

Optimization strategies for the linguistic landscape of harmonious and beautiful rural areas in Henan Province: top-level design, categorized optimization, typical case plans, and safeguard mechanisms

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Abstract. The linguistic landscape (LL) paradigm, traditionally grounded in urban public-space analysis, has increasingly been extended to rural contexts as China advances from the "Beautiful Countryside" initiative to the "Harmonious and Beautiful Countryside" (和美乡村) policy framework. This survey proposes a "normativity $\times$ functional adaptation $\times$ spatial balance $\times$ community participation" four-dimensional evaluation framework, benchmarked against the Landry and Bourhis information/symbolic-function distinction, and applies it to the rural linguistic landscape of Henan Province. Through a systematic review of the literature from 2018 to 2026, we construct a four-pillar strategy system encompassing top-level design, categorized optimization by sign type, typical village case plans, and multi-dimensional safeguard mechanisms. The categorized optimization pillar proposes differentiated strategies for five sign types, shifting the operational logic from standardized deployment to differentiated empowerment. The case-study pillar reveals a contrastive gradient of optimization priorities across tourism-driven, agriculture-dominated, and culture-heritage villages. The survey identifies three critical research gaps: the absence of rural-specific LL evaluation indicators, the scarcity of large-scale quantitative and longitudinal evidence, and the unclear integration of digital technology with community participation.

Keywords: rural linguistic landscape, Harmonious and Beautiful Countryside, Henan Province, top-level design, categorized optimization, safeguard mechanisms, community participation

1. Introduction

Henan Province, China's most populous agricultural province in the Central Plains, stands at a critical juncture of transition from the "Beautiful Countryside" (美丽乡村) initiative to the "Harmonious and Beautiful Countryside" (和美乡村) framework articulated in 2022. This policy shift repositions rural areas from mono-functional production spaces to composite communities that are livable, workable, and visitable, elevating cultural governance and community participation to the same priority level as physical infrastructure [1]. Within this transformation, the rural linguistic landscape (LL) — encompassing official signage, commercial

signboards, village regulation plaques, cultural walls, and tourism-oriented signage — serves simultaneously as a vehicle for spatial governance, a medium for cultural identity mediation, and a channel for community participation. Yet, unlike its urban counterpart, extensively studied since Landry and Bourhis, the rural LL remains under-theorized and under-measured in the context of systematic optimization [2, 3].

The dominant LL paradigm, originating from the information-function/symbolic-function dualism [4], was developed for urban settings where sign density is high and formal signage dominates. When transposed to rural contexts — characterized by lower sign density, a higher proportion of informal and community-generated signage, and a tripartite actor structure of government, village collectives, and individual villagers — three adaptations are required: spatial scale downscaling, actor-type diversification, and functional expansion from information transmission to cultural governance. Existing studies have documented rural LL patterns in specific sites [2, 4, 5], but these remain predominantly descriptive single-village case studies. A coherent framework that moves from diagnosis to prescriptive, multi-level intervention is absent.

This survey addresses this gap by proposing a four-dimensional evaluation framework and operationalizing it through a four-pillar strategy system tailored to Henan Province, drawing on sociolinguistics, language policy, and international comparative experiences from Japan, Europe, and Southeast Asia. Section 2 reviews the theoretical foundations and policy evolution. Section 3 proposes a three-tier top-level design framework. Section 4 develops categorized optimization strategies. Section 5 presents typical case plans. Section 6 constructs a four-dimensional safeguard mechanism system. Section 7 concludes with research gaps and future directions. Figure 1 illustrates the overall four-pillar strategy framework.

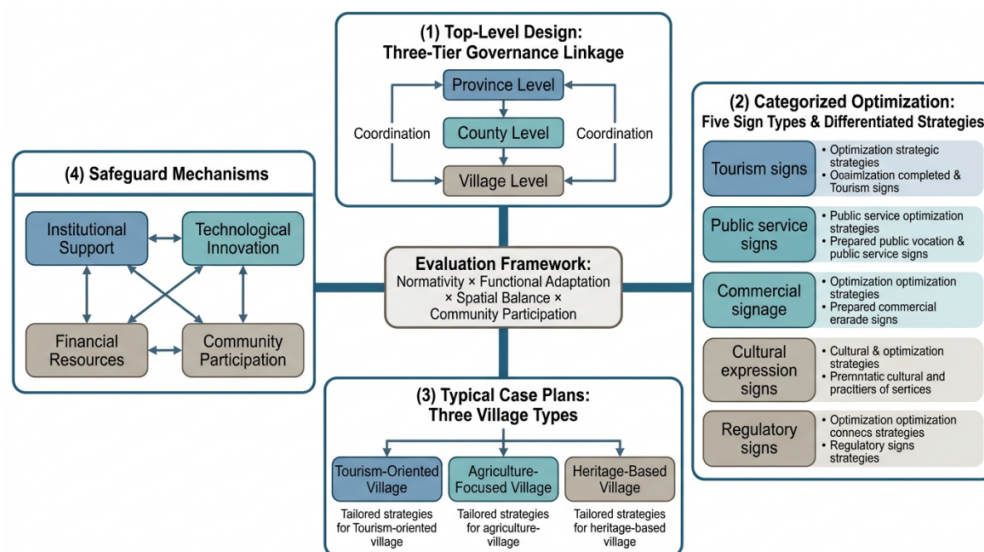


Figure 1. Four-pillar strategy framework for rural linguistic landscape optimization

2. Theoretical foundations and policy evolution of rural linguistic landscape optimization

2.1. Classic LL theory and its rural applicability

The LL paradigm was established by Landry and Bourhis (1997), who identified its two core functions: the informational function (marking the territory of a linguistic group and signaling available service languages) and the symbolic function (indexing the relative power and status of linguistic communities). Spolsky's

tripartite language policy model — ideology, practice, and management — enriched the analytical toolkit by distinguishing beliefs about language, actual language behaviors, and explicit efforts to modify language practices. Scollon and Scollon's geosemiotics framework added spatial sensitivity by emphasizing that the meaning of a sign is co-determined by its physical placement, interaction order, and visual semiotics [3, 4].

These theoretical pillars require systematic adaptation for rural applicability. First, spatial scale: rural LL is characterized by lower sign density, a higher proportion of informal and temporary signage, and wider spatial distribution. Second, actor type: rural LL emerges from a tripartite structure of government, village collectives, and individual villagers. Third, functional positioning: the rural LL carries additional functions of cultural heritage transmission, community governance, and place identity construction [2, 5]. These three adaptations — spatial downscaling, actor diversification, and functional expansion — constitute the methodological foundation for the framework proposed here.

2.2. From "Beautiful Countryside" to "Harmonious and Beautiful Countryside": policy evolution

The "Beautiful Countryside" initiative (2013) prioritized physical infrastructure and standardized village appearance; LL was treated as a subsidiary beautification component focused on signage uniformity. The Rural Revitalization Strategy (2017) broadened the scope, creating space for LL to be recognized as a cultural governance instrument. The "Harmonious and Beautiful Countryside" framework (2022) explicitly elevates cultural vitality and community participation as co-equal objectives alongside physical infrastructure, repositioning the rural LL as a vehicle for spatial governance and cultural identity mediation [1, 6]. Despite this evolution, a critical gap persists: LL remains a subsidiary project rather than an independent policy target with dedicated evaluation indicators, lacking specific quality metrics — such as signage normativity rates or dialect signage proportion — that would enable systematic monitoring and cross-village comparison.

2.3. International rural LL governance experiences

Japan's Satoyama philosophy has influenced signage design practices that prioritize community agency and cultural continuity, with interpretive signage co-designed with residents and dialect elements preserved in place-name signs [7]. European regional language protection frameworks, particularly the graded classification systems in bilingual regions such as Catalonia, South Tyrol, and Wales, provide a model for calibrating the relationship between standard languages, regional dialects, and minority languages in public signage [8, 9]. Southeast Asian rural tourism LL practices reveal that community co-design processes produce signage that is more locally authentic, better maintained, and more positively received than top-down standardized systems [10]. The dynamic equilibrium between standardization and locality, protection and development, and government-led and community-driven approaches constitutes a core design principle for the Henan-specific framework.

3. Top-level design framework for Henan rural linguistic landscape

3.1. Provincial-level policy framework

The provincial tier establishes four interdependent policy instruments. The first is a Henan Provincial Rural LL Construction Guideline articulating the "rigid constraints for normativity, flexible empowerment for cultural distinctiveness" principle: baseline standards for language correctness, sign safety, and information clarity are mandatory, while the integration of dialect elements and local cultural motifs is encouraged but not prescribed [1]. The second is a standardized sign language specification adopting a graded classification

approach: standard Chinese is the baseline for all official signage; dialect characters are permitted in cultural walls, village regulation plaques, and heritage interpretation signs; English is required for tourism signage in designated tourism-driven villages and optional for commercial signboards [11]. The third is a Henan Dialect Cultural Signage Protection Catalog, compiling culturally significant dialect vocabulary, intangible cultural heritage (ICH) terminology, and traditional place names. The fourth is a performance assessment indicator system integrating LL quality metrics — the signage normativity rate, the language diversity index, and the cultural signage density index — into the Harmonious and Beautiful Countryside evaluation framework [12].

3.2. County-level implementation planning and typological adaptation

County-level implementation matches planning priorities to the county's dominant economic function. Based on spatial distribution analysis of rural Henan [6, 13], four county types are identified: tourism-driven counties (e.g., Xinxiang, Jiaozuo), requiring multilingual tourism signage; agriculture-dominated counties (e.g., Eastern Henan Plain), prioritizing community governance information services; industry-driven counties (e.g., Gongyi, Yuzhou), requiring industry-city integration signage; and culture-heritage counties (e.g., Kaifeng, Luoyang periphery), prioritizing cultural signage systematization. Table 1 summarizes the four county types.

Table 1. County typology and linguistic landscape optimization priorities

County type	Primary function	Language combination	Optimization priority	Example
Tourism-driven	Tourism service	Chinese/ English/ dialect	Multilingual tourism signage	Xinxiang, Jiaozuo
Agriculture-dominated	Agricultural production	Standard Chinese	Community information signage	Eastern Henan Plain
Industry-driven	Manufacturing	Chinese/ English	Industrial zone signage	Gongyi, Yuzhou
Culture-heritage	Cultural preservation	Chinese/ dialect/ English	Cultural signage systematization	Kaifeng periphery

3.3. Village-level execution and digital management platform

Village-level execution operationalizes the three-tier framework through three workflows: a signage approval process (village-level review followed by township-level verification), a routine maintenance mechanism, and a community participatory signage design workflow (village design workshops, village-elder advisory groups, and villager representative assembly deliberation). The digital management platform consists of three core modules: a GIS-based sign spatial database maintaining "one sign, one file" records; a dynamic monitoring system combining periodic inspection reports with public feedback channels; and a public feedback mobile application enabling villagers and visitors to report signage issues and rate signage quality. Smart village concepts [14, 15] and digital governance frameworks [16] provide the technological foundation. Phased deployment is recommended: pilot in two to three demonstration counties, followed by municipal-level expansion, and ultimately province-wide coverage [17].

4. Categorized optimization strategies for rural linguistic landscape

The five sign types in Henan's rural LL are organized along a continuum from normativity-driven through function-driven to culture-and-participation-driven optimization. Figure 2 illustrates the core shift from standardized deployment to differentiated empowerment.

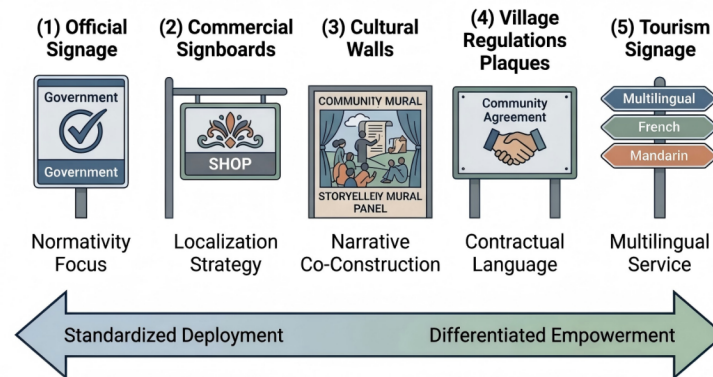


Figure 2. Continuum of sign-type optimization strategies from standardized deployment to differentiated empowerment

4.1. Official signage: normativity enhancement

The most pervasive challenge in Henan's rural official signage is sign redundancy and slogan inflation — the proliferation of overlapping policy posters and generic propaganda banners that reduce the informational value of the official LL. The optimization strategy shifts from quantity-driven proliferation to quality-driven curation through four measures: a sign reduction and quality improvement campaign; a unified language usage specification establishing standard Chinese as the baseline; font and size standards for outdoor readability, particularly for elderly villagers; and accessible signage design, including Braille signage and audio guides at village service centers where feasible [2, 4]. The core principle is that official signage should prioritize functional information delivery rather than serving as a vehicle for slogan dissemination.

4.2. Commercial signboards: vitality and localization

Rural commercial signboards face homogenization driven by standardized, low-cost sign-making services. The proposed optimization adopts a "guide rather than mandate, empower rather than replace" approach. A Rural Commercial Signboard Design Guide provides templates incorporating Henan cultural elements: Yu Opera facial designs, Shaolin martial arts imagery, Luoyang peony patterns, and Kaifeng embroidery motifs. Dialect element integration encourages the use of iconic Henan dialect expressions (e.g., *zhong* [中, 'good/okay'], *dejin* [得劲, 'comfortable/satisfying']) in shop names and promotional text. Heritage shop and traditional craft signage preservation support provides financial subsidies and design assistance for long-established businesses [3, 18].

4.3. Cultural walls and village regulations: narrative co-construction

Cultural walls and village regulation plaques represent the most distinctive rural LL category with the greatest potential for community co-construction. The proposed optimization transforms cultural walls from policy-proclamation tools to community narrative spaces through three content layers: village history (origin stories,

migration narratives, landmark events), local notable figures, and farming culture and ICH themes. The formal design draws on Henan's folk art traditions: Nianhua (New Year print) style, paper-cut art patterns, and farmer painting motifs. The linguistic style shifts village regulations from imperative language ("prohibit," "must") to contractual first-person plural language ("we agree," "jointly observe," "our commitment"), transforming the plaques from external disciplinary instruments into community self-governance documents [19, 20].

4.4. Tourism signage: multilingual and service-oriented strategy

Tourism signage optimization requires a three-layer language service architecture: standard Chinese for baseline information, English for international visitor accessibility, and dialect for cultural narration. The first layer ensures standardized Chinese-English bilingual signage at all major tourist nodes. The second layer introduces dialect cultural explanation plaques at key scenic nodes — introducing place-name origins, local legends, and dialect expressions. The third layer deploys a digital navigation system with multilingual support, voice guidance, AR interaction, and dialect mini-lessons [21, 22]. Design coordination with the rural visual landscape is essential: tourism signage should be adapted to the architectural style, color palette, and material traditions of the local village rather than transplanted wholesale from urban standardized signage systems.

5. Typical case optimization plans for Henan rural villages

5.1. Tourism-driven village: Guoliang Village

Guoliang Village, in Xinxiang City at the Taihang Mountain cliff-hanging road, is one of Henan's most iconic rural tourism destinations. Its current LL exhibits three deficiencies: inadequate multilingual coverage (predominantly Chinese-only signage), homogenized farmhouse signage, and absence of dialect cultural narration (the "Thirteen Heroes" road-building legend is entirely absent from the visible LL). The proposed optimization builds a comprehensive tourism language service system: standardized Chinese-English bilingual signage along the cliff-hanging road route, with Japanese and Korean auxiliary signage at the main visitor center; a "Taihang Family" series farmhouse signboard design incorporating Taihang landscape visual elements; dialect cultural explanation plaques narrating the "Thirteen Heroes" legend in Huixian dialect at key viewpoints; and a "Smart Guoliang" digital navigation mini-program integrating voice guidance, AR-enabled historical scene reconstruction, and dialect mini-lessons [2, 23].

5.2. Agriculture-dominated village: Eastern Henan Plain

The typical Eastern Henan Plain village presents a contrasting LL profile: official-signage-dominated with sparse commercial signage, monotonous cultural walls displaying generic policy text, and an overall pattern of "official-dominated, information-sparse, culture-absent." The optimization strategy shifts the LL toward an information-service-oriented system: standardized public facility signage for village committee, health clinic, and cultural square; village regulations redesigned from the imperative to the contractual format ("Our Agreement"); agricultural technology information signage (weather forecast boards, pest and disease alert boards, seasonal farming technique bulletin boards); and a harvest festival cultural wall with farming-themed farmer paintings and paper-cut art [1, 6]. Community governance efficiency, rather than tourism appeal, is the primary optimization objective.

5.3. Culture-heritage village: intangible cultural heritage villages

Henan's ICH villages — Zhuxian Town (Kaifeng woodblock New Year prints), Huaiyang (clay dog sculptures), and Xunxian (clay whistles) — represent the culture-heritage village type. The optimization strategy prioritizes cultural signage systematization: a complete craft-process signage system for each ICH technique, with sequential signboards illustrating the production stages; inheritor story walls designed with first-person narrative design, with the inheritor narrating their apprenticeship, creative philosophy, and transmission challenges in their own voice; dialect cultural explanation plaques introducing place-name origins and ICH terminology in the local dialect variant; and a unified community cultural space signage system linking the heritage transmission center, village history museum, and cultural square [24, 25]. Cultural authenticity is the primary optimization criterion, with tourism development treated as a secondary benefit.

5.4. Cross-case comparison and optimization pathway synthesis

The cross-case comparison reveals a contrastive gradient of optimization priorities. Figure 3 illustrates the gradient distribution across the three village types.

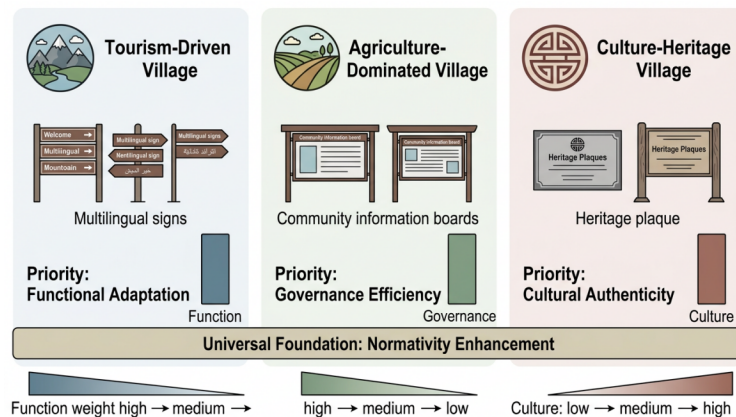


Figure 3. Cross-case comparison of optimization priorities across three village types

Normativity enhancement is a universal foundation across all three village types. Functional adaptation weight decreases from tourism-driven villages (high: multilingual service capacity) to agriculture-dominated villages (medium: community information service efficiency) to culture-heritage villages (low: functional adaptation is secondary to cultural authenticity). Cultural integration weight follows the inverse pattern: highest in culture-heritage villages, medium in tourism-driven villages, and lowest in agriculture-dominated villages. This gradient provides the empirical foundation for province-wide classification-based differentiated policy implementation: provincial uniform standards establish the normativity baseline, county-level typological adaptation assigns optimization priorities, and village-level operational execution realizes the priorities through context-specific measures.

6. Safeguard mechanisms for linguistic landscape optimization implementation

6.1. Institutional safeguards: approval, monitoring, and assessment

The institutional safeguard dimension establishes a pre-approval, dynamic monitoring, and performance assessment closed-loop system. The rural signage approval system integrates LL review into the rural construction planning permit pre-review process, ensuring new signage complies with language specifications, design guidelines, and functional zoning requirements before installation. The dynamic monitoring mechanism deploys three LL quality indicators: the signage normativity index (character error rate, code-mixing rate, translation error rate), the language diversity index (dialect signage proportion, multilingual signage proportion), and the cultural signage density index (ICH element signage proportion, historical place-name signage proportion). These indicators are collected through periodic county-level inspections and continuous public reporting through the digital platform. Integration of LL indicators into the Harmonious and Beautiful Countryside assessment framework provides institutional weight, creating incentives for sustained investment [1, 12]. Table 2 summarizes the four safeguard dimensions.

Table 2. Safeguard mechanism dimensions and implementation pathways

Dimension	Core mechanism	Key instruments	Implementation pathway
Institutional	Regulatory framework	Signage approval; LL quality indicators; assessment integration	Policy issuance → pilot → province-wide adoption
Technological	Operational infrastructure	GIS spatial database; management platform; public mobile app	2–3 demo counties → province-wide coverage
Financial	Sustainable resource input	Fiscal guidance fund; collective self-funding; social capital	Priority-ranked: normativity → culture → digital → participation
Community participation	Endogenous motivation	Design workshops; elder advisory groups; LL deliberation mechanism	Temporary mobilization → institutionalized participation

6.2. Technological safeguards: digital management and intelligent monitoring

The technological safeguard dimension deploys a phased "one database, one platform, one terminal" architecture. The GIS spatial database implements the "one sign, one file" principle, recording sign type, language composition, material, dimensions, installation date, and maintenance history. The management platform provides sign lifecycle management: approval workflow, periodic inspection scheduling, repair work order generation, and statistical analysis dashboards. The public mobile terminal enables villagers and visitors to photograph and report signage issues, submit design suggestions, and rate signage quality. AI image recognition, applied to photographs submitted through the public terminal, enables automatic detection of sign damage, character errors, and code-mixing violations. Satellite remote sensing, as a subsequent capability layer, enables large-scale spatial distribution monitoring of sign density and coverage across the province [26]. The phased deployment strategy aligns with the broader smart village concept, emphasizing incremental introduction of digital interventions to allow for local adaptation and capacity building [15].

6.3. Financial safeguards: diversified funding and sustainable investment

The proposed funding model combines four sources: a provincial special guidance fund distributed on a reward basis to counties and villages meeting LL quality targets; county-level matching funds integrated into the annual rural construction budget; village collective self-funding drawn from collective economic income for routine signage maintenance; and social capital, particularly from rural tourism developers. Expenditure follows a priority ranking: normativity enhancement is funded first; cultural signage construction is funded second; the digital management platform is funded third; and community participation projects are funded fourth. Routine LL maintenance is incorporated into village-level public service funding to prevent the "build-and-neglect" pattern that characterizes many rural construction projects [16, 27].

6.4. Community participation: participatory design and endogenous motivation

Community participation transforms LL optimization from an externally imposed project into an endogenously sustained practice. Three institutionalized participatory channels are proposed: village design workshops engaging villagers in cultural wall design, village regulation revision, and commercial signboard design through discussion, voting, and iterative revision [28-30]; village-elder advisory groups, composed of retired teachers, cultural inheritors, and returning entrepreneurial youth, serving as standing advisory bodies for LL decisions; and a village LL deliberation mechanism placing LL issues on the villager representative assembly agenda, embedding LL governance within existing village self-governance institutions. The core transition is from temporary mobilization (campaign-style participation during initial construction) to institutionalized participation (continuous engagement through standing governance mechanisms). This institutional embedding — aligning LL participation with the villager representative assembly system, village affairs transparency system, and village regulation revision system — is the mechanism for transforming villagers from passive sign recipients into active landscape co-constructors [31, 32].

7. Conclusion and future directions

This survey has proposed a "normativity $\times$ functional adaptation $\times$ spatial balance $\times$ community participation" four-dimensional evaluation framework and operationalized it through a four-pillar strategy system for Henan rural linguistic landscape optimization. The top-level design pillar introduced a three-tier governance architecture with coordinated policy instruments and typological adaptation. The categorized optimization pillar proposed differentiated strategies for five sign types, shifting from standardized deployment to differentiated empowerment. The case-study pillar demonstrated the contrastive optimization logic across tourism-driven, agriculture-dominated, and culture-heritage villages, revealing a gradient distribution of functional and cultural priorities. The safeguard-mechanism pillar integrated institutional, technological, financial, and community-participation dimensions into a progressive closed-loop system.

Three critical research gaps define the frontier for future work. First, the absence of a rural-specific LL evaluation system: existing tools lack indicator design, data collection protocols, and application methodologies tailored to the spatial scale, actor structure, and functional profile of rural settings. Second, the scarcity of large-scale quantitative surveys and longitudinal tracking studies: current research is dominated by descriptive single-village case studies that cannot support generalization, causal inference, or trend analysis. Establishing a Henan rural LL dynamic monitoring database, with standardized data collection across a representative village sample and repeated measurement waves, would provide the quantitative evidence base currently missing from the field. Third, the unclear integration mechanisms between digital technology and community participation: the articulation pathway between technological platforms and community

endogenous motivation remains unexplored. Addressing these three gaps would complete the paradigm shift from descriptive diagnosis to prescriptive intervention and from academic concept to operational policy instrument in rural linguistic landscape research.

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