

Evaluating the effectiveness of land use plans in containing urban expansion: An integrated view



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ARTICLE INFO

Keywords:

Planning effectiveness
Land use plan
Analytic framework
Urban expansion
China

ABSTRACT

Knowledge of the actual usage and impact of spatial plans remains deficient due to defective evaluation methods and scarce empirical studies. By integrating and widening the conformance and performance criteria, this study builds a framework for assessing the effectiveness of land use plans (LUPs), which provides a comprehensive overview allowing the different roles played by LUPs and the corresponding degrees of planning effectiveness to be distinguished. We examine the effectiveness of a Chinese county-level LUP in governing urban sprawl in the context of rapid urbanization with the devised framework. The results show that the plan failed to control the scale and spatial distribution of urban development, and stimulated fragmented urban expansion and large-scale farmland conversion inside the zone for urban area. While non-conforming urban development decisions tended to minimize possible damage to planning effectiveness. The findings indicate that conforming decisions/outcomes do not necessarily imply the achievement of planning goals, while non-conforming decisions may be guided by planning goals and hence contribute to realizing them.

1. Introduction

China has been undergoing rapid urbanization for decades (You, 2016). According to the National Bureau of Statistics, between 2005 and 2015, China's urban built-up area increased from 32,521 km² to 52,102 km². Meanwhile, side-effects of continuing large-scale urban expansion, such as consumption of farmland and ecological land, have caused widespread concern (Tong et al., 2017). Land use plans (LUPs) have been used as a basic tool to govern urban sprawl in China (Wang et al., 2014; You and Yang, 2017). However, plan implementation in Chinese context faces particular challenges, since fast development produces great uncertainty and difficulty in controlling urban expansion (Wei et al., 2016). Moreover, farmland conversion and urban development is an important tool through which local governments achieve land finance and attract manufacturing investment (Li, 2014; Wu et al., 2015). So do Chinese LUPs play a role in regulating local governments' decision-making on urban development? Are the centralized planning goals fulfilled? Answering these questions will contribute to revealing the actual influences and functions of LUPs.

Yet whether a plan is effective is not a simple question. The key challenge lies in the deficient theoretical foundation for planning

effectiveness (PE) evaluation (Seasons, 2003; Alfasi et al., 2012). One major controversy is whether the evaluation should assess the conformance of the outcome with the plan or instead focus on performance, namely, the extent to which the plan is used (Chapin et al., 2008; Feitelson et al., 2017; Lyles et al., 2016). The conformance criterion is considered objective and easy to operate, and can directly reflect the extent to which the plan is carried out. However, absolute consistency between the outcome and the plan is almost impossible and may also be inadvisable; besides, conformance evaluation does not fully reveal the practical influences of LUPs (Faludi, 2000; Waterhout and Stead, 2007). The performance criterion holds that when a non-conforming decision is made, the plan is still effective if the departure is reasonable and the plan takes a part in decision-making (Alexander, 2009; Mastop, 1997). However, there are methodological difficulties in measuring plan performance (Feitelson et al., 2017).

By combining the conformance and performance criteria, the realization degree of LUPs can be visually demonstrated through comparison between the outcomes and the plans, and plans' influences on decision-making that correlate to the outcomes can also be uncovered, contributing to fully revealing the actual influences of LUPs. To date, the few studies to employ both criteria in PE evaluation (Berke et al.,

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2006; Feitelson et al., 2017; Lyles et al., 2016; Zhong et al., 2014) have used them independently, rather than integratedly. By combining and expanding the conformance and performance criteria, we build a comprehensive framework for appraising PE, which we then use to examine the effectiveness of a Chinese county-level LUP in governing urban growth.

2. Analytic framework

2.1. Defining planning goal and planning content

Planning goals (PGs) are the basic intentions of a plan (Alexander, 2009), while planning contents (PCs) are detail arrangements in the plan, such as regulations, measures, tasks, and zoning. PGs play a dominant role, and PCs are means for realizing them (Long et al., 2015). While PGs enjoy sustainable rationality and stability, PCs are prone to modification and abandonment due to internal irrationality or external change. Taking LUPs in China as an example, farmland protection is an important goal, and PCs such as quotas of farmland consumption are measures to achieve it; farmland protection is a long-term necessity, but PCs are frequently adjusted and selectively used (Tan et al., 2009).

PGs are expected to be better realized by implementing PCs than they would do without carrying out any interventions, as shown by P₁ and NP, respectively (Fig. 1). However, as illustrated by P₂, PCs are not always feasible measures to accomplish PGs, and may even have a negative effect (Altes, 2006). Decisions may conform to the PCs (D₂, D₆), or may be that no interventions will be taken (D₄). Except from D₄, other non-conforming decisions (D₁, D₃, D₅, and D₇) may support or hinder achieving PGs. Particularly in China, PGs such as farmland protection and compact urban growth are top-down targets (Zhong et al., 2014), while land use zoning (a kind of PCs) in LUPs is mainly delimited by local governments. Local governments are motivated to promote urban expansion to increase financial revenue and fuel economic development (Shen et al., 2017; Wu et al., 2015). It is therefore possible that PCs fail to represent centralized PGs. Taking the study area as an example, the acreage of the zone for urban area is much larger than its top-down urban land quota, and the farmland protection task won't be accomplished unless a great part of the farmland inside the planned urban zone can be preserved.

Undoubtedly PGs' accomplishment is more important than PCs implementation (Talen, 1996). Given the disparity between PGs and PCs, their roles in PE should be distinguished to avoid confounding PCs implementation with PGs achievement, and nonconformance between decisions/outcomes and PCs with planning failure (Alexander, 2009;

Mastop, 1997).

2.2. An integrated framework

Fig. 2 outlines the steps of formulating and implementing plans: (1) establish PGs; (2) formulate PCs; (3) make decisions guided by plans; and (4) implement the decisions and produce corresponding outcomes. From the performance-based view, PE hinges on the usage of PGs and PCs during decision-making (Lyles et al., 2016; Waldner, 2008). Specifically, PGs provides direction for decision-making—clarify what decisions are for, and PCs are expected to provide options and regulations for decision-making (Faludi, 2000; Oliveira and Pinho, 2009). Therefore, the performance criterion focuses on the usage of PGs and PCs during decision-making (Waldner, 2008), while the conformance criterion centers on the consistency between outcomes and PCs (Alfasi et al., 2012; Gennaio et al., 2009).

Fulfilling PGs is the fundamental task of plan implementation, as well as an essential sign of planning success (Alexander, 2009; Long et al., 2015; Talen, 1996). However, both the performance and conformance criteria neglect the important question of whether the PGs are realized, and also fail to consider whether plans' influences on decision-making and ultimate outcomes are positive. Furthermore, PCs' influences on decision-making are obvious in the cases where decisions/outcomes conforms to them, but not the PGs'. Particularly in the non-conforming cases, both the PCs' and PGs' influences are obscure (Alexander and Faludi, 1989).

To overcome the theoretical limitations and methodological obstacles, we build a comprehensive framework that integrates the performance and conformance criteria along with evaluation of the outcomes of plan implementation, as shown in Fig. 3. Within this framework, PE evaluation comprises five steps: (1) usage of PCs during decision-making; (2) conformance between outcomes and plans; (3) benefits and impacts of the outcomes; (4) realization degrees of PGs; and (5) PGs' influences on decision-making. Benefits of outcomes and their correlation to PGs are indicators of the extent of PGs' accomplishment. Furthermore, realization degrees of PGs indicate PGs' influences on decision-making, the positivity of PCs' influences and the outcomes, and the reasonableness of non-conformances.

To distinguish different roles plans may play, this framework classifies degrees of PE. In case a₁, the PE grade is the highest since PCs are implemented, the outcomes conform to PCs and are beneficial, and PGs are realized. In cases a₂ and b, although PCs are adopted, the PE grade is negative, because the conforming outcomes is not beneficial (a₂) or the implemented PCs fail to produce a conforming and beneficial outcome (b). In both cases, the negative PE grade is attributable to PCs'

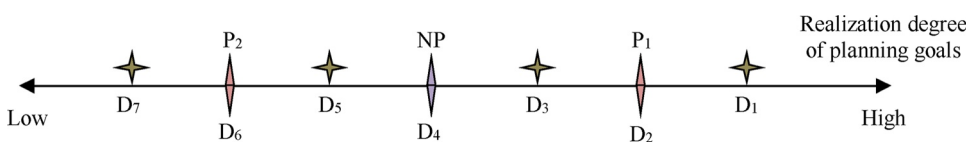


Fig. 1. Degrees of planning goal achievement resulting from different decisions.

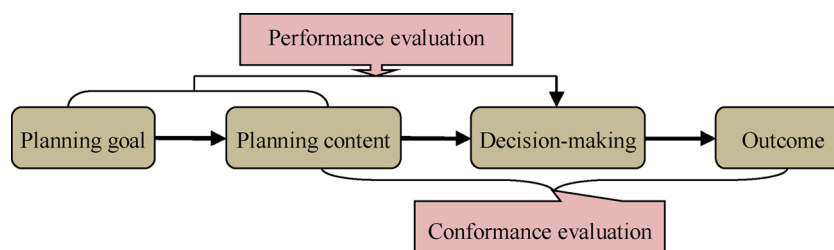


Fig. 2. The focuses of the performance and the conformance criteria.

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