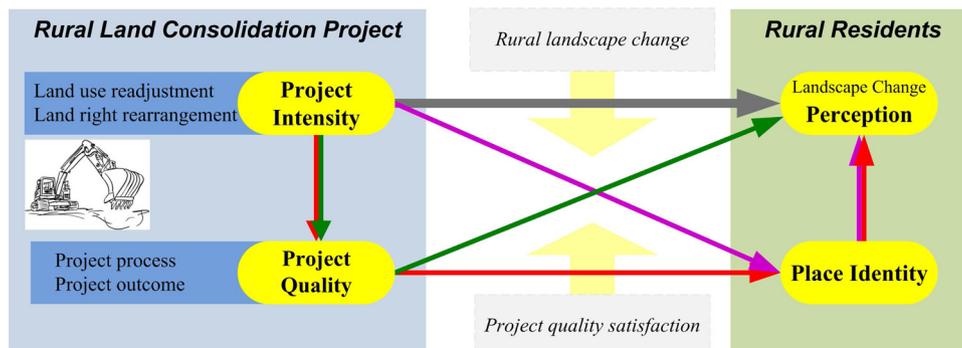


Fig. 2. The overall research scheme. The arrow linking two constructs indicates the assumed direction of the effect of the first construct on the second construct.

there', or 'I identify strongly with this place' (Carrus et al., 2005; Kyle et al., 2004; White et al., 2008; Williams and Roggenbuck, 1989; Xu et al., 2015). The concept of place identity from Proshansky (1978) has long been used within the literature as the basis for decomposing its meaning and contents. Researchers have applied this concept to numerous diverse contexts, resulting in a continual increase in the connotations and explanations associated with this term. Recent studies have indicated that the social perspective of the relations between individuals, identities, and places needs to be considered, in addition to the individualistic perspective that is centred in the concept of place identity developed by Proshansky (1978) (Bernardo and Palma-Oliveira, 2016). In place-behaviour studies, Breakwell (1986) formulated four underlying principles of place identity: distinctiveness, continuity, self-esteem, and self-efficacy. These four principles have served to guide the design of methods for measuring place identity within a wide range of studies (Wang and Chen, 2015).

Our review of the literature revealed the difficulty of finding widely accepted methods for measuring place identity. The fuzzy meanings and sometimes intangible contents of this concept have led to the formulation of diverse instruments for scaling or rating it. The application of an existing instrument, in its entirety, may not be feasible in a new and contrasting research context. Specifically, when applying research instruments developed in the West within studies conducted in the Chinese context, particular attention should be paid to issues of language expression customs, translation skills, cultural differences, the physical environment, and policy systems to avoid any misunderstandings regarding the instruments on the part of both the researchers and the respondents. Accordingly, we designed a questionnaire to measure the four latent constructs: intensity of a rural land consolidation project (ICP), quality of a rural land consolidation project (QCP), perception of landscape change (PLC), and place identity (RPI) (see Fig. 2). In doing so, we referred to the relevant literature (Carrus et al., 2005; Bonaiuto et al., 1996; Pretty et al., 2003; Raagmaa, 2002; White et al., 2008; Wang and Chen, 2015; Bernardo and Palma-Oliveira, 2016; Kovács et al., 2012; Wester-Herber, 2004; Downey et al., 2017; Lalli, 1992) while considering the particular context of the study area (e.g., language expression customs, landscape changes, and the rural land consolidation policy). To measure RPI, we mainly considered the four principles relating to an individual's place identity construction process and the social nature of place identity, as well as the identification of governmental jurisdiction. Table 1 presents a description of the indicators used in our study.

In line with the widely used though still debated approach, both positively and negatively worded items were measured to minimize extreme response and acquiescence biases (Paulhus, 1991; Van Sonderen et al., 2013). However, this technique of reversing statements was only used for the different latent constructs, with the wording of items for each construct still maintaining the same direction to retain internal consistency. For example, items for RPI are all negatively worded while those for PLC are all positively worded. The PLC indicators were measured using a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The RPI indicators (apart from X_{25}) were also measured using a 5-point Likert scale but with the scores reversed from 5 (*strongly disagree*) to 1 (*strongly agree*). Therefore, a higher RPI score corresponded to a stronger place identity held by a respondent. Not all of the ICP and QCP indicators were measured using a 5-point scale. Some, such as X_3 , and X_4 , were binary choice items. Ordinal integer scores of 1 and above were applied to responses ranging from *strongly disagree* to *strongly agree* for the ICP and QCP indicators.

4.3. Data collection

We selected Jiangsu Province as our study area. This province is representative of a developed region in Eastern China, with a GDP that has consistently been ranked among the highest provincial GDPs in China. Jiangsu's urbanization rate reached 69.61 % in 2018. However,

the per capita area of cultivated land is less than 0.06 ha, indicating that the double pressures issue is more acute in Jiangsu than elsewhere. The implementation of RLC in this province has significantly contributed to the intensive use of rural construction land and to the expansion of cultivated land while simultaneously having substantial impact on rural landscapes. From January to April 2014, we carried out a survey in seven cities in Jiangsu. We applied stratified sampling to select three counties within a city, and subsequently three towns per county, two villages per town, and 15 rural households per village. Thus, the initial sample comprised 1890 households in total.

The distribution of the sample was further determined by location and by variation in levels of economic development. For example, because southern Jiangsu is more economically developed than the central region and considerably more advanced than the northern region, we selected two cities from the southern part, two cities from the central part, and three cities from the northern part. The criterion of variation in economic development was also applied for the selection of counties within a city. Locational differences among the selected towns were determined by their distances to the nearest city. Accordingly, the three towns selected within a county were, respectively, a suburb, a moderately distant area, and a remote area in relation to the nearest city. The sampling process did not distinguish whether or not a village had undergone an RLC project, but an item in the questionnaire addressed this issue. We only included samples from villages where land consolidation had occurred. A total of 755 valid samples were obtained that were well distributed spatially (see Fig. 3).

5. Results and analysis

Mplus software was used to conduct the SEM analysis. The modeling process comprised two steps. First, confirmatory factor analysis (CFA) was performed to identify and test the measurement model. Subsequently, the structural equation model was built to test the proposed paths shown in Fig. 2.

5.1. Confirmatory factor analysis

5.1.1. Model fit

To establish the measurement scale of the latent variables, the factor loading of the first observed indicator of each latent variable was set to 1.0. Because there were over three indicators for each of the four latent factors, with each factor only loading one indicator, in general, the proposed CFA model could be identified when the measurement error terms were not correlated. We treated the items depicted in Table 1 as ordered categorical measures and used the weighted least squares means and variance adjusted (WLSMV) estimator for the model estimation (Muthén, 1984). The default method of Mplus was used to handle the missing data. The model fit indices were selected and assessed by referring to Wang and Wang (2012). The model estimation output did not indicate an acceptable fit after the incorporation of each of the 25 indicators. The χ^2 statistic for this model was $\chi^2 = 1,475.807$, ($df = 269$, $p < 0.001$). Both the comparative fit index (CFI) and Tucker-Lewis index (TLI) values were slightly below 0.9 (0.899 and 0.877, respectively). The estimated root mean square of error of approximation (RMSEA) value (0.077) was within the fair fit range (0.05–0.08), but the upper limit of its 90 % confidence interval (CI) (a range of 0.073–0.081) was marginally outside the boundary limit (> 0.08). Consequently, a close fit ($RMSEA \leq 0.05$) was not achieved ($p < 0.001$). All of the indicators apart from X_{12} (0.047, $p = 0.156$), X_{15} (0.235, $p = 0.000$), and X_{25} (0.187, $p = 0.000$) had standardized factor loadings that exceeded 0.5, which is above the rule of thumb reasonable cut-off for the factor loadings (0.4). The estimated loading of X_{12} and its two-tailed p-value suggested that the 'social connection' indicator is not an effective measure of PLC. The loadings of X_{15} and X_{25} indicated that 'history' is a weak indicator of the latent variable PLC and that 'jurisdiction' is a weak indicator of RPI. In addition, the

Table 1
Indicators for the four latent structural equation modelling variables.

Variables	Indicators	Interpretation
ICP	(X ₁) Land use in the village has changed a lot in recent years.	Changes in land use at the village level
	(X ₂) There have been a lot of land transfers or adjustments in land rights in the village in recent years.	Changes in land rights at the village level
	(X ₃) My family stopped cultivating arable land /woodland/grassland after the land consolidation.	Changes in land use at the household level
	(X ₄) I am unaware of the location of my contracted land after the land consolidation.	Changes in land rights at the household level
QCP	(X ₅) The duration of the land consolidation project is reasonable.	An evaluation of the quality of the project process
	(X ₆) The economic situation of my family improved after the land consolidation.	An evaluation of the quality of the project outcome
	(X ₇) Our needs have been considered during the land consolidation.	An evaluation of the quality of the project process
PLC	(X ₈) The overall outcome of the land consolidation project is positive.	An evaluation of the quality of the project outcome
	(X ₉) Farm plots have become larger and flatter.	Agriculture
	(X ₁₀) The natural rural landscape is now more attractive.	Aesthetic
	(X ₁₁) There are more places for recreation, for example, fishing, playing, and sports.	Recreation
	(X ₁₂) More strangers show up in the village.	Social connections
	(X ₁₃) There are more trees, flowers, fishes, wild birds, and animals in the village.	Biodiversity
	(X ₁₄) The roads and farm paths in the village have been improved.	Transportation
	(X ₁₅) Traditional cultural and historical monuments in the village are better protected now than they were before the project.	History
RPI	(X ₁₆) More straight farm ditches have been built.	Water Regulation
	(X ₁₇) The quality of farmland has improved and farming incomes have increased.	Production
	(X ₁₈) Houses and farm plots are organized in an orderly way.	Habitation
	(X ₁₉) I rarely take the initiative in greeting people around me.	Individual social relations
	(X ₂₀) There are not many interactions among the residents of the village.	General social relations
	(X ₂₁) The quality of life in our village is not as good as that in other places.	Self-esteem
	(X ₂₂) The quality of life in our village is not as good as it used to be.	Continuity
	(X ₂₃) Compared with other places, our village does not have any distinguishing features.	Distinctiveness
	(X ₂₄) I would like to move to another place if possible.	Self-efficacy*
	(X ₂₅) Which level of government policy or governance demonstrates the most concern about your interests ? (1 = Nation, 2 = Province, 3 = City/ County, 4 = Town, 5 = Village)	Jurisdiction

Note: * Self-efficacy is defined as individuals' belief in their capabilities to meet situational demands (Gist and Mitchell, 1992; Wang and Chen, 2015). We use item X₂₄ to indicate that the respondents are not able to deal with the situational changes in their village anymore and intend to leave for another place to achieve their requirements.

covariance between errors associated with the X₁₉ and X₂₀ indicators had the highest value for modification indices (MIs), indicating that freeing this parameter (X₁₉ with X₂₀) would reduce the model χ^2 statistic by 246.376.

When measuring the PLC, our intention to investigate the presence of strangers in a post-RLC village was to reflect the impact of RLC projects on landscape function for the dimension of social activities and connections with the outside of the village. We also aimed to investigate the impact of RLC projects on the landscape function with regard to cultural conservation. After reviewing the data, we found that only a few of the investigated villages had undergone residential land reclamation. Of the three types of RLC activities, agricultural land consolidation was predominant; a finding that was coincident with the reality. More precisely, only a small proportion of the investigated households were relocated. Notably, the relocated villagers who know each other well usually continue to live together in the new resettlement community. Therefore, cases entailing the presence of strangers tended to occur infrequently within our samples and only had a weak impact on 'social connection' identified in the model. Similarly, the small proportion of surveyed villages with distinctive traditional cultures and historical monuments very likely accounted for the weak impact of 'history'. The context of drastic, short-term landscape changes, as premised in this study, is also likely to have affected the result, as cultural change is a gradual process that occurs over a long duration. The framing of item X₂₅ differed from that of other PPI indicators which were worded as Likert-scale statements. This difference may have accounted for the low score for this item. Individual and general social relations within a village overlapped or were correlated to some extent, which may explain the fact that the highest MI value was that of X₁₉ with X₂₀.

In light of the first model fit results, we revised the model by removing the indicators X₁₂, X₁₅, and X₂₅ and setting the error covariance

between X₁₉ and X₂₀ as free parameter. The results of the revised CFA model showed improved fit results with higher CFI and TLI values (0.932 and 0.922, respectively) and a lower RMSEA value (0.073) at a 90 % CI (0.068–0.077). A close fit (RMSEA \leq 0.05) was not obtained ($p < 0.001$). The χ^2 statistic for the revised model was $\chi^2 = 1,004.352$, ($df = 202$, $p < 0.001$). The standardized factor loadings of all indicators ranged from 0.560 to 0.840, and all loading estimation statistics were significant. After all, the CFA results suggest that the revised measurement model provided a reasonably good fit.

5.1.2. Model reliability and validity

To test the reliability of the model scale, we firstly computed the Cronbach's alpha index, which is a commonly accepted and widely used measure. In general, internal consistency reliability can be confirmed when the value of Cronbach's alpha is above 0.70 (Hinkin, 1998). The Cronbach's alpha values for the latent variables ICP, QCP, PLC, and RPI in the revised model were 0.631, 0.602, 0.782, and 0.733 respectively, with the first two values evidently being below 0.70. Some recent studies have indicated that the Cronbach's alpha computed for Likert response data may result in a negatively biased estimate of the theoretical reliability (Zumbo et al., 2007). They suggest that construct reliability (CR) is a more appropriate coefficient for capturing the internal consistency reliability in CFA models (Yang and Green, 2010). Adequate internal consistency is reflected by a CR value of 0.7 or above (Farrell and Rudd, 2009; Hinkin, 1998; Hair et al., 2006).

We focused our analysis on convergent and discriminant validity for the latent variables to test the validity of the model scale (Hair et al., 2006; Levequea and Burns, 2017). Convergent validity was determined by the factor loading and the average variance extracted (AVE) value. To obtain an acceptable convergent validity, the standardized factor loading estimates should be 0.5 or above, and ideally they should not be below 0.7. They should also be statistically significant at a minimum.

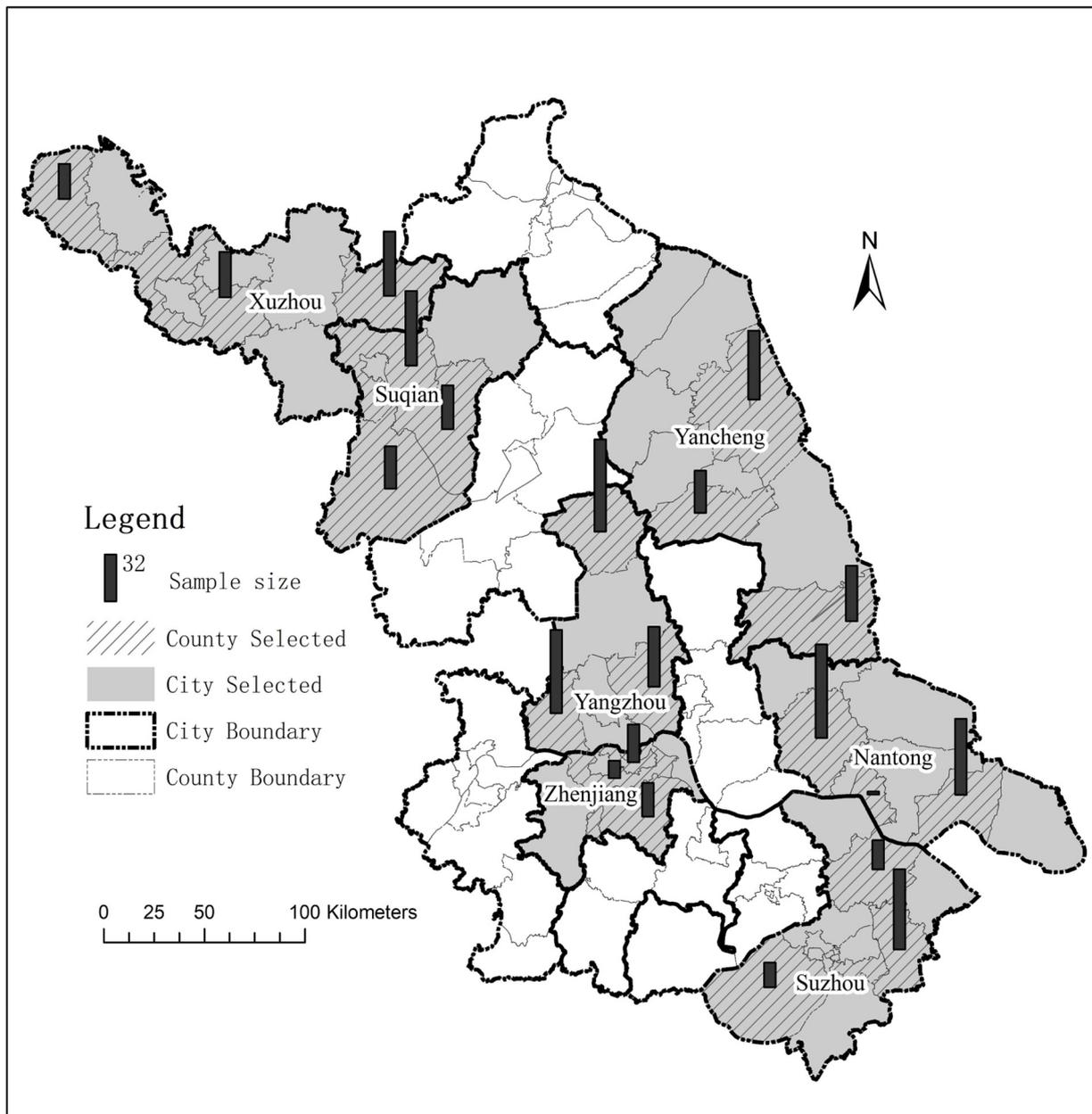


Fig. 3. Locations of the surveyed samples within seven cities in Jiangsu. In China, a county is a subdivision of a city, and it is usually under the jurisdiction of a city.

The AVE is a summary indicator of convergence, and an AVE of 0.5 or above generally indicates adequate convergence. Discriminant validity was assessed by comparing the AVE values for any two latent variables with the square of the correlation estimate between these two variables. AVE estimates that were above the squared correlation estimate were considered to provide evidence of discriminant validity.

Table 2 shows the results of CR, AVE, and squared correlations for the latent variables for the revised model. They show that the CR of each latent variable was greater than 0.7, indicating a high level of reliability. All of the standardized factor loading estimates were above 0.5. Apart from the AVE value obtained for RPI, which was slightly lower than 0.5, all of the AVE values were above the suggested cut-off value. Considering the CR and AVE results, we deemed the convergent validity to be acceptable. Further, a high level of discriminant validity was indicated by the estimated values of all of the squared correlations, which were below the AVE values. These results confirmed the reliability and validity of our model.

Table 2

Construct reliability (CR), average variance extracted (AVE), and squared correlations for latent variables in the revised model.

	ICP	QCP	PLC	RPI
CR	0.8535	0.8024	0.8914	0.8247
ICP	0.5936			
QCP	0.0357	0.5083		
PLC	0.0025	0.0339	0.5084	
RPI	0.0021	0.0156	0.2256	0.4418

Note: AVE values are shown in bold font.

5.2. Analysis of the results of the structural equation model

The SEM model was constructed based on the results of the CFA and the causal paths shown in Fig. 2. Variables relating to rural residents' personal characteristics were controlled for by treating them as covariates in the SEM model. The following demographic variables were

used to predict the four latent variables: age (*Age*: in years), occupation (*Occup*: 1 = non-farming occupations, 2 = farming and other occupations, 3 = farming), education (*Edu*: 1 = uneducated, 2 = primary school, 3 = junior middle school, 4 = senior middle school, 5 = higher education), relationship to the village (*Vilship*: 1 = born and raised in the village, 2 = migrant) and the length of residence in the village (*Live*: in years). The first three demographic variables have been used in a number of similar studies (Haartsen et al., 2000; Luo and Timothy, 2017; Xu et al., 2015). The last two are premised on the following respective beliefs, which are widespread. First, the strength of individuals' perceptions of their place identities corresponds to the duration of their residence in a place. Second, individuals who are born and raised in a place (usually referred to as 'natives') correspondingly have strong place identities. However, there can be a strong correlation between the variables *Age* and *Live*. This is especially the case in a sample such as ours in which the percentage of migrants in the villages was low (4.8 %). Therefore, the variable *Age* was excluded as we consider actual experience of living in a place to be essential for the formation and perception of place identity (Hernández et al., 2007). The variables *Occup*, *Edu*, *Vilship*, and *Live* were included in the model to enable the prediction of each of the latent constructs.

The model fit results proved to be good, with $\chi^2 = 1,191.951$ (df = 274, p < 0.001), CFI = 0.924, TLI = 0.911, and RMSEA = 0.067 (90 % CI, 0.063–0.071). A close fit of RMSEA (≤ 0.05) was not demonstrated. Fig. 4 shows the standardized path coefficients and factor loading estimates of the structural model. However, this figure only shows the statistically significant estimates and paths in order to avoid any confusion regarding the large arrow links from the covariates to the latent variables. As shown in Fig. 4, the intensity of an RLC project (ICP), its quality (QCP), and residents' place identity (RPI) all had significant positive direct effects on residents' perceptions of rural landscape change (PLC). For a RLC project entailing a high level of

intervention (usually reflected in bigger investments or a larger scale), more positive evaluations of the project and stronger place identities can contribute to strengthening residents' positive perceptions of the changes in the rural landscape caused by the RLC project. The finding of a negative effect (-0.248) of ICP on QCP is similar to that of Luo and Timothy (2017), suggesting that intensive and coerced environmental changes may lead to lower evaluations of the project's implementation as well as to residents' dissatisfaction with the project.

The selected demographic covariates had varying effects on the latent variables. PLC was positively affected by *Occup*, indicating that farmers are more in favour of the landscape changes resulting from RLC projects compared with non-farming rural residents. The place identities of migrants and native residents differed, with migrants tending to have a relatively lower level of place identity compared with natives, which supports the finding of Hernández et al. (2007). ICP was positively influenced by *Live* and *Vilship* but negatively influenced by *Occup*. It can be argued that a longer duration of living experience in a village may prompt a perception of greater RLC intervention, and that such perceptions may be stronger among migrants than among natives. Rural residents engaging in less or no farming work perceive greater RLC intervention, possibly as a result of losing or transferring their arable land. QCP was positively influenced by *Edu*; a finding that is consistent with that of Luo and Timothy (2017). More educated rural residents may have a better understanding of the land consolidation policy, which could increase their support for an RLC project. There is also a strong likelihood that more educated villagers are less engaged in farming. This assumption would account for the estimated negative effects of *Occup* on QCP. Rural residents who were more engaged in farming evaluated the quality of the RLC project to be lower than those who were less engaged in farming. This result could be attributed to the fact that farmers, who are affected the most by RLC projects hold high expectations of the project or resist its interventions, whereas non-

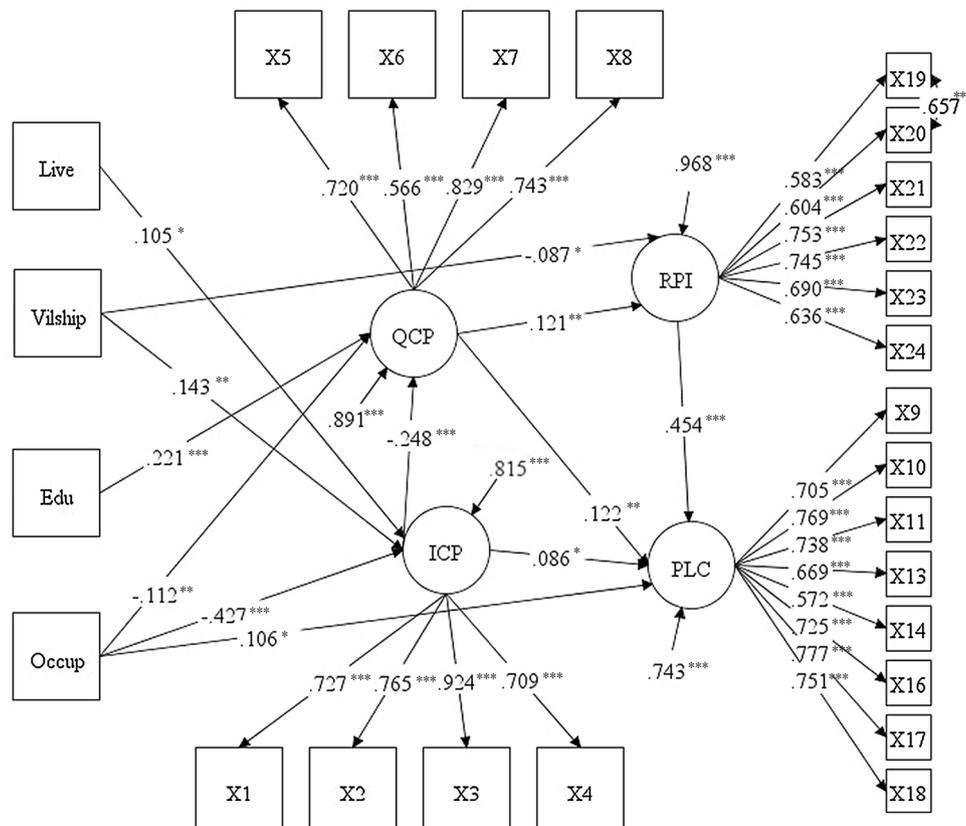


Fig. 4. Standardized estimations of the structural equation model.
Notes: *p < 0.05, **p < 0.01, ***p < 0.001.

Table 3
Standardized total, direct, total indirect, and specific indirect effects of PLC on ICP and of PLC on QCP.

Structural path	Effect	Estimate	P-Value
ICP→PLC	Total	0.063	0.128
	Direct	0.086	0.045
	Total indirect	-0.023	0.382
	Specific indirect		
	ICP→QCP→PLC	-0.030	0.022
	ICP→RPI→PLC	0.021	0.342
QCP→PLC	Total	0.177	0.000
	Direct	0.122	0.006
	Total indirect	0.055	0.010
	Specific indirect		
	QCP→RPI→PLC	0.055	0.011

Note: PLC is the perception of landscape change. ICP is the intensity of a rural land consolidation project. QCP is the quality of a rural land consolidation project. RPI is resident's place identity.

farmers are relatively indifferent to the use of and changes in rural land.

5.3. Total and indirect effects

All of the indirect paths from ICP to PLC and from QCP to PLC, shown in Fig. 2, were tested in the structural equation model (see Table 3). The total indirect effect was the sum of specific indirect effects, and the total effect was constituted by a combination of the direct effects and the total indirect effects. As shown in Table 3, when all of the indirect effects mediated by residents' place identities and evaluations of the RLC project quality were considered, the intensity of the RLC project did not have a significant total effect on rural residents' perceptions of landscape changes. When each indirect effect was separated, it was apparent that place identity alone did not significantly mediate the influence of ICP on PLC. Instead, QCP alone significantly mediated that influence. Intensive rural land consolidation may lead to landscape changes that are positively perceived, but it can also lead to low evaluations of the project quality, and the latter effect can partially undermine the former effect. Residents' positive perceptions of landscape changes brought about by RLC may be offset by the poor implementation of the RLC project. When RPI was combined with QCP, the indirect effect of these double mediators was still significant.

A comparison of the estimated coefficient or double mediators value (-0.014) with that of the QCP mediator (-0.030) indicated that the strong identification of rural residents with their village could serve to counteract some of the negative impacts of the RLC project relating to poor quality. In this case, rural residents' place identities did not play a role in mediating the changes in the discrepancies between their place identities and their perceptions of landscape changes; rather, it enabled them to protect themselves against the anxiety and threats induced by a poorly conceived RLC project (Proshansky et al., 1983). The test results for the indirect effect from QCP to PLC may support the above point from another perspective. A positive evaluation of the quality of an RLC project can contribute to improving residents' positive perceptions of landscape changes. The mediating role of residents' place identities reinforced that contribution to a large extent, as the indirect effect accounted for 31 % of the total effect.

6. Discussion

6.1. The relationship between residents' place identities and their perceptions of landscapes

The landscape concept has been widely used within many disciplines to accommodate all of the emergent interests and functions within a rural area in an integrated manner (Pinto, 2000). A landscape

is an element of local and regional identity. Nogue and Vicente (2004) argued that it is the cultural projection of a society to a place, serving as a centre of meaning and symbolism, and that it is a fundamental element in the process of constructing a territorial identity. Landscape identity or character is perceived by individuals through a combination of their interactions with the landscape and socially constructed images of that place (Pinto, 2000). Landscape perception is therefore a key activity entailed in the ascription of an identity to a place. In this sense, the relationship between residents' place identities and their perceptions of a landscape are consonant with our previously discussed premise of the dual meanings of place identity.

An analysis of individuals' subjective perceptions of landscape changes may strengthen the validity of information about the reality in which strong public opposition to landscape changes cannot be correlated easily to objective criteria (Pinto, 2000). Our SEM analysis showed that residents' place identities had a positive direct effect on their perceptions of landscape changes. This finding is consistent with that of many previous studies that have revealed the positive role of residents' strong identification with a place in fostering a sense of satisfaction and a positive attitude towards their living environment. The Chinese government's commitment to RLC has apparently contributed significantly to improving the identities of rural regions in recent years, which can also be demonstrated by the positive effect of ICP on PLC in the SEM model. As an integral approach for constructing a new type of countryside in China, RLC is expected to continue to play an important role in the rural revitalization of this country (Long et al., 2010; Long, 2014).

Massive RLC projects result in dramatic and large-scale changes in landscapes that are implemented without taking into consideration residents' long-established interactions with their physical environments, thereby inducing feelings of anxiety in those who continue to live in the project areas. The situation may worsen if residents' participation in RLC projects is passive or deliberately squeezed out by institutions or governmental power. In light of the relationship existing between residents' place identities and their perceptions of a landscape, it could be assumed that in the context of RLC in China, individuals' socio-spatial consciousness is being reconstructed through the re-shaping of territories, symbols, and institutions. To obtain a more acknowledged reputation of RLC than its existing contributions, the RLC projects and associated policies can additionally focus on strengthening residents' identification with their villages. Our finding of the mediating influence of place identity in relation to indirect effects supports this point.

6.2. Mediation of the quality of rural land consolidation projects

The results of our model revealed that ICP had a strongly negative effect on QCP. This finding indicates that the current strategy of rapid, large-scale implementation of RLC projects does not widely satisfy the public. Moreover, the modelling results demonstrated that this negative effect severely undermines attempts made within RLC projects to strengthen the public's perceptions of improved rural landscapes. Our findings relating to the intensity of RLC projects indicate that better project quality can still lead directly to more positive perceptions of landscape changes and indirectly to significantly more positive perceptions through the mediation of place identity. This finding reinforces the importance of the quality of the land use policy implementation.

Nevertheless, it is important to reconsider the background of RLC in China when criticizing the top-down RLC strategy and advocating a more open decision-making process in which stakeholders' interests are fully incorporated to resolve the above-mentioned issue. In China, local governments rely heavily on 'land finance' for propelling economic growth (Wu et al., 2015). They favour the relatively easy and cheap approaches of expropriating rural land at low costs and reallocating it for urban use, thereby reaping the value increments from land grant premiums. Faced with the 'double pressures', local governments are

inclined to carry out RLC projects to increase the quality and quantity of cultivated land on the one hand and to reserve rural construction land for urban use on the other hand. However, local governments cannot afford long-term RLC projects. The urban construction land quota and the supplementary quota for occupied cultivated land are required to be established annually for new investments and urban expansion. In practice, although there are legal provisions for ensuring and safeguarding public participation in RLC projects in China, some local governments intend to adopt tricky operations to bypass these regulations in order to accelerate the progress of RLC projects when they are engaged in 'trouble' to satisfy everyone or fulfil the provisions. Moreover, frequent readjustment of land parcels and rural labour migration complicate the process of balancing rural interests that are oriented towards collective membership and rural land rights in relation to RLC projects (Yan et al., 2014). Therefore, it is conceivable that large-scale RLC projects that have significant impacts could generate more complaints.

6.3. Effects of the demographic covariates

A few studies have shown that the place identities and images of a place constructed by natives and non-natives differ (Hernández, et al. 2007; Rijnks and Strijker, 2013). Our study's findings confirmed those of previous studies that the place identities of natives are stronger than those of migrants. There is also a widespread assumption that the duration of residence is positively correlated with residents' place identities (Wang and Chen, 2015). However, we did not observe a significant coefficient estimate in the model relating to the effect of RPI on the *Live* variable. This result does not imply that the duration of residence is not related to residents' place identities, as the assumption expects that it should be (Hay, 1998; Hernández et al., 2007; Rijnks and Strijker, 2013). Instead, it suggests that when the demographic covariates are controlled for the model, the differences in RPI and PLC observed in our samples could be explained by differences created by other latent variables (Hernández et al., 2007).

More educated residents with limited farming engagement tend to be more satisfied with RLC projects than actively engaged but less well-educated farmers. The results obtained for the effects of QCP on the variables *Edu* and *Occup* support the finding of Raagmaa (2002) that more educated and better-off individuals are generally more willing to participate in social and political life than less educated and less well-off individuals. However, individuals who want to leave their place of residence are also those who are most likely to participate in development. Yan et al. (2014) also found that higher levels of education are positively correlated with higher levels of migration in rural China. Brain drain has emerged as one of the main reasons for the rural recession. The current strategy of rural revitalization proposed by the Central Committee of the Communist Party of China is being implemented throughout the country. Accordingly, any further outflow of educated and active labour from rural regions would undermine this policy. Our modelling results did not reveal any significant coefficients of RPI on *Edu* and *Occup*; nor did they reveal significant coefficients of PLC on *Edu*. Nevertheless, their relationship in the context of RLC in China is worth exploring in more depth in future studies.

7. Conclusions

In the context of extensive rural land consolidation processes and dramatic rural landscape changes that are currently underway in China, we examined the influence of rural residents' place identities on their perceptions of landscape changes. Intensity and quality are key aspects of land consolidation projects. Whereas the former can affect the degree and scale of landscape changes, the latter may influence residents' attitudes towards the changes. We introduced a structural model for exploring the direct and indirect effects of place identities and of the intensity and quality of RLC projects on rural residents' perceptions of

landscape changes. We obtained a good fit by performing CFA to refine our proposed measurement model. Considering the context of the study area, we determined the causal relationships between the four latent constructs that were estimated in our model to be reasonable. The results suggest that the influence of place identity on perceptions of landscape change cannot be attributed simply to antecedents and consequences. Rural residents' place identities combined with the quality of RLC projects play an important mediating role in their positive perceptions of landscape changes. In light of our findings, we offer the following recommendations regarding priority issues that should be considered for management practices relating to land use, and especially in RLC projects in China.

(1) In the current context of rapid urbanization, the implementation of RLC projects contributes to improving the efficiency of rural land utilization, optimizing the spatial structure of land use, and promoting the circulation of land. RLC policies need to be planned thoughtfully and advanced in a systematic manner to ensure the effective enhancement of the quality of rural production, living conditions, and ecologies and to strengthen the landscape identities of rural areas and positive perceptions of them. Consequently, rural residents are likely to develop place-based consciousness and identities that may help to strengthen their positive perceptions of the identities of their living environments. In turn, the sustainable development capacities of rural regions may be strengthened.

(2) While top-down policy implementation drives the efficient completion of RLC projects in China, more attention should be paid to ensuring that both the process and the outcome of these projects are of high quality and that there is recognition and a positive perception of this quality among the public. The duration of most RLC project cycles in China is two to three years, with this rapid pace bringing tremendous changes to rural residents' productive and living environments. By contrast, land consolidation processes in Northwestern Europe are often completed over an extended period of 10–30 years to ensure that a balance of all stakeholders' interests is achieved. In the absence of adequate negotiation and public participation, local residents' resistance to RLC projects to varying degrees is inevitable, especially in the context of drastic changes induced by top-down project implementation. Dissatisfaction with RLC projects resulting in poor evaluations can significantly reduce perceptions of positive changes within a landscape.

As we have previously argued, in the overall context of China's governance system, long-term negotiations of local governments with stakeholders of RLC projects do not appear to be feasible. However, at a minimum, extensive top-down actions that seriously impact on the social well-being of rural communities should be regulated during the implementation of RLC projects. Transparent and routine procedures for enabling members of the public to participate actively in RLC projects should be prescribed as an indispensable requirement for project implementation. The details of the RLC policy should also be disseminated widely among farmers so that they develop an in-depth understanding of the project's mechanisms and the associated costs and benefits. Reasonable requirements raised by members of the public and their willingness to participate in such projects should be actively considered and addressed. More power should be delegated to rural households, and they should be facilitated in claiming their justified demands. Independent and fair social impact assessments of the entire RLC project implementation process and its outcomes should be established to guide and ensure smooth project operations. After all, successful efforts to mitigate the public's resistance to or negative evaluations of the implementation of RLC projects may encourage residents' positive perceptions of the impacts of RLC on rural landscapes.

(3) Currently, farmers in China evidence a significant degree of occupational differentiation. Some farmers residing in rural areas have completely withdrawn from agriculture. Others are part-time workers who work in the cities and return home to conduct seasonal farming activities, such as seeding and harvesting. Brain drain from rural

regions appears to be an inevitable global trend along with urbanization and globalization. As previously noted, RLC has accelerated the process of farmers' withdrawal from arable land and agriculture in China. Some active and educated farmers are being deprived of the possibility of practising sustained farming or even of being employed in rural regions. Therefore, a 'one size fits all' approach to RLC, entailing 'holistic demolition and re-construction' and 'holistic land circulation and resettlement' should be discouraged. The implementation of RLC projects should be adapted to the rural social structure, and especially to the labour structure, and should be aligned with local conditions and regulated guidance. Moreover, the RLC planning process should include the creation of agricultural employment and conditions that are conducive to production for skilled farmers who are willing to engage in cultivation. Simultaneously, the RLC planning process should promote appropriate conditions and provide guidance for those farmers who strongly desire to leave farming on how to transfer farmland and obtain non-agricultural employment in rural or urban areas. In conclusion, rural revitalization requires active rural labour, appealing rural landscapes, and rural residents' positive identification with rural areas.

CRedit authorship contribution statement

Jianchao Peng: Conceptualization, Methodology, Software, Formal analysis, Writing - original draft. **Siqi Yan:** Data curation, Validation. **Dirk Strijker:** Writing - review & editing. **Qun Wu:** Supervision, Resources. **Wei Chen:** Data curation. **Zhiyuan Ma:** Data curation.

Acknowledgements

This work was jointly funded by the National Natural Science Foundation of China (grant number 71403129), the National Social Science Foundation of China (grant number 17ZDA076), and the 111 Project in China (grant number B17024). Thanks to Frans Sijtsma for valuable suggestions and to two anonymous referees for their constructive suggestions and comments.

References

- Altman, I., Low, S.M., 1992. *Place Attachment: a Conceptual Enquiry*. Plenum, New York.
- Aranzabal, I.D., Schmitz, María Fe, Aguilera, P., Pineda, F.D., 2008. Modelling of landscape changes derived from the dynamics of socio-ecological systems: a case of study in a semiarid mediterranean landscape. *Ecol. Indic.* 8 (5), 672–685.
- Bernardo, F., Palma-Oliveira, J., 2016. Urban neighbourhoods and intergroup relations: the importance of place identity. *J. Environ. Psychol.* 45, 239–251.
- Bonaiuto, M., Breakwell, G.M., Cano, I., 1996. Identity processes and environmental threat: the effects of nationalism and local identity upon perception of beach pollution. *J. Community Appl. Soc. Psychol.* 6, 157–175.
- Bonaiuto, M., Carrus, G., Martorella, H., Bonnes, M., 2002. Local identity processes and environmental attitudes in land use changes: the case of natural protected areas. *J. Econ. Psychol.* 23, 631–653.
- Breakwell, G., 1986. *Coping With Threatened Identities*. Methuen, London.
- Brown, B., Perkins, D.D., Brown, G., 2003. Place attachment in a revitalizing neighborhood: individual and block levels of analysis. *J. Environ. Psychol.* 23 (3), 259–271.
- Carrus, G., Bonaiuto, M., Bonnes, M., 2005. Environmental concern, regional identity, and support for protected areas in Italy. *Environ. Behav.* 37, 237–257.
- Chow, K., Healey, M., 2008. Place attachment and place identity: first-year undergraduates making the transition from home to university. *J. Environ. Psychol.* 28, 362–372.
- Christiaanse, S., Haartsen, T., 2017. The influence of symbolic and emotional meanings of rural facilities on reactions to closure: the case of the village supermarket. *J. Rural Stud.* 54, 326–336.
- Devine-Wright, P., 2005. Beyond NIMBYism: towards an integrated framework for understanding public perceptions of wind energy. *Wind. Energy* 8 (2), 125–139.
- Downey, H., Threlkeld, G., Warburton, J., 2017. What is the role of place identity in older farming couples' retirement considerations? *J. Rural Stud.* 50, 1–11.
- Farrell, A.M., Rudd, J.M., 2009. Factor analysis and discriminant validity: a brief review of some practical issues. In: Tojib, D. (Ed.), ANZMAC 2009 Conference Proceedings ANZMAC, Melbourne, Australia.
- Gist, M., Mitchell, T.R., 1992. Self-efficacy: a theoretical analysis of its determinants and malleability. *Acad. Manag. Rev.* 17, 183–211.
- Haartsen, T., Groote, P., Huigen, P.P.P., 2000. *Claiming Rural Identities: Dynamics, Contexts, Policies*. Van Gorcum, Assen.
- Haartsen, T., Groote, P., Huigen, P.P.P., 2003. Measuring age differentials in representations of rurality in the Netherlands. *J. Rural Stud.* 19, 245–252.
- Hair, J.F., Black, W.C., Babin, B.J., Anderson, R.E., 2006. *Multivariate Data Analysis*, 7th edition. Prentice Hall, New Jersey.
- Hanley, N., Ready, R., Colombo, S., Watson, F., Stewart, M., Bergmann, E.A., 2009. The impacts of knowledge of the past on preferences for future landscape change. *J. Environ. Manage.* 90 (3), 1404–1412.
- Hay, R., 1998. Sense of place in developmental context. *J. Environ. Psychol.* 18, 5–29.
- Hernández, B., Hidalgo, M.C., Salazar-Laplace, M.E., Hess, S., 2007. Place attachment and place identity in natives and non-natives. *J. Environ. Psychol.* 27, 310–319.
- Hinkin, T.K., 1998. A brief tutorial on the development of measures for use in survey questionnaires. *Res. Methods* 2 (1), 104–121.
- Houet, T., Verburg, P.H., Loveland, T.R., 2010. Monitoring and modelling landscape dynamics. *Landsc. Ecol.* 25 (2), 163–167.
- Knez, I., Butler, A., Sang, A.O., Ångman, E., Sarlöv-Herlinc, I., Åkerskog, A., 2017. Before and after a natural disaster: disruption in emotion component of place-identity and wellbeing. *J. Environ. Psychol.* 55, 11–17.
- Kovács, K.F., Nagy, G.G., Kollányi, L., 2012. Evaluation of rural landscape functions based on domestic case study. *Appl. Ecol. Environ. Res.* 10 (1), 17–30.
- Kyle, G.T., Absher, J.D., Graefe, A.R., 2003. The moderating role of place attachment on the relationship between attitudes toward fees and spending preferences. *Leis. Sci.* 25 (1), 33–50.
- Kyle, G.T., Graefe, A.R., Manning, R., Bacon, J., 2004. Effects of place attachment on users' perceptions of social and environmental conditions in a natural setting. *J. Environ. Psychol.* 24, 213–225.
- Lalli, M., 1992. Urban-related identity. *J. Environ. Psychol.* 12 (4), 285–303.
- Levequea, J.G., Burns, R.C., 2017. A Structural Equation modeling approach to water quality perceptions. *J. Environ. Manage.* 197, 440–447.
- Lewicka, M., 2008. Place attachment, place identity, and place memory: restoring the forgotten city past. *J. Environ. Psychol.* 28, 209–231.
- Li, Y., Wu, W., Liu, Y., 2018. Land consolidation for rural sustainability in China: practical reflections and policy implications. *Land Use Policy* 74, 137–141.
- Long, H., 2014. Land consolidation: an indispensable way of spatial restructuring in rural China. *J. Geogr. Sci.* 24 (2), 211–225.
- Long, H.L., Liu, Y.S., Li, X.B., Chen, Y.F., 2010. Building new countryside in China: a geographical perspective. *Land Use Policy* 27 (2), 457–470.
- Luo, W., Timothy, D.J., 2017. An assessment of farmers' satisfaction with land consolidation performance in China. *Land Use Policy* 61, 501–510.
- Mougiakakou, S.G., Tsochlaraki, A.L., Cassios, C., Nikita, K.S., Matsopoulos, G.K., Uzunoglu, N.K., 2005. Scapeviewer: preliminary results of a landscape perception classification system based on neural network technology. *Ecol. Eng.* 24 (1–2), 5–15.
- Muthén, B., 1984. A general structural equation model with dichotomous, ordered categorical, and continuous latent variable indicators. *Psychometrika* 49, 115–132.
- Nijman, J., 1999. Cultural globalization and the identity of place: the reconstruction of Amsterdam. *Cult. Geogr.* 6 (2), 146–164.
- Nogue, J., Vicente, J., 2004. Landscape and national identity in Catalonia. *Polit. Geogr.* 23, 113–132.
- Paasi, A., 1986. The institutionalization of regions: a theoretical framework for the understanding of the emergence of regions and the constitution of regional identity. *Fennia* 164, 105–146.
- Paasi, A., 1991. Deconstructing regions: notes on the scales of spatial life. *Environ. Plan. A* 23, 239–256.
- Paasi, A., 2003. Region and place: regional identity in question. *Prog. Hum. Geogr.* 27 (4), 475–485.
- Paasi, A., 2009. The resurgence of the 'Region' and 'Regional Identity': theoretical perspectives and empirical observations on regional dynamics in Europe. *Rev. Int. Stud.* 35, 121–146.
- Palmer, J.F., 2004. Using spatial metrics to predict scenic perception in a changing landscape: dennis, Massachusetts. *Landsc. Urban Plan.* 69 (2), 201–218.
- Paulhus, D.L., 1991. Measurement and control of response bias. In: Robinson, J.P., Shaver, P.R., Wrightsman, L.S. (Eds.), *Measures of Personality and Social Psychological Attitudes*. Academic Press, San Diego, pp. 17–59.
- Peng, J., Strijker, D., Wu, Q., 2020. Place identity: how far have we come in exploring its meanings? *Front. Psychol.* 11, 294.
- Pinto, C.T., 2000. Landscape identity, a key for integration. In: Pedrolí, B. (Ed.), *Landscape-Our Home*. Uitgeverij Christofoor, Lebensraum landschaft, pp. 145–149.
- Pretty, G.H., Chipuer, H.M., Bramston, P., 2003. Sense of place amongst adolescents and adults in two rural Australian towns: the discriminating features of place attachment, sense of community and place dependence in relation to place identity. *J. Environ. Psychol.* 23, 273–287.
- Proshansky, H.M., 1978. The city and self-identity. *Environ. Behav.* 10, 147–169.
- Proshansky, H.M., Fabian, A.K., Kaminoff, R., 1983. Place-identity: physical world socialization of the self. *J. Environ. Psychol.* 3, 57–83.
- Raagmaa, G., 2002. Regional identity in regional development and planning. *Eur. Plan. Stud.* 10 (1), 55–76.
- Reid, K., Beilin, R., McLennan, J., 2020. Communities and responsibility: narratives of place-identity in Australian bushfire landscapes. *Geoforum* 109, 35–43.
- Rijnks, R.H., Strijker, D., 2013. Spatial effects on the image and identity of a rural area. *J. Environ. Psychol.* 36, 103–111.
- Rounsevell, M.D.A., Annetts, J.E., Audsley, E., Mayr, T., Reginster, I., 2003. Modelling the spatial distribution of agricultural land use at the regional scale. *Agric. Ecosyst. Environ.* 95 (2–3), 465–479.
- Stewart, W.P., Liebert, D., Larkin, K.W., 2004. Community identities as visions for landscape change. *Landsc. Urban Plan.* 69, 315–334.
- Stoll-Kleemann, S., 2001. Barriers to nature conservation in Germany: a model explaining opposition to protected areas. *J. Environ. Psychol.* 21 (4), 369–385.
- Tang, Y., Mason, R.J., Wang, Y., 2015. Governments' functions in the process of integrated consolidation and allocation of rural-urban construction land in China. *J.*

- Rural Stud. 42, 43–51.
- Van Sonderen, E., Sanderman, R., Coyne, J.C., 2013. Ineffectiveness of reverse wording of questionnaire items: let's learn from cows in the rain. *PLoS One* 8 (7), 1–7.
- Wang, S., Chen, J.S., 2015. The influence of place identity on perceived tourism impacts. *Ann. Tour. Res.* 52, 16–28.
- Wang, J., Wang, X., 2012. *Structural Equation Modeling: Applications Using Mplus*. Wiley, UK.
- Wang, C., Huang, B., Deng, C., Wan, Q., Zhang, L., Fei, Z., et al., 2016. Rural settlement restructuring based on analysis of the peasant household symbiotic system at village level: a case study of Fengsi village in Chongqing, China. *J. Rural Stud.* 47, 485–495.
- Wester-Herber, M., 2004. Underlying concerns in land-use conflicts—the role of place-identity in risk perception. *Environ. Sci. Policy* 7 (2), 109–116.
- Wheeler, R., 2014. Mining memories in a rural community: landscape, temporality and place identity. *J. Rural Stud.* 36, 22–32.
- White, D.D., Virden, R.J., van Riper, C.J., 2008. Effects of place identity, place dependence, and experience-use history on perceptions of recreation impacts in a natural setting. *Environ. Manage.* 42, 647–657.
- Williams, C.H., 1999. The communal defense of threatened environments and identities. *Geografski Vestnik* 71, 105–120.
- Williams, D.R., Roggenbuck, J.W., 1989. Measuring place attachment: some preliminary results. In: McAvoy, L.H., Howard, D. (Eds.), *Abstracts of the 1989 Leisure Research Symposium*. National Recreation and Park Association, Arlington, VA, pp. 32.
- Woltjer, J., 2000. *Consensus Planning*. Ashgate Publishing Limited, England.
- Wu, Q., Li, Y.L., Yan, S.Q., 2015. The incentives of China's urban land finance. *Land Use Policy* 42, 432–442.
- Xu, M., de Bakker, M., Strijker, D., Wu, H., 2015. Effects of distance from home to campus on undergraduate place attachment and university experience in China. *J. Environ. Psychol.* 43, 95–104.
- Yan, X., Bauer, S., Huo, X., 2014. Farm size, land reallocation, and labour migration in rural China. *Popul. Space Place* 20, 303–315.
- Yang, Y., Green, S.B., 2010. A note on structural equation modeling estimates of reliability. *Struct. Equ. Model.* 17 (1), 66–81.
- Yep, R., Forrest, R., 2016. Elevating the peasants into high-rise apartments: the land bill system in Chongqing as a solution for land conflicts in China? *J. Rural Stud.* 47, 474–484.
- Zhang, Z., Wen, Y., Wang, R., Han, W., 2018. Factors influencing rural households' willingness of centralized residence: comparing pure and nonpure farming areas in China. *Habitat Int.* 73, 25–33.
- Zumbo, B.D., Gadermann, A.M., Zeisser, C., 2007. Ordinal versions of coefficients Alpha and Theta for Likert rating scales. *J. Mod. Appl. Stat. Methods* 6, 21–29.