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## **From the cost trap to greater honesty over true costs: the costs and consequential costs of settlements and infrastructure**

### **1 Consequential-cost assessments and cost-benefit analysis in spatial planning**

What is the long-term equation between costs and benefits when greenfield sites are given over to new development? Are the effects of local-authority policies to give preference to consolidating inner-city development over development on the urban fringes positive or negative with regard to municipal budgets? Is it possible for a restrictive settlement policy at the levels of state and regional planning – one which pursues a consistent policy of restricting rural counties to consolidating existing development and steers settlement development primarily to the established centres of population (known as “central places”) within a region – both to reduce infrastructure costs and to create conditions conducive to regional growth? In the light of the specific conditions which exist in a particular region with regard to demographic change, what course of settlement development will prove to be both sustainable and cost-saving with regard to the region’s infrastructure?

At the present time, it is not possible for the majority of municipalities and regions in Germany to offer a convincing answer to these pressing questions since there is, in most cases, no procedure in place for systematically assessing the future consequential costs and benefits of settlement development. Neither in local-authority practice nor in regional planning are the appropriate measures undertaken either to produce an adequate cost-benefit analysis or to assess satisfactorily the consequential costs ensuing from a specific development project or from alternative proposals for settlement development within the municipality or region. The increased use of cost-benefit analysis in the context of infrastructure planning is one of the changes called for by the Parliamentary Advisory Council on Sustainable Development of the German Bundestag (2007, p. 3).

In the years to come, more and more regions in Germany will be affected by population depletion, and in many planning regions there have long been clear signs of decline with regard to average settlement density. Consequently, it will become all the more important for both local authorities and regions to gauge the consequential costs of planned urban-development schemes prior to drawing up land-use plans and regional plans, in order to allow them to square these costs with the anticipated benefits. Taken together, falling levels of settlement density and a decline in demand from key groups within society have very serious repercussions when it comes to funding the basic level of infrastructure provision needed to serve the population. If there is an increase in the amount of land given over to settlement and transport-related uses, while at the same time there is stagnation or even decline in terms of population size, then each individual citizen will necessarily bear a proportionately larger share of the cost of borrowing to provide the essential technical and social infrastructure. And it is not only in city-centre areas that falling population densities push up infrastructure costs: the urban fringe is affected particularly severely as in such areas settlement density is on average already predominantly low. Any further deterioration in the relationship between the infrastructure deemed essential and the number of people contributing to paying for it will inevitably lead to significant cost increases with damaging macroeconomic effects.

It is no coincidence that spatial planning derives its duty of co-ordination from the requirement it is under to contribute towards achieving economic and cost-saving settlement structures by aligning the development plans of local authorities. However, although assessing the environmental impacts of alternative development proposals has

long been accepted as one of the core tasks of spatial planning, it is only very recently that prime importance has come to be attached to the need to assess consequential costs, particularly in the field of essential infrastructure provision. The new status given to the cost issue is attributable most notably to the challenges posed by demographic change. Under a resolution adopted on April 28th, 2005 by the Standing Conference of state ministers with responsibility for spatial planning (the MKRO), regional planning is required to undertake adjustments as early as possible to respond to the effects of population depletion and ageing, as well as to increasing international diversity. It is also required to support any corresponding adjustments which need to be made in respect of the supply of public services, and in doing so proceed in a more cost-efficient manner. The relationship between settlement development and infrastructure provision is also an issue addressed in the MKRO's Visions and Strategies for Spatial Development in Germany (MKRO 2006): "The bodies charged with state-level and regional planning shall strive to create a pattern of spatial and settlement structure capable of safeguarding the efficient and economic provision of infrastructure."

## **2 State of knowledge to date**

### **A fiscal view of development-land strategies for local authorities**

Building on research carried out by Gutsche in and around Hamburg (Gutsche 2004; Gutsche 2006), a study undertaken for the Stuttgart region elucidates projected financial outcomes for development areas in a number of different types of municipality which would ensue given the framework parameters currently provided by the procedure for sharing local-authority revenues and burdens in Baden-Württemberg and in the light of various possible future developments in demographics.

In the cases which have been studied, the critical initial parameters are not the cost of providing infrastructure – which are defrayed through a system of recoupment charges – but rather the ongoing cost of providing street-lighting, public green spaces, street-cleaning, gritting and snow-clearing services, of maintenance, of maintaining children's playgrounds and sports facilities, as well as the operating and (to some extent) staffing costs for school buildings and kindergartens (and in some cases also public swimming pools) as well as any charges for which the municipality is liable. Public transport and school-bus services are not included here as they are not local-authority responsibilities. In local-authority budgets these permanent costs are not assigned to specific development areas. And, with the exception of charges – they are determined by decisions taken by the local authority. Here, however, a distinction has to be made between the largely constant, long-term costs of technical infrastructure, on the one hand, and the more easily adjustable costs of social infrastructure, where there is the political will to make such changes.

With regard to revenues – which include principally property taxes, the municipality's share of income-tax revenue, the capitation grant, "equalisation payments", family-policy and child-benefit payments and proceeds from real-estate sales – it is important to note that these are determined largely (with the sole exception of proceeds from the sale of real estate) by decisions taken at a higher level. Equally significantly, these revenues accrue only once (on the sale of the property).

One factor which has a particularly vital bearing on the long-term and sustainable affordability of technical infrastructure is settlement density. High levels of settlement density and concentrated development ensure that infrastructure is used to its full capac-

ity; they are also efficient in both micro- and macroeconomic terms, and they avoid cost leap-frogging. Both the number of incomers and the time it takes for a development area to be fully occupied have tangible financial effects. However, it is extremely difficult to predict the dynamics of population movement, and in too many cases new development sites tend to generate relocations within the area.

### **Assessing consequential costs at the regional level**

A key requirement for cost-sensitive spatial planning is the existence of tools for assessing consequential costs. These are essential for producing a balance sheet with a mid- to long-term horizon and for arriving at any useful appraisal. By international standards, Germany has to date shown relatively little interest in making use of consequential-cost analysis in regional planning.

For many regions, comparing alternative courses of development has shown that those additional costs incurred in providing an acceptable level of infrastructure which are attributable to demographic factors can in fact be held down by exerting influence on regional settlement development and through a consistent policy of making adjustments to the existing infrastructure base (BBR 2007; Siedentop et al. 2006a, b, Gutsche et al. 2008). Model calculations at the regional level show that, in respect of both technical and social infrastructure, a “steady-as-she-goes” policy of settlement development will inevitably run into a “cost trap”. In regions suffering severe population depletion, there is a risk that many basic infrastructure assets will fail to achieve the minimum levels of capacity utilisation (including, for example, minimum class sizes or school populations) required for them to remain economically viable. In many cases, the facilities concerned are closed down. However, viewed from the political perspective of “fair distribution”, this approach is immediately problematic since it represents a breach of the principle of guaranteeing basic universal provision. Hitherto, spatial planning had pursued the goal of ensuring the blanket provision of key services within an acceptable distance of users, even where levels of utilisation were consistently below full capacity. Macroeconomic accounting must therefore also have regard for such external, cross-departmental and cross-provider effects as transport costs.

If spatial planning wishes to prevent a drastic deterioration of supply and accessibility, then it must strive more actively to co-ordinate the process of adjusting the supply of basic services to respond to demographic change. However, in Germany it is only in a small number of model projects that regional planning takes an interdepartmental approach to co-ordinating the adjustment process. Just how valuable a task this is for spatial planning is documented in the findings of the Model Project on Spatial Planning (known by the abbreviation MORO) under the title “Regional-planning approaches to safeguarding vital public services” (BBR 2007), referring specifically to the Dittmarsch/Steinburg and the Mecklenburg Seenplatte regions. Within this project, integrated and networked supply strategies were developed for four areas of basic service provision (schools, child care, nursing care, public transport), which were in turn compared with regard to changes in the level of service provision, in standards and in cost development.

- The problem of the significantly higher residual overhead costs incurred with technical infrastructure, by comparison with social infrastructure, is due to the dominance here of capital costs. In all of the examples of technical infrastructure examined, capital costs represented over 60% of total costs. This illustrates the much higher intensity of fixed costs associated with maintaining technical infrastructure as compared with social infrastructure. In the case of roads and district heating,

capital costs even accounted for up to 90% of total costs. In addition to capital costs, the total cost also includes the corresponding level of operating costs. By contrast, administrative costs and maintenance costs together account for no more than 10% of total costs.

- Social infrastructure displays high levels of adaptability to changes in settlement and population structure. Here day-care facilities for children and nursing-care services tend to lend themselves relatively easily to adjustments to falling populations; the situation is more difficult with sport and school infrastructure. However, in individual cases the political will to go through with such measures may be fraught with difficulty. It is also necessary to adopt an overall perspective, weighing up, for example, the cost of running and maintaining a school versus the cost of transporting students to school. Such costs may well be spread over various authorities.
- The financial burdens incurred in connection with technical infrastructure should be borne, as far as possible, by private-sector users. This would make a contribution towards greater honesty over true costs and cost transparency. In the case of sewage disposal and the provision of drinking water, costs are already borne exclusively by consumers. But even in the case of rainwater drainage and highways infrastructure, the share to be borne by local authorities rarely exceeds 20%. In general, this socialisation of costs is further reinforced by the new single-family and semi-detached houses which are being built. The high costs incurred in more sparsely populated, sprawling residential locations have to be shared to some degree by those living in more compact settlements. Over the long term, this can be expected to lead to greater cost transparency and cost honesty over the connection charges for infrastructure.
- As far as technical infrastructure is concerned, central importance has to be attached to the issue of settlement density or concentration of use. As more and more technical infrastructure has been privatised (telecommunications, energy, water), it has now already become apparent that commercial providers no longer offer equal levels of provision throughout the areas they serve; increasingly there are variations in both price and availability. One example is the frequent lack of availability of high-speed internet connections in rural areas. Such services require minimum densities and a minimum number of subscribers, which ultimately either encourages reconcentration or leads to different levels of service being offered. This is currently being demonstrated particularly clearly in connection with the rolling out of broadband infrastructures and gas-supply networks in peripheral areas.
- In principle, closing down underused infrastructure, where such infrastructure serves to supply basic services, does not necessarily lead to a reduction in costs. This can be demonstrated by considering schools development. For the authorities responsible for providing schooling, closing down a school at a particular location reduces the financial burden of paying for teaching staff and school management, and equally of maintaining the school building, which includes other staffing costs and material expenditure. From the perspective of school-development planning, such cost-based arguments usually suffice to lead to an undersubscribed school being closed. However, once other types of cost are included in the equation, the picture suddenly looks entirely different. To a large extent, the cost savings achieved by closing one school are more than eaten up by the increased costs which arise in providing school transport; the children whose school has been closed now have to be bussed greater distances to other schools (Gutsche 2006, Gutsche 2008). Consequently, maintaining an undersubscribed school need not necessarily be more ex-

pensive than a school closure, since this would avoid the consequential costs which ensue from closing down the school, in particular the cost of providing transport.

### 3 Conclusions

If cost-saving settlement development is to be promoted going forward, it is not enough for regional planning solely to increase the frequency with which it undertakes assessments of the consequential costs of alternative courses of development, or requires these to be carried out by local authorities; regional planning must also intensify its efforts to deliver integrated settlement and infrastructure planning during the process of revising and updating existing regional plans or drawing up new ones. In the majority of cases, the regional plans currently valid fail to achieve an adequate degree of co-ordination, either in respect of developing essential public services, or with regard to integrated settlement and infrastructure planning. The reasons for this include the following:

- Only in very exceptional cases do the authorities charged with regional planning maintain precise, GIS-supported cadastral registers of infrastructure in which details of infrastructure assets and capacities are constantly up-dated. Although information is usually available regarding the various sites, this frequently does not extend to details of capacity and levels of capacity utilisation.
- Methods for assessing the consequences for infrastructure demand and the effects on capacity utilisation resulting from demographic change and settlement development at the regional level are still practically unknown in spatial planning practice. Although information, models and models for calculation are available (Einig, Siedentop 2006; Gutsche et al. 2008; Siedentop et al. 2006a; Verband Region Stuttgart 2006), as mentioned above, this information is still so complex that it is rarely put to use in concrete cases.
- One serious impediment to more intensive engagement in infrastructure planning on the part of regional planning is the resistance which is brought to bear by the municipalities and counties, which protect this policy area as part of their own remit and rarely show any interest in intervention from regional planning. If, in addition, the *Länder* (states) are not prepared to recognise the provision of essential public services as a responsibility of regional planning, then the scope for action on the part of regional planning is severely curtailed.
- As far as estimating land demand and the possible consequences for infrastructure which may ensue from land development within a local-authority area, it is only in very few regions that regional planning actively provides advice to municipalities. In many cases there is a lack of comprehensive spatial data (e.g. a register of building land) to form the foundation for such advice. Only in a few exceptional cases has regional planning performed a moderating role to guide infrastructure providers through the process of adjusting and adapting supply. This is often due to the lack of the necessary financial and human resources in regional planning.
- Spatial planning should adopt a more targeted approach to deploying the knowledge at its disposal in the interests of achieving a spatial pattern of population distribution which maximises the utilisation of existing infrastructure. This should be achieved by consistently applying such instruments as the central-place system and development axes, by consistently restricting development at non-central locations (in terms of the central-place system) to consolidating development, and by exerting control over locations for retail. This is the only way to secure the long-term viabil-

ity of decentralised infrastructure in the face of current demographic developments and globalisation.

- However, regional planning also itself contributes to shortcomings in co-ordination. Many regional plans reveal a lack of adequate co-ordination between sectoral plans. With regard to technical infrastructure, the keys to maps containing designations predominantly do no more than adopt and report the content of other plans (Einig 2008). Only in very rare cases is the content of a sectoral plan given legally-binding, designated status in a regional plan, with the consequence that it is only rarely possible for regional planning to exercise any statutory control over locations and routes under spatial-planning law. The situation in respect of social infrastructure has to be viewed even more critically. The majority of regional plans fail to depict the locations of schools, hospitals and other vital public services for the reason that the providers of these services consider that they have sovereign power over these matters and so refuse to co-operate or even supply data. Moreover, it is also rare for the authorities responsible for state-level planning to wish to include these matters within the scope of regional planning. In the future, regional planning will be called upon to play a significantly more active role in respect of infrastructure planning. It will have to involve itself much more intensively both with sectoral plans and with the background to such plans if it is to be accepted as an equal partner in the process of deciding on locations. In addition, comprehensive state and federal level spatial planning (*Raumordnung*), as a cross-cutting and supra-local discipline, must more actively exercise its co-ordinating role in respect of sectoral plans with spatial impacts and thus play an overarching role in co-ordinating the process of adjusting the provision of vital infrastructure for the maximum macro-economic benefit. In order for it fully to meet the statutory requirement of safeguarding sustainable spatial development with parity of living conditions in all regions, and equally of securing decentralised settlement structure throughout the national territory (Federal Spatial Planning Act, sections 1 and 2), in both cases with due regard to cost, spatial planning should draw on all of the knowledge available to it on levels of infrastructure utilisation, and on the quality of provision experienced by consumers in different locations, and feed this into the process of drawing up standards for levels of provision and for locations.

However, before this can happen, suitable methods and models still need to be developed or refined; these must be sufficiently precise, and yet also applicable in both local and regional contexts, without being too complex. They should include the monitoring of locations, levels of endowment and capacity utilisation and of essential infrastructure assets in order to enable more targeted and detailed planning. This would in turn form a foundation upon which regional planning can create a distinct profile as a moderator of the process to adjust the provision of essential infrastructure. If, hitherto, the adjustment strategies which have been employed have focused almost exclusively on isolated areas of infrastructure provision, it is now apparent that what is called for is overarching co-ordination of the kind which regional planning is particularly suited to providing. Moreover, spatial planning should adopt a more offensive stance to communicating its understanding of these insights and interactions: a laissez-faire attitude leads everyone affected into the “cost trap”.

## Literature

- Bundesamt für Bauwesen und Raumordnung (Hrsg.) (2007): Regionalplanerische Handlungsansätze zur Gewährleistung der öffentlichen Daseinsvorsorge. Ein MORO-Forschungsfeld. In: MORO-Informationen, Nr. 2/1 and 2/2, Bonn, [http://www.bbr.bund.de/cln\\_007/nn\\_23558/DE/Veroeffentlichungen/MORO/](http://www.bbr.bund.de/cln_007/nn_23558/DE/Veroeffentlichungen/MORO/).
- Einig, K. (2008): Fachplanungskoordination durch Raumordnung – Eine vergleichende Institutionenanalyse von Festlegungen zur Ver- und Entsorgungsinfrastruktur in Regionalplänen. In: Tietz, H.-P.; Hühner, T. (Hrsg.): Zukunftsfähige Infrastruktur und Raumentwicklung – Handlungserfordernisse für Ver- und Entsorgungssysteme. In: Forschungs- und Sitzungsberichte der ARL, Hanover, in preparation.
- Einig, K.; Siedentop, S. (2006): Infrastrukturkostenrechnung. Eine Methodik zur Folgekostenabschätzung in der Regionalplanung. In: Raumplanung, Nr. 126/7, S. 115-119.
- Friedrich, S.; Perret, F.; Baumgartner, R. (2004): Siedlungsentwicklung angesichts knapper Finanzen. In: Baublatt, Nr. 101, Dezember, p. 2-4.
- Gutsche, J.-M. (2004): Auswirkungen neuer Wohngebiete auf die kommunalen Haushalte. In: Die Gemeinde. Zeitschrift für die kommunale Selbstverwaltung in Schleswig-Holstein. Jg. 56. H. 9/2004. p. 186-193.
- Gutsche, J.-M. (2006): Kurz-, mittel- und langfristige Kosten der Baulanderschließung für die öffentliche Hand, die Grundstücksbesitzer und die Allgemeinheit. Abschlussbericht zu einem Forschungsprojekt für das Ministerium für Landwirtschaft, Umwelt und ländliche Räume des Landes Schleswig-Holstein. Hamburg.
- Gutsche, J.-M. (2008): Diskursive Erarbeitung regionaler Anpassungsstrategien der Daseinsvorsorge an den demographischen Wandel. Erfahrungen aus einem Modellvorhaben der Raumordnung. In: Informationen zur Raumentwicklung, H. 1-2, p. 127-140.
- Ministerkonferenz für Raumordnung (2005): Sicherung und Weiterentwicklung der öffentlichen Daseinsvorsorge vor dem Hintergrund des demographischen Wandels. Resolution of the 32nd conference of state ministers with responsibility for spatial planning of 28.4.2005 in Berlin.
- Ministerkonferenz für Raumordnung (2006): Leitbilder und Handlungsstrategien für die Raumentwicklung in Deutschland. Berlin.
- Parlamentarischer Beirat für nachhaltige Entwicklung des Deutschen Bundestages (2007): Demographischer Wandel und nachhaltige Infrastrukturplanung. Deutscher Bundestag 16. Wahlperiode, Drucksache 16/4900.
- Reidenbach, M. u. a. (2007): Neue Baugebiete: Gewinn oder Verlust für die Gemeindekasse? Fiskalische Wirkungsanalyse von Wohn- und Gewerbegebieten. Berlin.
- Siedentop, S.; Schiller, G.; Gutsche J.-M.; Koziol, M.; Walther, J. (2006a): Siedlungsentwicklung und Infrastrukturfolgekosten. Bilanzierung und Strategieentwicklung. In: BBR-online-Publikationen, Nr. 03/2006, Bonn.
- Siedentop, S.; Schiller, G.; Gutsche, J.-M. (2006b): Infrastrukturkostenrechnung in der Regionalplanung. Ein Leitfaden zur Abschätzung der Folgekosten alternativer Bevölkerungs- und Siedlungsszenarien für soziale und technische Infrastrukturen. Reihe „Werkstatt Praxis“, Nr. 43, Bonn.
- Verband Region Stuttgart (2006): Neubaugebiete und demographische Entwicklung – Ermittlung der fiskalisch besten Baulandstrategie für die Kommunen in der Region Stuttgart. In: Schriftenreihe, Nummer 25.



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