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05-03-2016 / 2016-03-05**Petra Radeljak Kaufmann**

Metoda scenarija u istraživanju i planiranju prostora

Scenario Method in Spatial Research and Planning

Radi analize oblika scenarija koji su značajni za istraživanje i planiranje prostora te načina na koji se metoda scenarija upotrebljava u tom kontekstu na pojedinim prostornim razinama proveden je opsežan pregled literature vezane uz tipologije i primjere upotrebe metode scenarija. Prema prostornom i vremenskom okviru, svrsi i postupku izrade scenarija te izrađenim scenarijima, pobliže je analizirano jedanaest odabranih scenarijskih studija u europskim državama te devet studija u drugim svjetskim državama, opisanih u akademskim radovima. Na temelju analize tipologija scenarija izdvojeni su: a) eksplorativni, deskriptivni, prognozirajući – normativni, anticipativni, retrognozirajući scenariji, b) kvalitativni – kvantitativni, c) stručni – participativni, d) osnovni – upravljački scenariji i e) ostali tipovi scenarija. Analiza odabranih primjera upotrebe metode scenarija pokazala je posebno: prisutnost scenarija u različitim svjetskim državama i na različitim prostornim razinama, relevantnost u vrednovanju varijanti mogućega budućeg razvoja te postavljanju temelja strategija i specifičnih mjera planiranja i upravljanja, povezanost metode s integralnim pristupom prostornom razvoju, ali i regionalno i lokalno specifičnim temama te ulogu scenarija kao poveznice istraživanja u okviru znanosti o okolišu i prostornog planiranja.

Ključne riječi: metoda scenarija, tipovi scenarija, istraživanje prostora, prostorno planiranje

With the goal of analysing the forms of scenarios relevant for spatial research and planning, and ways in which the scenario method is contextually used at different spatial levels, a wide encompassing literature review was conducted in relation to typologies and examples of scenario method usage. Given the spatial and temporal frame, the purpose and procedure of scenario construction and resulting scenarios, eleven scenario studies in European countries and nine studies in other countries, described in published academic papers, were selected for closer analysis. On the basis of analysis of scenario typologies, underlying scenarios were recognised: a) explorative, descriptive, forecasting – normative, anticipatory, backcasting; b) qualitative – quantitative; c) expert – participatory; d) baseline – policy; and e) other types of scenarios. The analysis of selected examples of scenario method usage showed especially: the presence of the scenario method in different countries on different spatial levels; relevance in evaluating of alternatives of possible future developments and providing a firm ground for strategies and specific planning and policy measures; connections of the method to the integral approach to spatial development, but also to regionally and locally specific topics; the role of scenarios as links between environmental science research and spatial planning.

Key words: scenario method, scenario types, spatial research, spatial planning

Uvod

Uobičajeno je da se pojmovi „planiranje”, „razmišljanje”, „prognoziranje”, „analiza” i „učenje” povezuju sa scenarijima (Bradfield i dr., 2005), pojmom koji sam po sebi ima niz značenja. Upotrebljava se u različitim kontekstima: od sadržaja dramske radnje i iscrpnog opisa radnje filma s tehničkim indikacijama do analize trenda, prognoza, predviđanja, analize osjetljivosti, analize varijanti, konkretnih razvojnih projekata i dr. U literaturi je prisutan veliki broj različitih i ponekad kontradiktornih definicija, značajki, principa i metodoloških gledišta na scenarije.

Mnogi su autori međutim promišljali i definirali scenarije s motrišta *metode scenarija*. Među prvima definirali su ih Kahn i Wiener (1967, 6), kao „hipotetične sljedove događaja osmišljene sa svrhom usmjerivanja pozornosti na uzročne procese i točke donošenja odluke”. Schoemaker (1993) scenarije definira kao koherentno oblikovane opise fundamentalno različitih budućnosti. Scenarij je opis budućeg stanja i tijeka događaja koji omogućuje napredak od sadašnjega prema budućem stanju (Godet i Roubelat, 1996). Scenarij je općenito razumljiv opis mogućeg stanja u budućnosti temeljen na kompleksnoj mreži utjecajnih čimbenika (Gausemeier i dr., 1998). Scenarij je opis načina na koji bi se budućnost mogla odviti temeljen na pretpostavkama „ako-onda”, a uglavnom podrazumijeva opis početnog stanja te ključnih faktora i promjena koje vode prema određenome budućem stanju (Alcamo i Henrichs, 2008,¹ u: Rothman, 2008). Prema Međuvladinu panelu o promjeni klime, scenarij je koherentan, interno konzistentan i uvjerljiv opis mogućega budućeg stanja svijeta (IPCC, n. d.).

S motrišta *metode scenarija* scenarij stoga nije neformalna anticipacija trendova i događaja (Martelli, 2001) ni bilo koji skup hipoteza (Godet i Roubelat, 1996). Scenarij nije analiza osjetljivosti koja simulira utjecaj varijacija jednog čimbenika (npr. temperatura) na rezultat, već sadržava uvjerljive opise sistemskih faktora, koji

Introduction

The terms planning, thinking, forecasting, analysis, and learning are all often attached to the word scenario (Bradfield et al., 2005), which in itself has multiple meanings. It is used in different contexts, going from the contents of drama works and movie scripts, to trend analysis, forecasts, predictions, sensitivity analysis, analysis of different alternatives, concrete development projects, etc. Relevant literature encompasses a great number of contradictory definitions, characteristics, principles, and methodological views of scenarios.

Many authors, however, have contemplated and provided definitions in the context of *the scenario method*. An early definition by Kahn and Wiener sees scenarios as “hypothetical sequences of events constructed for the purpose of focusing attention on causal processes and decision points” (Kahn and Wiener, 1967, 6). Schoemaker (1993) defines scenarios as (p. 195) “... focused descriptions of fundamentally different futures presented in coherent script-like or narrative fashion”. A scenario is a description of a future situation and a course of events that allows moving forward from the original situation to the future situation (Godet and Roubelat, 1996). A scenario is a generally intelligible description of a possible future situation, based on a complex network of influence factors (Gausemeier et al., 1998). A scenario is a description of how the future may unfold based on “if-then” assumptions, which typically consists of a description of an initial situation and the key driving forces and changes that lead to a particular future state (Alcamo and Henrichs, 2008,¹ in: Rothman, 2008). According to the *Intergovernmental Panel on Climate Change*, a scenario is a coherent, internally consistent, and plausible description of a possible future state of the world (IPCC, n. d.).

When speaking about the *scenario method*, therefore, a scenario is not just any informal anticipation of future trends and events (Martelli, 2001), or set of hypotheses (Godet and Roubelat, 1996). A scenario is not a sensitivity analysis, which tends to produce a large number of simulations resulting from gradual variations of one

¹ Alcamo, J., Henrichs, T., 2008: Towards guidelines for environmental scenario analysis, u: *Environmental Futures: The Practice of Environmental Scenario Analysis* (ed. Alcamo, J.), Elsevier, Amsterdam, 13-35.

¹ Alcamo, J., Henrichs, T., 2008: Towards guidelines for environmental scenario analysis, in: *Environmental Futures: The Practice of Environmental Scenario Analysis* (ed. Alcamo, J.), Elsevier, Amsterdam, 13-35.

moгу biti različiti u svakom scenariju (Mahmoud i dr., 2009). Scenarij nije „varijantna budućnost”, odnosno samo završno stanje, već sredstvo postizanja tog stanja (Shearer, 2005). Konačno, scenarij nije strategija, jer strategija ovisi o stavovima usvojenima s obzirom na moguće budućnosti (Godet i Roubelat, 1996). Scenariji mogu biti izraženi u različitim oblicima – kao narativni tekstovi, slike, tablice, grafikoni, karte itd. (Rothman, 2008).

Primjena metode scenarija u različitim oblicima planiranja proširila se nakon Drugoga svjetskog rata, a njezin razvoj bio je vezan uz vojno planiranje, planiranje u javnoj upravi, poslovno planiranje, predviđanje tehnološkog razvoja, studije okoliša i održivi razvoj, urbano i regionalno planiranje te studije budućnosti uopće. Izrada scenarija označuje se kao osnovna metodologija (Slaughter, 2002), odnosno *par excellence* alat studija budućnosti² (Inayatullah, 2008). Kao središta razvoja scenarijskih tehnika tijekom šezdesetih godina 20. stoljeća istaknuli su se SAD i Francuska (Bradfield i dr., 2005).³

Sa sve prisutnijom predodžbom kompleksnosti i neizvjesnosti razvoja svijeta koji nas okružuje, posebno u kontekstu disciplina i djelatnosti koje počivaju na donošenju odluka (poput javnog upravljanja i prostornog planiranja), povećalo se zanimanje za razvijanje i analizu scenarija. Sardar (2010) govori o „postnormalnim vremenima”, koja traže napuštanje ideja kontrole i upravljanja te preispitivanje pojmova napretka, modernizacije i učinkovitosti koji podupiru zapadnjačko kapitalističko društvo. Analiza scenarija pojavila se kao ključna metodologija za istraživanje varijanti budućeg razvoja, identifi-

single factor (e.g. temperature), while a small number of scenarios contain plausible descriptions of system factors that can potentially be vastly different in each scenario (Mahmoud et al., 2009). Scenarios are not alternative futures i.e. possible end-states – a scenario is a means to achieve that state (Shearer, 2005). Finally, a scenario is not a strategy, because strategies depend on attitudes adopted in the face of possible futures (Godet and Roubelat, 1996). Scenarios come in various forms – as narrative texts, images, tables and charts of data, maps, etc. (Rothman, 2008).

Application of the scenario in various forms of planning increased after the Second World War, and its development was connected to military planning, public policy planning, business planning, technology foresight, environmental studies and sustainable development, urban and regional planning, and future studies in general. In future studies² scenarios are described as perhaps a keystone methodology (Slaughter, 2002) and the tool *par excellence* (Inayatullah, 2008). The USA and France became distinctive in the 1960s as centres of development of scenario techniques (Bradfield et al., 2005).³

The interest in scenario development and analysis increased with the ever more present perception of complexity and uncertainty of the development of the world that surrounds us, especially in relation to disciplines and activities based on decision-making (such as public governance and spatial planning). Sardar (2010) writes about “postnormal times”, which demand abandoning the ideas of “control and management”, and rethinking the notions of progress, modernisation, and efficiency underpinning western, capitalist society. Scenario analysis has emerged as a key methodology for exploring alternative future de-

2 Povezanost scenarija sa studijima budućnosti, koji su se razvili tijekom druge polovine 20. stoljeća, uz napredovanje njihove metodološke osnove (Krawczyk i Slaughter, 2010), uvjetovala je susretanje s raznolikom terminologijom u stranoj literaturi. U standardiziranju prevođenja terminologije primijenjen je pristup Dumičić i Knežević (2007), koje navode da se postupci prosuđivanja o budućnosti u literaturi opisuju terminima prognoziranje (*forecasting*) i predviđanje (*prediction, foresighting*). Pritom se statističari-prognostičari koriste terminom *prognoza* naslanjajući se na kvantitativne pokazatelje postojećih događanja i pojava, dok su terminom *predviđanje* obuhvaćene različite kvalitativne metode prognoziranja i predviđanja zasnovane na prosuđivanju.

2 The association of scenarios with futures studies, which developed over the second half of the 20th century with the continuing advancement of its methodological base (Krawczyk and Slaughter, 2010), was the reason for encountering different terms in non-Croatian literature. To be able to standardise translations of terminology, the approach of Dumičić and Knežević (2007) was used; according to them the terms *forecasting* and *prediction/foresighting* are used in literature to describe exercising judgment on the future. Thereby statisticians-forecasters use the term *prognoza* on the basis of quantitative indicators of existing events and phenomena, while the term *predviđanje* encompasses different qualitative methods based on judgment.

3 Veliki utjecaj na razvoj metode imali su određeni istaknuti pojedinci (H. Kahn, B. de Jouvenel, M. Godet i dr.) i organizacije (npr. RAND Corporation, Institut Hudson, Stanfordski istraživački institut, DATAR, Royal Dutch/Shell).

3 Certain individuals (H. Kahn, B. de Jouvenel, M. Godet, and others) and organisations (RAND Corporation, Hudson Institute, Stanford Research Institute, DATAR, Royal Dutch/Shell etc.) were distinctive in the development of the method.

ciranje ključnih neizvjesnih faktora i usmjerivanje akcije (Raskin, 2005). Uz to se neizostavno veže i pojam održivosti i održivog razvoja, pri čemu analiza scenarija, uključujući pristupe okrenute participativnosti i rješavanju problema, može biti alat za istraživanje ključnih pitanja i metodoloških izazova (Swart et al., 2004). Planiranje ili pravo na budućnost nije neodređeno i bezgranično pravo, već dobiva svoju dimenziju kroz održivi razvoj i održivu budućnost (Šimunović, 2005). Friedmann zagovara lokalno utemeljeno, dubinsko istraživanje strateških pitanja urbanog razvoja pod različitim skupovima pretpostavki ili scenarija kao način procjene potencijalnih ishoda i njihovih učinaka na stanovništvo, gospodarstvo i okoliš. To je način propitkivanja budućnosti kako bi se donijele bolje odluke u sadašnjosti (Friedmann et al., 2004).

Iz rečenoga proizlazi potreba analize oblika scenarija koji su relevantni za istraživanje i planiranje prostora te načina na koji se metoda scenarija upotrebljava u tom kontekstu na različitim prostornim razinama. Stoga je proveden opsežan pregled literature vezane uz tipologije i primjere upotrebe metode scenarija u širem kontekstu istraživanja i planiranja prostora. S obzirom na prostorni i vremenski okvir, svrhu i postupak izrade scenarija te izradene scenarije pobliže je analizirano jedanaest odabranih scenarijskih studija u europskim državama te devet studija u drugim svjetskim državama, opisanih u akademskim radovima objavljenima nakon 2002. Navedene studije odabrane su prema svojoj usmjerenosti na istraživanje/planiranje prostora te dostupnosti cjelovitog prikaza procesa izrade scenarija. Zaključno se iznose osnovna obilježja primjene scenarija u istraživanju i planiranju prostora, u smislu svrhe i postupka izrade, obuhvaćene problematike prostornog razvoja te izdvojenih tipova scenarija.

Tipovi scenarija

Razvoj metode scenarija u posljednjih pola stoljeća karakteriziralo je širenje njene primjene u različitim djelatnostima i područjima istraživanja. Svako od njih pridodalo je nova obilježja metodi, s obzirom na svrhu i cilj izrade scenarija, upotrijebljene specifične metode i tehnike te razrađen

velopments, identifying key uncertainties, and guiding actions (Raskin, 2005). This is inevitably connected to sustainability and sustainable development, where scenario analysis, including participatory and problem-oriented approaches, can be a tool for addressing core questions and methodological challenges (Swart et al., 2004). Planning or “the right to the future” is not an undefined and unlimited right – it gains its meaning through sustainable development and a sustainable future (Šimunović, 2005). Friedmann argues for a locally based, in-depth exploration of the strategic issues of urban development under different sets of assumptions or “scenarios” as a way to assess potential outcomes and their effects on local populations, the economy, and the environment. This is a way of probing the future in order to make more informed decisions in the present (Friedmann et al., 2004).

This has given rise to the need to analyse forms of scenarios relevant for spatial research and planning, and ways in which the scenario method is contextually used at different spatial levels. It is the underlying reason why a wide encompassing literature review was conducted, in relation to typologies and examples of scenario method usage in the wide context of spatial research and planning. Given the spatial and temporal frame, the purpose and procedure of scenario construction and resulting scenarios, eleven scenario studies in European countries and nine studies in other countries, described in academic papers published after 2002, were selected for closer analysis. These studies were selected according to their focus on spatial research/planning, and the availability of a full description of the scenario development process. In conclusion, basic characteristics of scenario application in spatial research and planning are given in relation to the purpose and development procedure; encompassing issues of spatial development and previously described scenario types.

Scenario types

Development of the scenario method in the last half-century has been characterised by its increasing application in different sectors and areas of research. Each of which has supplemented the method with new characteristics, regarding its purpose and goal for scenario construction, specific methods

slijed metodoloških koraka. Potreba usustavljanja spoznaja pridonijela je istraživanjima koja su rezultirala pregledima osnovnih tipova scenarija. Zbog svoje važnosti za primjenu metode scenarija u istraživanju i planiranju prostora u tab. 1. dani su primjeri integriranih tipologija. Na temelju njih može se izdvojiti nekoliko osnovnih načina kategorizacije scenarija.

a) Eksplorativni, deskriptivni, prognozirajući – normativni, anticipativni, retrognozirajući scenariji

Od 1996. do 2006. vidljivo je povećanje složenosti tipova scenarija navedenih u tab. 1. No svim tipologijama zajedničko je razdvajanje scenarija s obzirom na dva osnovna pitanja na koja odgovaraju: o razvoju koji bi se *mogao* dogoditi te razvoju koji bi se *trebao* dogoditi. Prva kategorija scenarija temelji se na analizi postojećeg stanja i trendova te ispitivanju mogućih smjerova razvoja u budućnosti. Scenariji druge kategorije kreću od poželjnih ciljeva budućeg razvoja, gdje se „vraćanjem unatrag” traže načini njihova postizanja. Drugim riječima, prema Rothmanu (2008), scenariji mogu biti razvijeni na eksplorativni način, neuvjetovan završnom vizijom, ili retrognozirajući (engl. *backcasting*)⁴ način, pri čemu je važna težnja za postizanjem završne vizije. Kod izrade velikog dijela scenarija kombiniraju se oba pristupa, iako se jedan odabire kao glavni. Osim toga oba tipa scenarija mogu biti uvjetovana postojećim trendovima ili kontrastna, ovisno o tome razmatraju li se najvjerojatnije ili najnevjerojatnije promjene (Godet i Roubelat, 1996; Godet, 2000a; Durance i Godet, 2010).

No upravo oko značenja pojmova *eksplorativni*, *deskriptivni* i *prognozirajući* vezanih uz prvu kategoriju scenarija, odnosno *normativni*, *anticipativni* ili *retrognozirajući* vezanih uz drugu kategoriju, u literaturi je prisutno neslaganje. Dio autora te pojmove upotrebljava kao sinonime, a dio razdvaja njihovo značenje ovisno o tome bave li se scenariji vrijednostima i normama. Prema Swart i dr. (2004), primarno deskriptivni scenariji oni su koji opisuju moguće razvojne pravce krećući od sadašnjih uvjeta i trendova,

and techniques used, and sequence of methodological steps. A need to systematise different understandings resulted in a review of basic types of scenarios. Given their importance for the application of the scenario method in spatial research and planning, examples of integrated typologies are given in Tab. 1. On that basis, several basic types of scenario categorisation can be recognised.

a) Explorative, descriptive, forecasting – normative, anticipatory, backcasting scenarios

In the 1996 – 2006 period an increase in the complexity of scenario types shown in Tab. 1 can be seen. However, the classification of scenarios, in relation to two basic questions to which scenarios respond is common to all typologies: regarding the development that *could* happen and the development that *should* happen. The first category of scenarios is based on an analysis of the current state of affairs and trends and explores possible development paths into the future. Scenarios of the second category start from the desirable goals of future development, and “working backwards” find ways to achieve them. In other words, according to Rothman (2008), scenarios can be developed in an exploratory fashion, i.e. not constrained by a predetermined end-vision, or in a backcasting⁴ fashion, where the desire to reach a predetermined end-vision is important. Either scenario type can be trend-driven or contrasted, depending on whether the most likely or the most unlikely changes have been incorporated (Godet and Roubelat, 1996; Godet, 2000a; Durance and Godet, 2010).

However, the terms *explorative*, *descriptive* and *forecasting* relating to the first category of scenarios, and *normative*, *anticipatory* or *backcasting* relating to the second category are a matter of disagreement in literature. Some authors use those terms as synonyms, and some make a distinction depending on whether scenarios deal with values and norms. According to Swart et al. (2004), primarily descriptive scenarios are those that describe possible developments starting from current conditions and trends, and primarily normative

⁴ Jedan od smjerova u izradi scenarija usredotočio se na predočivanje poželjnih budućnosti i načina njihova ostvarenja, posebno u području energetike.

Robinson ih je 1982. nazvao *backcasting* studiji (Swart i dr., 2004). Kao paralela s pojmom *forecasting* – „prognoziranje”, pojam *backcasting* može se u ovom smislu prevesti kao „retrognoziranje”.

⁴ Another direction in scenario work focused on envisioning desirable futures and ways to achieve them, particularly in the energy field. In 1982 Robinson called them ‘backcasting’ studies (Swart et al., 2004). Parallel to the term “forecasting” – “prognoziranje” in Croatian, the term ‘backcasting’ could be translated into Croatian as “retrognoziranje”.

Tab. 1. Usporedba tipova scenarija prema različitim autorima

Autori/ osnovni kontekst tipologije	Tipovi scenarija
<p>Godet i Roubelat, 1996; Godet, 2000a/ Planiranje/upravljanje poduzećima, javna uprava, prostorno planiranje</p>	<p>Eksplorativni – kreću od prošlih i sadašnjih trendova i vode vjerojatnim budućnostima Anticipativni ili normativni – grade se na različitim vizijama budućnosti te mogu biti poželjni ili nepoželjni Mogući – zamislivi scenariji Ostvarivi – mogući ako se uzmu u obzir ograničenja Poželjni – ulaze u kategoriju mogućih, ali nisu nužno ostvarivi</p>
<p>Rotmans i dr., 2000/ Integrirana podjela, s naglaskom na održivi razvoj</p>	<p>Prognozirajući – istražuju posljedice određenog slijeda pretpostavki Retroprognozirajući – kreću od postavljenoga krajnjeg stanja i istražuju preduvjete koji bi mogli dovesti do njega (uključujući niz strategija) Deskriptivni – navode redoslijed mogućih događaja neovisno o (ne)poželjnosti Normativni – uzimaju u obzir vrijednosti i interese, često se oslanjajući na specifične ciljeve koje treba postići Kvantitativni – često zasnovani na modelima, što uključuje upotrebu računalnih modela (kao glavnih sredstava istraživanja posljedica skupova pretpostavki ili kao alata za provjeru konzistentnosti razvijenih scenarija) Kvalitativni – temelje se na naraciji i kvalitativnom opisu puteva prema budućnosti Participativni – dionici igraju aktivnu ulogu u izradi scenarija Stručni – razvija ih mala skupina stručnjaka</p>
<p>Alcamo, 2001/ Naglasak na međunarodnim procjenama utjecaja na okoliš</p>	<p>Kvalitativni – opisuju moguće budućnosti u obliku riječi ili vizualnih simbola; mogu biti u obliku dijagrama, fraza i skica, no najčešće su sastavljeni od narativnih tekstova Kvantitativni – pružaju numeričke informacije u obliku tablica i grafova Eksplorativni – oni koji kreću od sadašnjosti i istražuju trendove prema budućnosti (poznati i kao „deskriptivni“ scenariji) Anticipativni – oni koji kreću od postavljenih vizija budućnosti (optimistične, pesimistične ili neutralne) i vraćajući se unatrag nastoje vizualizirati kako bi se ta budućnost mogla ostvariti (poznati i kao „preskriptivni“ ili „normativni“) Osnovni – predstavljaju buduće stanje u kojem upravljačke mjere izravno vezane uz glavnu temu scenarija ne postoje ili nemaju zamjetnog utjecaja Upravljački – odražavaju buduće učinke mjera upravljanja</p>
<p>Van Notten i dr., 2003/ Integrirana tipologija</p>	<p>Cilj projekta (istraživanje – potpora odlučivanju): I. uloga vrijednosti i normi: deskriptivni (istražuju moguće budućnosti) – normativni (opisuju vjerojatne ili poželjne budućnosti) II. polazište: prognozirajući (eksplorativni, kreću od sadašnjosti) – retroprognozirajući (preskriptivni ili anticipativni, kreću od određenoga budućeg stanja) III. predmet: temeljeni na društvenim pitanjima, institucijama* ili određenom prostoru IV. vremenski obuhvat: dugoročni (25 godina i više) – kratkoročni (3 – 10 godina) V. prostorna razina: svjetska/nadnacionalna – nacionalna/lokalna Oblikovanje procesa (intuitivni – formalni): VI. podaci: kvalitativni – kvantitativni VII. metoda prikupljanja podataka: participativni – sekundarni VIII. resursi (financijski, istraživački, vremenski): ekstenzivni – ograničeni IX. institucionalni uvjeti (u kojima se scenariji izrađuju): otvoreni – ograničavajući Sadržaj scenarija (kompleksan – jednostavan): X. priroda vremena: lančani (razvojni, opisuju razvojni put do krajnjeg stanja) – trenutačni (prije svega opisuju krajnje stanje) XI. skupovi varijabli: heterogeni – homogeni XII. priroda dinamike: periferni (kontrastrni, opisuju diskontinuirani put prema budućnosti, malo vjerojatne ili ekstremne događaje) – trend-scenariji (linearne trajektorije, bez iznenađenja) XIII. razina devijacije: alternativni (opisuju budućnosti koje se značajno razlikuju) – konvencionalni (temelje se na sadašnjim trendovima i njihovoj ekstrapolaciji u budućnost) XIV. razina povezivanja: visoka (povezivanje varijabli i dinamike na prostornim i vremenskim razinama, različitih domena) – niska (mala razina međupovezanosti)</p>
<p>Börjeson i dr., 2006/ Integrirana tipologija</p>	<p>Prediktivni – što će se (vjerojatno) dogoditi u budućnosti? <ul style="list-style-type: none"> • prognostički (što će se dogoditi u najizglednijem slučaju) • „što-ako“ (što će se dogoditi pod određenim uvjetima – promjena vanjskih ili unutrašnjih čimbenika koji su vrlo važni za budući razvoj) Eksplorativni – što se može dogoditi? (moguće) <ul style="list-style-type: none"> • vanjski (usmjeruju se na faktore koji su izvan područja utjecaja aktera kako bi se ispitala učinkovitost i „otpornost“ pojedinih planova i strategija na promjene vanjskih faktora) • strateški (želi se opisati niz mogućih posljedica određenih strateških odluka i mjera; usmjeruju se na unutrašnje faktore, a razmatraju vanjske) Normativni – kako se određeni cilj može postići? (poželjno) <ul style="list-style-type: none"> • scenariji očuvanja (kako postići određeni cilj promjenama trenutačnog stanja – prikladni su ako je moguće postići ciljeve uz postojeći sustav) • scenariji preobrazbe (kako postići cilj kada postojeća struktura sprečava potrebne promjene – prikladni su ako je potrebna preobrazba u strukturno drugačiji sustav kako bi se postigli ciljevi) </p>

* Scenariji temeljeni na institucijama bave se područjima interesa određenih organizacija i sektora, a mogu se uže podijeliti na kontekstualne (opisuju okruženje na koje institucija nema izravnog utjecaja) i transakcijske (opisuju mezookruženje institucije, interakcije varijabli i dinamiku u određenom polju) (Van Notten i dr., 2003).

Tab. 1 Comparison of scenario types according to various authors

Authors/ Basic context of the typology	Types of scenarios
<p>Godet i Roubelat, 1996; Godet, 2000a/ Business planning/ management; public sector; spatial planning</p>	<p>Exploratory – starting from past and present trends and leading to a likely future; Anticipatory or normative – built on the basis of different visions of the future; they may be either desired or feared. Possible – those that can be imagined; Realisable – possible, taking account of constraints; Desirable – fall into the possible category, but are not all necessarily realisable.</p>
<p>Rotmans i dr., 2000/ Integrated classification, with focus on sustainable development</p>	<p>Forecasting – exploring future consequences of a sequence of assumptions; Backcasting – starting from an assumed final state, and exploring the preconditions that could lead to it (including a palette of strategies). Descriptive – stating an ordered set of possible events irrespective of their (un)desirability; Normative – taking values and interests into account, often reasoning from specific, intended targets. Quantitative – often model-based, involving the use of computer models (either as a central means to explore the future consequences of sets of assumptions, or as a tool to check the consistency of the developed scenarios); Qualitative – based on narratives and a qualitative description of pathways into the future. Participatory – stakeholders play an active role in scenario construction; Expert – developed by a small group of technical experts.</p>
<p>Alcamo, 2001/ Focus on international environmental assessments</p>	<p>Qualitative – describing possible futures in the form of words or visual symbols; coming in the shape of diagrams, phrases, or outlines, but most commonly they are made up of narrative texts (storylines); Quantitative – providing numerical information in the form of tables and graphs. Exploratory – beginning in the present and exploring trends into the future (also known as “descriptive” scenarios); Anticipatory – starting with prescribed visions of the future (optimistic, pessimistic, or neutral) and working backwards trying to visualise how this future could emerge (also known as “prescriptive” or “normative” scenarios). Baseline – presenting a future state in which policies connected to the main theme of scenarios either do not exist or do not have a discernible influence; Policy – depicting the future effects of certain policies.</p>
<p>Van Notten i dr., 2003/ Integrated typology</p>	<p>Project goal (exploration – decision support): I. Inclusion of norms: descriptive (those that explore possible futures) – normative (describe probable or preferable futures); II. Vantage point: forecasting (exploratory, starting from present) – backcasting (prescriptive or anticipatory, reason from a specific future situation); III. Subject: issue-based, institution-based* or area-based; IV. Time scale: long term (25 years or more) – short term (3 – 10 years); V. Spatial scale: global/supranational – national/local. Process design (intuitive – formal): VI. Data: qualitative – quantitative; VII. Method of data collection: participatory – desk research; VIII. Resources (financial, research, time invested): extensive – limited; IX. Institutional conditions (in which scenarios are constructed): open – constrained. Scenario content (complex – simple): X. Temporal nature: chain (developmental, describing the path of development to an end-state) – snapshot (primarily describing the end-state); XI. Variables: heterogeneous – homogenous; XII. Dynamics: peripheral (contrast, describing a discontinuous path to the future, unlikely and extreme events) – trend (surprise-free, linear trajectories); XIII. Level of deviation: alternative (describing futures that differ significantly from one another) – conventional (adherent to present trends and their extrapolation into the future); XIV. Level of integration: high (integration of variables and dynamics across time and spatial scales, and across different domains) – low (low level of interconnections).</p>
<p>Börjeson i dr., 2006/ Integrated typology</p>	<p>Predictive – What will happen? (probable) • Forecasts (what will happen if the most likely development unfolds); • What-if (what will happen given the occurrence of certain events – external events or internal decisions of great importance for future development); Explorative – What can happen? (possible) • External (focusing on factors beyond the control of the actors in order to assess how robust certain policies and strategies are to changes in external factors); • Strategic (describing a range of possible consequences of certain strategic decisions; focusing on internal factors, and taking external ones into account); Normative – How can a specific target be reached? (preferable) • Preserving (how to reach the target via adjustments to the current situation – appropriate if reaching the target is possible within the prevailing structure of the system); • Transforming (how to reach the target when the prevailing structure blocks necessary changes – appropriate if a transformation into a structurally different system is necessary in order for the goal to be attained).</p>

Source: papers of authors referred to in the left-hand column

* Institution-based scenarios address the spheres of interest of certain organisations and sectors; they can be sub-divided into contextual (describing the environment not directly influenced by the institution) and transactional (describing the institution's meso-environment, and the interactions between variables and dynamics within a particular field) scenarios (Van Notten et al., 2003).

a primarno normativni scenariji oni su koji trebaju voditi prema budućnosti kojoj su autori scenarija dodijelili specifičnu subjektivnu vrijednost. I Shearer (2005) navodi da se u globalu istraživanja temeljena na scenarijima dijele na *normativne* studije, koje nastoje identificirati poželjne budućnosti, te *deskriptivne*, koje nastoje identificirati moguće budućnosti bez obzira na poželjnost. I normativni i deskriptivni scenariji upotrebljavaju se kao pomoć u donošenju odluka, no na različite načine. Kod normativnih scenarijskih studija scenariji su sami po sebi planovi za budućnost, a odluka se odnosi na to koju budućnost primijeniti. U deskriptivnim scenarijskim studijama scenariji su različiti uvjeti kroz koje se uspoređuju odluke/mjere i njihova „otpornost“; što je bolji rezultat određene odluke kroz skup scenarija, ta je opcija „otpornija“ na neizvjesnosti budućeg razvoja (Shearer, 2005).

Predmet rasprave u literaturi jest i odnos scenarija, koji se bave različitim mogućnostima razvoja, i prognoza, koje se bave procjenama najvjerojatnijeg razvoja kod sustava koji su relativno dobro poznati i jasno definirani (van Vuuren i dr., 2012). Pritom se postavlja pitanje trebaju li se koncepti vjerojatnosti vezati uz scenarije, jer tako postaju preslični prognozama (Mahmoud i dr., 2009).

Ako se u osnovnu kategorizaciju uključe i koncepti vjerojatnosti, eksplorativni, deskriptivni odnosno prognozirajući scenariji mogu se i uže specificirati. Naime Börjeson i dr. (2006) razlikuju tri glavne kategorije scenarija (prediktivni, eksplorativni i normativni) na temelju osnovnog pitanja koje korisnik scenarija postavlja o budućnosti – o vjerojatnome, mogućem i poželjnom razvoju (tab. 1). Kod prediktivnih scenarija ishod je prognoza s rasponom osjetljivosti za jedan ishod ili ishodi koji se razlikuju s obzirom na jednu točku bifurkacije, dok eksplorativni scenariji istražuju mogućnosti razvoja s različitih gledišta, dugoročniji su i obuhvaćaju veće, strukturne promjene.⁵

scenarios are those constructed to lead to a future that is afforded a specific subjective value by the scenario authors. Shearer (2005) also states that the scenario-based studies are broadly divided into *normative*, which seek to identify preferable futures, and *descriptive*, which aim to identify possible futures without regard for preference. Normative and descriptive scenarios are both used as aids to decision-making, but they are used in different ways. In normative scenario studies, the scenarios themselves are plans for the future and the decision concerns which future to implement. In descriptive scenario studies, the scenarios are different conditions in which decisions and their “robustness” are compared; the better the result of a certain decision across the set of scenarios, the more robust that option is to future uncertainties (Shearer, 2005).

An issue discussed in the literature is the relationship between scenarios, which explore different futures, and forecasts, which deal with assessments of the most likely developments for relatively well-known and well-defined systems (van Vuuren et al., 2012). Thereby a question can be raised as to whether likelihoods and probabilities should be associated with scenarios, as that could make them too similar to forecasts (Mahmoud et al., 2009).

If the concepts of probability and likelihood are included in the basic categorisation, explorative, descriptive, i.e. forecasting scenarios can be further specified. Namely, Börjeson et al. (2006) classify scenarios into three main categories (predictive, explorative, and normative) on the basis of the question that the scenario user poses about the future – on probable, possible, and preferable developments (tab. 1). In predictive scenarios, results come in the form of forecasts with a sensitivity span for one outcome, or more outcomes differing in relation to a “bifurcation” point, while explorative scenarios encompassing a wide scope of possible developments are elaborated with a long time-horizon, and allow for more profound, structural changes.⁵

⁵ Swart i dr. (2004) navode da, s metodološkoga gledišta, autori scenarija mogu pokušati razlučiti vjerojatne ishode niza očekivanih trendova, ocrtati implikacije pretpostavki koje nisu odabrane na temelju vjerojatnosti („što-ako” analiza) ili ispitati ostvarivost i implikacije poželjnih budućnosti/rizike nepoželjnih (retroprognoza – *backcasting*). Berkhout i dr. (2002) u literaturi nalaze tri kategorije scenarijskih pristupa: ekstrapolativni/prognozirajući, normativni/retroprognozirajući te eksplorativni, pri čemu se ekstrapolativni oslanja na prošle trendove i nastavlja ih u budućnost. Često se primjenjuju u modeliranju, no glavni je nedostatak da nisu dobra osnova za objašnjavanje kvalitativnih promjena, novosti i iznenađenja.

⁵ Swart et al. (2004) state that, from a methodological point of view, scenario authors can attempt to differentiate the likely outcomes of a range of expected trends, outline the implications of assumptions not chosen on the basis of likelihood (“what-if” analysis), or examine the feasibility and implications of desirable futures/risks and of undesirable ones (*backcasting*). Berkhout et al. (2002) find three categories of scenario exercises distinguished in the literature: extrapolatory/forecasting, normative/backcasting, and exploratory, where the extrapolatory take past trends and iterate them into the future. They are often used in modelling, but their chief disadvantage is that they do not serve as a good basis for explaining qualitative changes, or novelty and surprise.

b) Kvalitativni – kvantitativni scenariji

Uz opisanu podjelu na scenarije koji se temelje na mogućem i poželjnom razvoju učestala je podjela na kvalitativne i kvantitativne scenarije. Kvalitativni scenariji opisuju budući razvoj u obliku riječi, slika, dijagrama i fraza, a obično su sačinjeni od narativnih tekstova (Alcamo, 2001). Kvalitativni ili narativni scenariji prikladni su za analizu kompleksnih okolnosti s visokom razinom neizvjesnosti te kad se relevantne informacije ne mogu u potpunosti kvantificirati – primjerice one koje se odnose na ljudske vrijednosti, emocije i ponašanja (van Notten i dr., 2003). Kvantitativni scenariji pak obično se zasnivaju na formaliziranim računalnim modelima i pružaju numeričke informacije u obliku tablica, grafova i karata (Alcamo, 2001). Kvantitativno modeliranje često se upotrebljava za prediktivnu analizu, prikladnu za simuliranje dobro poznatih sustava u dovoljno kratkom razdoblju (Swart i dr., 2004). Računalni modeli upotrebljavaju se kao glavna sredstva istraživanja posljedica skupova pretpostavki, ali i kao alati za provjeru konzistentnosti razvijenih scenarija (Rotmans i dr., 2000).

Distinkcija kvalitativnih i kvantitativnih scenarija ponekad nije jasno prepoznatljiva – kvalitativni scenariji mogu biti izrađeni formaliziranim, gotovo kvantitativnim metodama (npr. Godet, 2000b), dok se kvantitativni mogu razviti dobivanjem numeričkih procjena od stručnjaka ili upotrebom semikvantitativnih tehnika (Alcamo, 2008). Osim toga upravo kombinacija kvalitativnih i kvantitativnih scenarija može biti najbolji način postizanja ciljeva scenarijske analize (Alcamo, 2008).⁶ U matematičkom su pristupu pretpostavke u modelima jasno izražene u obliku matematičkih izraza u odnosu na neverbalizirane pretpostavke iza kvalitativnih scenarija (Alcamo, 2001). Kod narativnog pristupa model je općenito implicitan

b) Qualitative – quantitative scenarios

Alongside the previously described classification of scenarios based on possible and desirable developments, classification into qualitative and quantitative scenarios is also common. Qualitative scenarios describe possible futures in the form of words, pictures, diagrams, and phrases, but most commonly they are made up of narrative texts (Alcamo, 2001). Qualitative or narrative scenarios are suited to the analysis of complex situations with high levels of uncertainty and when relevant information cannot be entirely quantified – such as information relating to human values, emotions, and behaviour (van Notten et al., 2003). Quantitative scenarios are usually based on formalised computer models and provide numerical information in the form of tables, graphs, and maps (Alcamo, 2001). Quantitative modelling is often used for predictive analysis, appropriate for simulating well-known systems over sufficiently short times (Swart et al., 2004). Computer models are used as a central means in exploring the future consequences of sets of assumptions, and also as tools to check the consistency of the developed scenarios (Rotmans et al., 2000).

The distinction between qualitative and quantitative scenarios is often not clearly visible – qualitative scenarios can be constructed using formalistic, almost quantitative methods (e.g. Godet, 2000b), while quantitative scenarios can be developed by soliciting numerical estimates from experts or by using semi-quantitative techniques (Alcamo, 2008). In fact, a combination of qualitative and quantitative scenarios can be the best way of achieving the goals of a scenario analysis (Alcamo, 2008).⁶ In the mathematical approach, assumptions in models are written down in the form of model equations unlike the non-verbalised assumptions behind qualitative scenarios (Alcamo, 2001). In the narrative approach, the model is generally implicit in the

⁶ U tom smislu Kemp-Benedict (2004) važnom smatra interakciju kvalitativnih i kvantitativnih pristupa u izradi scenarija. Scenarijski modeli trebaju odražavati „kompleksnost” i „kompliciranost”. „Kompleksnost” proizlazi iz međupovezanosti različitih komponenata određenoga sustava i treba se odražavati u kvalitativnim scenarijskim tehnikama, odnosno narativnim tekstovima. „Kompliciranost” proizlazi iz velikog broja čimbenika koje treba imati na umu (akteri, resursi, društveno-ekonomski odnosi koji mogu utjecati na scenarij i dr.) i najbolje se obuhvaća putem kvantitativnih, osobito računalnih modela.

⁶ In this sense, Kemp-Benedict (2004) argues for the interaction between the qualitative and quantitative contributions in scenario construction. Scenario models should represent ‘complexity’ and ‘complicatedness’. ‘Complexity’ arises from the inter-relatedness of different components of a system, and should be reflected in qualitative scenario techniques, i.e. narratives. ‘Complicatedness’ arises from many factors, which must be kept in mind (actors, resources, socio-economic relationships that can influence a scenario, etc.), and is best tackled with quantitative, especially computer models.

u obliku narativnog teksta koji odražava zajednički mentalni model svojih autora. Izazov je kombinirati narativne tekstove s matematičkom analizom na način koji se zasniva na snagama obaju pristupa (Kemp-Benedict, 2004).

c) Stručni – participativni scenariji

Osim podjele temeljene na polazištu scenarija, obuhvaćanju vrijednosti i interesa i zasnovano-
sti na kvantitativnim ili kvalitativnim podacima Rotmans i dr. (2000) scenarije su podijelili i s obzirom na uključenost dionika – na participativne i stručne scenarije (tab. 1). Prednost kvalitativnih scenarija jest mogućnost istovremenog predstavljanja gledišta više različitih dionika i stručnjaka te razumljiv način prenošenja informacija o budućnosti. Stručnjaci su u pravilu pojedinci s ekspertizom relevantnom za izradu scenarija, a dionici su pojedinci ili organizacije zainteresirani za ishode scenarija (Alcamo, 2001). Težnja prema upotrebi participativnih metoda za izradu scenarija sve je izraženija jer raznolike skupine dionika s različitim znanjem, stručnošću i gledištima pružaju veće bogatstvo scenarijima (Rotmans i dr., 2000). Osim uključivanja znanja izvan grupe izravno uključenih stručnjaka, participacija može pridonijeti i boljoj prilagođenosti scenarija potrebama korisnika (van Vuuren i dr., 2012).

d) Osnovni – upravljački scenariji

Osnovni scenariji predstavljaju buduće stanje u kojemu mjere izravno vezane uz glavnu temu scenarija ne postoje ili nemaju zamjetnog utjecaja, dok upravljački scenariji upravo odražavaju buduće učinke mjera upravljanja (Alcamo, 2001). Osnovni scenariji tako se tipično upotrebljavaju kao referentni scenariji za ispitivanje učinkovitosti različitih upravljačkih scenarija (van Vuuren i dr., 2012).

Određeni autori naglašavaju i važnost izrade više osnovnih scenarija, od kojih bi svaki počivao na različitim pretpostavkama o razvoju i odražavao različite trendove (Hourcade i Robinson, 1996; Alcamo, 2001).

e) Ostali tipovi scenarija

Među ostalim tipovima valja istaknuti scenarije koji su vezani uz određene teme i arhetipove,

form of the narrative, which reflects the common mental model of its authors. The challenge lies in combining narratives with mathematical analysis in a way that uses the strengths of both approaches (Kemp-Benedict, 2004).

c) Expert – participatory scenarios

Apart from the categorisation of scenarios based on the scenario's starting point, whether or not they take values and interests into account as well as foundation in quantitative or qualitative data, Rotmans et al. (2000) also classify scenarios on the basis of stakeholder involvement – into participatory and expert scenarios (Tab. 1). The advantage of qualitative scenarios is the possibility of representing the views of several different stakeholders and experts at the same time, as well as communicating information about the future in an understandable way. Experts are generally individuals with the expertise needed to construct the scenarios, while stakeholders are individuals or organisations with a special interest in the outcome of scenarios (Alcamo, 2001). There is an increasing tendency towards the use of participatory methods for designing scenarios, given that diverse groups of stakeholders with different knowledge, expertise and perspectives provide a greater richness to scenarios (Rotmans et al., 2000). Besides using knowledge from outside of the group of directly involved experts, participation can ensure that scenarios are better targeted to the user needs (van Vuuren et al., 2012).

d) Baseline – policy scenarios

Baseline scenarios present the future state in which policies connected to the main theme of scenarios either do not exist or do not have a discernible influence, while policy scenarios focus on depicting the future effects of certain policies (Alcamo, 2001). Baseline scenarios are typically used as references for exploring the impact of policy intervention compared to the baseline (van Vuuren et al., 2012).

Some authors stress the importance of developing multiple baseline scenarios, which would be based on different assumptions about development patterns and reflect different trends (Hourcade and Robinson, 1996; Alcamo, 2001).

e) Other types of scenarios

Among other types, scenarios connected with cer-

odnosno specifične završne vizije. Tako scenariji mogu biti eksplicitno optimistični ili pesimistični, te odražavati arhetipove poput kontinuiranog rasta, kraha i stagnacije⁷ te usmjerenosti na liberalizaciju tržišta, očuvanje okoliša i dr. (Inayatullah, 2008; Rothman, 2008). Coates (2000) smatra da je neparan broj scenarija s najboljim, najgorim i najvjerojatnijim slučajem manjkav zbog naginjanja prihvaćanju srednjeg slučaja, ali i podcjenjivanja važnosti različitih varijanti budućeg razvoja.

Metoda scenarija u istraživanju i planiranju prostora

Raširenost i obilježja upotrebe metode scenarija

Izrada scenarija u kontekstu istraživanja i planiranja prostora široko je rasprostranjena i prisutna u različitim europskim i drugim svjetskim državama te na različitim prostornim razinama. To je vidljivo iz prikaza svrhe, postupka i izrađenih scenarija u odabranim primjerima (tab. 2 i tab. 3). Svrha izrade scenarija vezana je uz sagledavanje postojećih trendova razvoja u prostoru, promišljanje mogućih i poželjnih smjerova budućeg razvoja, postavljanje kvalitetne osnove za donošenje odluka u prostornom planiranju te razradu strategija radi postizanja postavljenih planerskih ciljeva. Krawczyk i Ratcliffe (2005) navode da studiji budućnosti općenito mogu pružiti nove, sustavne, maštovite i inovativne pristupe promišljanju mogućih, vjerojatnih i poželjnih urbanih budućnosti koji mogu pomoći planerima, donositeljima odluka i lokalnoj zajednici. Scenariji potiču maštu unutar racionalnog procesa analize (Masini i Vasquez, 2000). Vrijednost scenarija ne počiva u njihovoj sposobnosti predviđanja budućnosti, već u sposobnosti pružanja uvida u sadašnjost, prepoznavanju više i manje izraženih promjena po-

tain topics and archetypes, namely specific end-visions, should be mentioned. Such scenarios can be explicitly optimistic or pessimistic, and reflect archetypes such as continued growth, collapse, and steady state,⁷ and can be focused on market liberalisation, environmental protection etc. (Inayatullah, 2008; Rothman, 2008). Coates (2000) finds deficient an odd number of scenarios with a best case, a worst case, and a most likely case with regard to the tendency to drive towards accepting the central one but also because it underestimates the importance of alternative future developments.

Scenario method in spatial research and planning

Range and characteristics of the usage of the scenario method

Scenario development in the context of spatial research and planning is widely spread and present in many countries in Europe and around the world, and at different spatial levels. This is visible from the purpose, process of construction, and constructed scenarios from the selected examples (Tab. 2 and Tab. 3). The purpose of scenario development is connected to analysing current trends in spatial development, considering possible and preferable future development paths, setting a sound foundation for decision-making in spatial planning, and developing strategies in order to achieve set planning goals. Krawczyk and Ratcliffe (2005) state that future studies in general can provide a fresh, systematic, imaginative, and innovative approach for the examination of possible, probable and desirable urban futures, which can help planners, decision-makers, and local communities. Scenarios stimulate imagination within the rational process of analysis (Masini and Vasquez, 2000). The value of scenarios does not lie in their capacity to predict the future, but in their ability to provide insights into the present, identifying stronger and weaker signals of change potentially

7 Inayatullah (2008) među modelima izrade scenarija izdvaja onaj Jamesa Datora s oblikovanjem scenarijskih arhetipova – kontinuirani rast, krah, stagnacija i preobrazba; ali i model Petera Schwartz iz *Global Business Networka* s najboljim i najlošijim slučajem, iznenađujućom budućnošću i nastavkom trendova.

7 Among the models of scenario construction, Inayatullah (2008) shows James Dator's method of articulating scenario archetypes – continued growth, collapse, steady state, and transformation; and also the model of Peter Schwartz from *Global Business Network* with best case, worst case, outlier, and business as usual scenarios.

tencijalno važnih za budući razvoj i razmatranju implikacija tih promjena (Rotmans i dr., 2000).⁸ Osobito kvalitativni scenariji mogu uključiti nelinearnosti, povratne veze i iznenađenja, lakše nego kvantitativni scenariji ili modeli (Kok i dr., 2006a). Povezano s tim, Rotmans i dr. (2000) istaknuli su nedostatke mnogih postojećih scenarija: nekonzistentnost postavki za različite sektore, regije i pitanja, netransparentnost ključnih postavki, implicitnih sudova i preferencija, nedovoljnu raznovrsnost i manjak maštovitosti.

Izrada scenarija povezana je s integralnim pristupom prostornom razvoju, uključujući urbani i ruralni razvoj, ali i s regionalno i lokalno specifičnim temama u prostornom uređenju, poput primjerice utjecaja izraženoga turističkog razvoja, važnosti brdsko-planinske poljoprivrede ili degradacije zemljišta. Tako su scenariji izrađeni za portugalsku regiju Algarve povezani s turističkim razvojem, urbanizacijom, razvojem infrastrukture te kapacitetom nosivosti obalnih područja (Petrov i dr., 2009; de Noronha Vaz i dr., 2012). Na nacionalnoj razini Lowe i Ward (2009) prepoznali su sa socijalnogeografskog motrišta prevladavajuće trendove razvoja u ruralnim područjima Engleske i Walesa pa ih projicirali u budućnost putem modeliranja; razvijanjem scenarija željelo se potaknuti raspravu o ruralnim budućnostima. U projektu ÖROK-a (n. d.) pak izrađeni su scenariji prostornog razvoja Austrije. Prema Bartholomew (2007), mnoga metropolitanska područja u SAD-u u posljednja dva desetljeća primjenjuju tehnike opisivanja budućnosti svojih zajednica; često jedan od oblika scenarijskog planiranja za kvantitativno vrednovanje nekoliko inačica razvoja, i analizu njihovih učinaka na različite indikatore (od cijene stanovanja do kvalitete vode). Özkaynak (2008) pokazala je na primjeru grada Yalova u Turskoj kako izrada i analiza scenarija mogu pomoći urbanom planiranju i upravljanju manjim do srednje velikim gradovima. Scenariji su potpora donošenju

important for future developments, and unfolding the implications of those changes (Rotmans et al., 2000).⁸ Qualitative scenarios in particular can more readily include non-linearities, feedbacks, and surprises than quantitative scenarios or models (Kok et al., 2006a). In relation to this, Rotmans et al. (2000) listed a number of deficiencies of many of the currently existing scenarios: inconsistent sets of assumptions made for different sectors, regions, or issues; lack of transparency in key assumptions, underlying implicit judgements and preferences, and a lack of diversity and imagination.

Scenario construction is connected to the integral approach to spatial development, including urban and rural development, but also to regionally and locally specific topics in spatial planning, such as the influence of more prominent tourist development, the significance of agriculture in mountainous areas, or land degradation. Scenarios developed for the Portuguese Algarve region were connected to tourist development, urbanisation, infrastructural development, and the carrying capacity of coastal areas (Petrov et al., 2009; de Noronha Vaz et al., 2012). At the national level, Lowe and Ward (2009) identified the dominant trends of development in rural areas of England and Wales from a socio-geographical perspective, and projected them forward through modelling; the developed scenarios were to encourage a debate on rural futures. In the frame of ÖROK (n. d.) scenarios of spatial development of Austria were constructed. According to Bartholomew (2007), many metropolitan areas in the United States have engaged in a form of visioning in the last two decades to describe a future for their communities; often as a form of scenario planning to evaluate quantitatively several alternative development patterns and analyse their impacts along different indices (ranging from the affordability of housing to water quality). Using the example of Yalova in Turkey, Özkaynak (2008) showed how scenario building and analysis can contribute to small and medium-sized city planning and governance. Scenarios provide support in decision-making and in evaluating possible urban development paths from the economic, social, and en-

⁸ Prema Hasanu Ozbekhanu, društvo može odabrati jedan od četiri stava kada se suočava s budućnošću: 1) pasivni akter, koji prihvaća promjene bez preispitivanja, 2) reaktivni akter, koji reagira kad se „alarm već oglasi“, 3) preaktivni akter, koji se na vrijeme priprema za nadolazeće promjene i 4) proaktivni akter, koji djeluje prema ostvarenju željenih promjena (Godet i Durance, 2011).

⁸ According to Hasan Ozbekhan, humanity can choose among four attitudes when faced with the future: 1) the passive actor, who accepts change without challenging it; 2) the reactive actor, who waits for the alarm to sound to react; 3) the pre-active actor, who prepares for foreseeable changes; and 4) the proactive actor, who acts to provoke desirable change (Godet and Durance, 2011).

odluka i vrednovanju mogućih smjerova razvoja grada s ekonomskoga, društvenoga i okolišnoga gledišta te u odnosu na vrijednosti i očekivanja mnogostrukih dionika.

Na važnost integralnog pristupa, osobito u strateškom planiranju prostornog razvoja, upućuje i niz drugih primjera: Godet i Durance (2011) navode primjer studije u Baskiji, izrađene uz potporu DATAR-a i participaciju ključnih dionika u regiji, koja je vodila konceptu prostornog razvoja regije; Fernández Güell (2010) iznosi primjer izrade trend-scenarija za Madridsku regiju do 2025., kako bi se vrednovala održivost postojećeg modela razvoja; Van Berkel i dr. (2011) upotrebljavaju kvalitativne scenarije u vrednovanju mogućnosti i ograničenja različitih oblika ruralnog razvoja (primjer župe Castro Laboreiro u sjevernom Portugalu). U studiji „Osnove gospodarskog razvitka Grada Splita” (2003) SWOT analiza bila je temelj za definiranje vizije budućeg razvoja i odabir temeljnih strateških pitanja.⁹

O prostornoj razini i obilježjima prostora te pitanjima/temama kojima se scenariji bave ovisi koji se faktori i na koji način razmatraju. Rothman (2008) i Özkaynak (2008) navode glavne utjecajne faktore koji se izdvajaju i analiziraju u većini scenarijskih studija (demografski, ekonomski, društveni, znanstveni i tehnološki, institucionalni, kulturni i okolišni). Scenariji omogućuju povezivanje izoliranih informacija unutar zajedničkog okvira, ali i strukturirani pristup putem kojega se pojedinačni faktori mogu razmotriti u različitim okvirima (Shearer, 2005).

Scenariji su tematska i metodološka poveznica istraživanja u okviru znanosti o okolišu i prostornog planiranja. To se posebno odnosi na promišljanje održivog razvoja, procjene utjecaja na okoliš, zaštitu okoliša i istraživanje promjena zemljišnog pokrova i načina korištenja zemljišta.

environmental perspectives, in relation to values and expectations of multiple stakeholders.

Other examples also point to the importance of an integral approach, especially in the strategic planning of spatial development: Godet and Durance (2011) mention the Basque country study, performed with the support of DATAR and the participation of key stakeholders in the Basque region, which led to a territorial development schema; Fernández Güell (2010) gives the example of developing a trend scenario for the Madrid region in 2025 in order to evaluate the sustainability of the present development model; Van Berkel et al. (2011) use qualitative scenarios in evaluating the assets and constraints of different forms of rural development (with the example of the parish of Castro Laboreiro in northern Portugal). In a study under the title of “Foundation of the economic development of the City of Split” (2003), SWOT analysis was a baseline for defining the vision of future development and the choice of fundamental strategic issues.⁹

Factors that are analysed and the ways in which they are considered depend on the spatial level, the characteristics of the area in question, and the issues/topics the scenarios deal with. Rothman (2008) and Özkaynak (2008) list the most common driving forces selected and analysed in scenario studies (demographic, economic, social, scientific and technological, institutional, cultural, environmental). Scenarios enable the relation of isolated pieces of information within a single framework, and also a structured approach by which individual factors can be considered across different frameworks (Shearer, 2005).

Scenarios are thematic and methodological links between research undertaken in the frame of environmental science and spatial planning. These especially concern considerations on sustainable development, environmental assessments, environmental protection and the research of land-use and land-cover change. In the context of sustainable de-

⁹ Uži istraživački tim Ekonomskog fakulteta u Splitu definirao je scenarij poželjne budućnosti gospodarskog razvoja Splita, a zatim u suradnji sa širom radnom skupinom predložio razvojne programe i projekte od posebne važnosti. Uključen je bio niz stručnjaka te predstavnika javnih i privatnih institucija. Posebno uska suradnja ostvarena je s nositeljima izrade prostornoplanske dokumentacije.

⁹ The research team from the Faculty of Economics in Split defined the scenario of a preferable future of the economic development of Split. Following this, and in co-operation with a wider working group, the team proposed development programmes and projects of special significance. A number of experts and representatives of public and private institutions were included. The co-operation was especially close with those responsible for the development of spatial planning documents.

Tab. 2. Pregled odabranih primjera scenarija u europskim državama

Izvor/ prostor/ vremenski okvir	Svrha izrade scenarija
	Postupak izrade scenarija
	Izrađeni scenariji
Tress i Tress, 2003/ Kravlund (Danska)/ 2020.	Testiranje strategije participacije dionika u planiranju u ruralnim područjima.
	Kroz prevagu pojedinih načina korištenja zemljišta određeni su i kartografski/slikovno predočeni ekstremni scenariji. Predstavljani su dionicima kako bi se kroz raspravu i putem upitnika prepoznali njihovi interesi.
	Ekstremni scenariji pokazali su prevagu sljedećih načina korištenja zemljišta: intenzivirana industrijalizacija poljoprivrede, rekreacija i turizam, zaštita prirode i povećanje stambenog fonda.
de Nijs i dr., 2004/ Nizozemska/ 2030.	Vrednovanje utjecaja socio-ekonomskih i demografskih scenarija na prirodu i pejzaž.
	Scenariji se naslanjaju na SRES scenarije Međuvladina panela o promjeni klime izrađene na svjetskoj razini. Elementi tematskih analiza sintetizirani su u integrirane prostorne scenarije. Za izradu detaljnih karata načina korištenja zemljišta na temelju scenarija i dodatnih pokazatelja promjene načina korištenja zemljišta primijenjen je model staničnih automata Environment Explorer.
	Integrirani scenariji jesu „Individualni svijet”, „Individualna regija”, „Kooperativni svijet” i „Kooperativna regija”, s razlikama u pristupu poljoprivrednom tržištu i zoniranju te načinu korištenja zemljišta.
Kok i dr., 2006b/ Guadalentín (Španjolska) i Val d’Agri (Italija)/ 2030.	Istraživanje promjene načina korištenja i degradacije zemljišta s naglaskom na participativni razvoj scenarija u sklopu projekta MedAction.
	U razvijanju lokalnih scenarija kao okvir služili su prije izrađeni scenariji za europsku i mediteransku razinu. Na radionicama s dionicima primijenjena je eksplorativna metodologija i potom retrognozirane, uz identificiranje mogućih mjera upravljanja.
	Izrađeno je više kvalitativnih scenarija.
Walz i dr., 2007/ Davos (Švicarska)/ 2050.	Istraživanje mogućih ekonomskih i promjena načina korištenja zemljišta kao rezultat manjih subvencija za brdsko-planinsku poljoprivredu i liberalizacije tržišta; razmatranje metodoloških implikacija kombinacije participativnog pristupa i integriranoga numeričkog modeliranja.
	Pomoću radionica s lokalnim akterima razvijene su matrice utjecaja, sistemski grafovi i tablice s opisom razvoja elemenata važnih za razvoj regije te ocrtni koherentni kvalitativni scenariji. Kvalitativna razrada scenarija bila je osnova za razradu ulaznih parametara za numeričku simulaciju. Parametri su kvantificirani uz pomoć iscrpnog pregleda literature. Te vrijednosti upotrijebljene su u integriranome modelu ALPSCAPE za simuliranje scenarija i doradu narativnih opisa.
	Znatnim smanjenjem subvencija za brdsko-planinsku poljoprivredu porast će cijene poljoprivrednih proizvoda. Scenarij A pretpostavlja porast potražnje za lokalnim proizvodima unatoč porastu cijena proizvoda, dok Scenarij B pretpostavlja snažno smanjivanje potražnje. Model korištenja zemljišta ukazao je na veliki utjecaj obaju scenarija na pejzaž, s više od 1700 ha zapuštenog zemljišta tijekom pedeset godina.
Petrov i dr., 2009/ Algarve (Portugal)/ 2020.	Analiza utjecaja turizma na promjene načina korištenja zemljišta u ovisnosti o mjerama za razvoj turizma te ispitivanje implikacija za prostorno planiranje.
	Nakon kontekstualnog razmatranja razvoja regije i procesa planiranja te analize različitih pokazatelja izrađena je matrica kvalitativnih scenarija temeljenih na stanovništvu, gospodarstvu i odnosu prema planiranju. Ključne postavke o stanju, trendovima razvoja i različitim aktivnostima u kvalitativnim opisima predstavljene su s jednim ili više parametara u modelu MOLAND za simulaciju urbanih i regionalnih scenarija, radi vrednovanja mjera i programa s teritorijalnim učinkom.
	Scenariji „Trend scenarij”, „Raspršeni razvoj” i „Kompaktni razvoj” temeljeni su na dvama glavnim faktorima budućeg načina korištenja zemljišta na NUTS 3 razini: a) priljevu stanovništva i b) ekonomskom razvoju. Povećanje površine izgrađenog zemljišta izračunato je u ovisnosti o promjenama broja stanovnika, BDP-a i rasta u proizvodnom i uslužnom sektoru (upotrijebljen je i makroekonomski model).
Williams i dr., 2009/ Austrija/ 2030.	Projekt ÖROK-a trajao je od 2007. do 2009. s ciljem izrade scenarija prostornog razvoja.
	Projektini tim (vanjski stručnjaci) i radna skupina ÖROK-a (predstavnici državne uprave) definirali su prostorno relevantne teme za izradu tematskih/sektorskih scenarija. Uglavnom kvalitativni tematski scenariji definirani su na temelju trendova i mogućih načina razvoja glavnih faktora utjecaja te doradeni kroz diskusije na radionicama sa stručnjacima. Scenarijski tim izradio je četiri integrirana prostorna scenarija, raspravljena na dodatnoj radionici i potom predstavljena (uz raspravu o preporukama/posljedicama) na konferenciji za donositelje odluka u prostornom planiranju i regionalnom razvoju. Definirani su i indikatori za praćenje promjena glavnih faktora utjecaja kako bi se bolje anticipirali dugoročni trendovi razvoja.
	Integrirani prostorni scenariji jesu ekstremni scenariji s ciljem razvijanja učinkovitih mjera koje se mogu nositi s promjenama postojećih razvojnih trendova: „Sveukupni rast”, „Sveukupna kompeticija”, „Sveukupna sigurnost” i „Sveukupni rizik”.

Izvor/ prostor/ vremenski okvir	Svrha izrade scenarija
	Postupak izrade scenarija
	Izrađeni scenariji
Lowe i Ward, 2010/ Engleska i Wales/ 2024.	Istraživanje mogućeg razvoja ruralnih područja sa socijalnogeografskoga gledišta kako bi se potaknula rasprava o budućnosti (ma) ruralnog prostora; istraživanje načina na koji futurološke tehnike mogu zadovoljiti kriterije znanstvenosti.
	Na temelju analize društvenih i ekonomskih obilježja izrađena je tipologija ruralnih područja. Pomoću klaster analize dobiveno je sedam statistički značajnih klastera ili tipova ruralnih područja. Skup varijabli upotrijebljenih u tipologiji, pretvoren u dimenzije koje su predstavljale glavne faktore promjena, zajedno sa sedam tipova ruralnih područja, činio je matricu za model. Elementi matrice u daljnjem su postupku kalibrirani na temelju prosudbe stupnja utjecaja svake dimenzije na tipove područja. Upotrebom tehnike Monte Carlo za simulacije modela dobiveni su scenariji. Odabrani scenariji elaborirani su na radionici sa stručnjacima.
	Razrađeni su scenariji: „Potrošački ruralni prostor”, „Dobar život 21. stoljeća” te „Uspon rurbanoga”, s razlikama u demografskim i ekonomskim promjenama, zaštiti okoliša te režimu planiranja.
Celino i Concilio, 2010/ Regionalni park delte Po (Italija)/ -	Izrada scenarija kroz participativni pristup s motrišta okolišnoga prostornog planiranja, odnosno izrade dugoročnoga socijalnog i ekonomskog plana regionalnog parka.
	Proces scenarijskog planiranja počeo je unutar planerskog tima, a potom je parkovska agencija organizirala sastanak s akterima. Scenariji su strukturirani prema opisu problema kojima se bave, prepoznavanju područja intervencije i opisu intervencije.
	Unutar plana izrađeni su kratkoročno-srednjoročni scenariji, s hitnim intervencijama za zaštitu okoliša, te dugoročni, strukturirani scenariji sa skupinama intervencija. U preliminarnom planu identificirani su: 1) „Prema zajedničkoj viziji Parka”, 2) „Inovacija” i 3) „Mreža agencija i institucija”. Oni su dinamične vizije planiranih aktivnosti, uključenih aktera i mogućih učinaka tih aktivnosti; mogu se razvijati kroz proces planiranja te fazu implementacije.
Valbuena i dr., 2010/ Achterhoek (Nizozemska)/ 2020.	Analiza potencijalnih posljedica promjena egzogenih procesa (kao što su liberalizacija tržišta ili razvoj regionalnih tržišta) na endogene procese u ruralnom području.
	Primijenjeno je modeliranje pomoću agenata. Na temelju postojećih trendova i regionaliziranih verzija SRES scenarija analizirana su tri scenarija. Simulirani rezultati validirani su provođenjem nestrukturiranih intervjua s pet stručnjaka iz regije.
	Trend-scenarij odnosi se na nastavak sadašnjih trendova u regiji, dok scenariji A1 i B2 sagledavaju utjecaj liberalizacije, odnosno jače regionalizacije svijeta, na strukturu pejzaža.
Petrov i dr., 2011/ Regija Velikog Dublin (Irska)/ 2026.	Regionalno strateško planiranje i sagledavanje ključnih indikatora za vrednovanje mjera upravljanja. Povezivanje znanstvenika, dionika i donositelja odluka kako bi se razvili kvalitativni opisi i poboljšala simulacija modela.
	Tijekom ljetne škole i radionice znanstvenici i dionici izradili su četiri kvalitativna scenarija regionalnog razvoja. Oni su kvantificirani i „prevedeni” u parametre modela MOLAND radi izrade karata korištenja zemljišta 2026.
	„Trend-scenarij” te scenariji „Kompaktni razvoj/zaštita okoliša”, „Upravljana disperzija” i „Recesija” promatraju urbani razvoj u različitim inačicama širega razvojnog okvira.
de Noronha Vaz i dr., 2012/ Algarve (Portugal)/ 2020.	Potpore strateškom odlučivanju o regionalnom razvoju s motrišta održivosti te povezivanja kvalitativnog odlučivanja s kvantitativnim analitičkim pristupom.
	U izradi scenarija upotrijebljeno je multikriterijsko vrednovanje na temelju fizičkih, socio-ekonomskih i regionalnih obilježja, prioritiziranih pomoću analitičkoga hijerarhijskog procesa, što je vodilo izradi scenarija s različitim kvantifikacijom parova. Posrijedi je bio kvalitativni strukturni proces donošenja odluka, u kojem se ne kvantificira samo jedna najbolja odluka, već se okuplja niz različitih vrijednosti za donošenje odluka u određenom prostoru i vremenu. Ponavljanjima modela staničnih automata generiran je scenarij budućega urbanog rasta do 2020.
	Scenariji „Ekološki interes”, „Trend-scenarij” i „Ekonomski interes” predstavljaju moguće trendove korištenja zemljišta koji ovise o donošenju odluka i ekonomskom/poljoprivrednom razvoju te njegovu odnosu s turizmom.

Izvor: radovi i publikacije navedene u lijevom stupcu

S motrišta održivog razvoja Nijkamp i Vreeker (2000) iznose primjer analize razvojnih scenarija s obzirom na njihov utjecaj na indikatore održivosti (ekonomski, socijalni, demografski i okolišni indikatori) prostora regije Songkhla/Hat Yai u južnom Tajlandu. Prostorni planovi obično uključuju niz ciljeva vezanih uz okoliš i predlažu aktivnosti za upravljanje prirodnim resursima,

development, Nijkamp and Vreeker (2000) describe the example of development scenarios analysis in relation to their influences on sustainability indicators (economic, social, demographic, and environmental) in the Songkhla/Hat Yai region in southern Thailand. Spatial plans usually include a range of environmental targets and propose natural resource management actions for their achievement, which

Tab. 2 A review of selected examples from European countries

Source/ Area/ Time frame/	The purpose of scenario development
	The procedure of scenario development
	Developed scenarios
Tress and Tress, 2003/ Kravlund (Denmark)/2020.	Testing a strategy for stakeholder participation in planning in rural areas.
	Through predominance of specific land uses, extreme scenarios were defined and visualised by photorealistic design techniques. They were presented to stakeholders in order to identify their interests through a discussion and a questionnaire.
	Extreme scenarios showed the dominance of certain land uses: industrial farming, recreation and tourism, nature conservation, and residential expansion.
de Nijs et al., 2004/ The Netherlands/ 2030.	Evaluating the effects of socio-economic and demographic scenarios on nature and the landscape.
	The scenarios are related to SRES scenarios of the Intergovernmental Panel on Climate Change developed at the global level. Elements from thematic analyses were combined into integrated spatial scenarios. To construct detailed land-use maps on the basis of scenarios and additional indicators of land-use change, a cellular automata model – The Environment Explorer, was used.
	The integrated scenarios are “Individual World”, “Individual Region”, “Co-operative World”, and “Co-operative Region”, with differences in approach to agricultural markets, zoning, and land use.
Kok et al., 2006b/ Guadalentín (Spain) and Val d’Agri (Italy)/ 2030.	Exploration of land-use change and degradation, focusing on participatory scenario development within the MedAction project.
	To develop local scenarios, previously constructed scenarios for the European and the Mediterranean levels were used as boundary conditions. In the course of workshops with stakeholders, an exploratory forecasting methodology was employed, followed by a backcasting exercise, and an identification of possible policy measures.
	Multiple qualitative scenarios were constructed.
Walz et al., 2007/ Davos (Switzerland)/ 2050.	Researching possible economic and land-use changes resulting from decreasing subsidies for mountain agriculture and the liberalisation of markets; discussing the methodological implications of combining the role of participatory involvement and integrated numerical modelling.
	Impact matrices, system graphs, and scenario tables with descriptions of the evolution of elements important for regional development were constructed through workshops with local actors, and coherent qualitative scenarios drawn. Elaboration of qualitative scenarios was the basis for setting the input parameters for the numeric simulation. The parameters were quantified with the help of an in-depth literature review. These values were used in the ALPSCAPE integrated modelling framework to simulate the scenarios and enhance the storylines.
	With a considerable decline in subsidies for mountain agriculture, the price of agricultural products will rise. Scenario A assumes an increase in the demand for local products in spite of the rise in prices of the products, while Scenario B assumes that the demand will strongly reduce. The Land Use Allocation Model suggested strong impacts on the landscape for both scenarios, with over 1700 ha of abandoned land within the 50-year simulation period.
Petrov et al., 2009/ Algarve (Portugal)/ 2020.	An analysis of impacts of tourism on land-use dynamics in relation to different policies for tourism development, and consideration of the implications for spatial planning.
	Following contextual consideration of the development of the region and prior planning efforts, and an analysis of different indicators, a matrix of qualitative scenarios based on population, economy, and planning policy was developed. Key assumptions on the state and trends of development, and different activities in qualitative descriptions were linked to a parameter(s) in the MOLAND model for simulating urban and regional scenarios, for the evaluation of policies and programmes that have a territorial impact.
	The scenarios “Business-as-usual”, “Scattered Development” and “Compact Development” were based on two main driving forces for future land-use change at the NUTS 3 level: (a) population flux; (b) economic development. The growth of built-up areas was calculated proportionally to changes in population, GDP, and growth in the production and service sectors (a macroeconomic model was also used).
Williams et al., 2009/ Austria/ 2030.	The ÖROK project ran between 2007 and 2009, with the goal of generating spatial development scenarios.
	The scenario project team (external experts) and the ÖROK working group (representatives of government authorities) defined spatially relevant themes for the construction of thematic/sectoral scenarios. Predominantly qualitative thematic scenarios were defined on the basis of trends and possible developments of key driving forces, and completed through workshop discussions with experts. The scenario team developed four integrated spatial scenarios, discussed in an additional workshop, and presented later (including a discussion on recommendations/consequences) at a conference for decision-makers in spatial planning and regional development. Indicators for monitoring changes in relevant driving forces were defined in order to anticipate better long-term future developments.
	The integrated spatial scenarios are extreme scenarios with the goal of creating resilient policies that can cope with changes in current development trends: “Overall Growth”, “Overall Competition”, “Overall Security”, and “Overall Risk”.

Source/ Area/ Time frame/	The purpose of scenario development
	The procedure of scenario development
	Developed scenarios
Lowe and Ward, 2010/ England and Wales/ 2024.	Researching possible rural development from a socio-geographical perspective in order to encourage the debate on rural future(s); exploring how techniques used by futurologists might satisfy the criteria of scientific rigour.
	Based on an analysis of social and economic characteristics a typology of rural areas was developed. A cluster analysis produced seven statistically significant clusters or types of rural area. A list of change-drivers derived from variables used to construct the typology was set against the seven components of the typology to create a matrix for the model. Following this, the calibration of the matrix required judgement to be exercised on the degree to which each change-driver would impact on the different area types. The Monte Carlo procedure, used to run simulations of the model, resulted in a set of scenarios. The selected scenarios were examined at a workshop of invited experts.
	The following scenarios were created: "The Consumption Countryside", "The 21st-Century Good Life", and "The Rise of the Rurbs", with differences in demographic and economic change, environmental protection, and planning policies.
Celino and Concilio, 2010/ The Po Delta Regional Park (Italy)/ -	Constructing scenarios through a participatory approach in the context of environmental spatial planning, i.e. a construction of long-term social and economic plan of a regional park.
	The scenario planning process started from within the planning unit, and afterwards the park agency organised a meeting with actors. Scenarios were structured according to the description of the problem they addressed, identification of the fields of intervention, and description of interventions.
	Within the plan, short-medium term scenarios were constructed, with urgent interventions for the protection of the environment, and long-term, structured scenarios, with groups of interventions. In the preliminary plan the following scenarios have been identified: "1. Towards a collective vision of the Park"; "2. Innovation"; "3. Network of agencies and institutions". They are dynamic visions of planning activities, involved actors, and the possible impacts derived from these actions; they can evolve along the planning process and the implementation phase.
Valbuena et al., 2010/ Achterhoek (The Netherlands)/ 2020.	Analysing potential consequences of changes in the exogenous processes (such as market liberalisation or development of regional markets) on the endogenous process in a rural area.
	Agent-based modelling was used. Based on the current trends and on regionalised versions of the SRES scenarios, three different scenarios were analysed. Simulated results were validated through carrying out unstructured interviews with five experts of the region.
	Trend scenario envisions a continuation of the current trends in the region, while A1 and B2 scenarios explore the impacts of a more liberalised and a more regionalised world on landscape structure.
Petrov et al., 2011/ The Greater Dublin Region (Ireland)/ 2026.	Regional strategic planning and examining examples critical for policy evaluation purposes. Linking scientists, stakeholders and decision-makers to develop storylines and improve the model simulation.
	Four scenarios of regional development were produced by scientists and stakeholders during a summer school and workshop. They were quantified and translated into parameters of the MOLAND model to create land-use maps for 2026.
	"Business as usual", "Compact development/Environmental friendly", "Managed dispersed", and "Recession" examine urban development in alternative wider development frames.
de Noronha Vaz et al., 2012/ The Algarve (Portugal)/ 2020.	Support for strategic decision-making on development of the region having in mind sustainability and an integration of qualitative decision-making within a quantitative analytical approach.
	Multi-criteria Evaluation was used on the basis of physical, socio-economic, and regional characteristics, which were prioritised by means of an Analytical Hierarchy Process, which led to the design of scenarios with different pairwise quantification. This was a qualitative structural decision process which, rather than quantifying just one best decision, aggregates a range of different values balanced for decision-making in a specific space-time context. The iterations of the cellular automata model enabled generation of the future urban growth scenario for the year 2020.
	Scenarios "Ecological Interest", "Business as usual" and "Economic Interest" present possible land-use trends depending on decision-making and economic/agricultural development and its direct relation to tourism.

Source: papers and publications of authors referred to in the left-hand column

što zahtijeva bitne dugoročne promjene u korištenju i upravljanju zemljištem. Postupak integriranog procjenjivanja, kroz interdisciplinarnost i participativni pristup, osobito je prikladan za kvantifikaciju učinaka na okoliš pomoću niza budućih scenarija (Bryan i dr., 2011).

require substantial change in land use and management over the long term. Integrated assessment, through interdisciplinarity and a participatory approach, is especially suitable in quantifying the impacts on the environment under a range of future scenarios (Bryan et al., 2011).

Tab. 3. Pregled odabranih primjera scenarija u drugim svjetskim državama

Izvor/ prostor/ vremenski okvir	Svrha izrade scenarija
	Postupak izrade scenarija
	Izrađeni scenariji
Barbanente i dr., 2002/ grad Tunis (Tunis)/ 2020.	Studija slučaja u okviru projekta <i>Concerted Action</i> s ciljem analize međuovisnosti strukturnih promjena u poljoprivredi, migraciji iz ruralnih u urbana područja te razvoju Tunisa.
	Nakon intervjua s lokalnim dionicima i predstavljanja projekta, potom definiranja problema i selektiranja problemskih područja putem modificirane metode Delfi te provedene "radionice o budućnosti" u konačnici su razvijeni scenariji.
	Scenariji „Grad-toranj”, „Ekograd” i „Humani grad” za metropolitansku regiju Tunisa uključili su vizije, moguća ograničenja i probleme koje bi trebalo riješiti i strategije koje bi trebalo primijeniti radi ostvarivanja ciljeva.
Geneletti, 2012/ grad Caia (Mozambik)/ 2018.	Usporedba različitih mogućnosti prostornog planiranja s obzirom na učinke na okoliš.
	Pet mogućnosti prostornog planiranja razrađeno je u suradnji s planerskim timom. Scenariji budućeg korištenja zemljišta kartografski su vizualizirani prostornim modeliranjem u GIS-u. Upotrijebljen je sustav za planiranje „What if? TM ”.
	Scenariji su kartografski prikazi mogućih načina korištenja zemljišta s obzirom na kombinaciju prostornoplanskih mjera „P” (zoniranje i lokacija infrastrukture i usluga) i projekcija rasta broja stanovnika (niski, srednji i visoki rast).
Özkaynak, 2008/ grad Yalova (Turska)/ 2020.	Izrada i analiza scenarija kao doprinos planiranju i upravljanju gradom Yalova, odnosno potpora integriranom vrednovanju razvojnih strategija s ekonomskoga, društvenoga i ekološkoga gledišta. Povezivanje strukturnih utjecaja na svjetskoj i nacionalnoj razini s lokalnim faktorima i mogućnostima izbora društvenih aktera.
	Pregledom globalnih scenarijskih studija te relevantnih dokumenata i literature izdvojeni su glavni neizvjesni faktori na svjetskoj, regionalnoj i nacionalnoj razini. Slijedeći metodologiju „važnih faktora i važnih aktera” Bertranda i dr. iz 1999., predstavljene su četiri trajektorije za Yalovu i potom istraženi interesi i odnosi moći dionika te potencijalna uloga u njihovu oblikovanju. Provedeni su dubinski intervjui, fokus-grupe, radionice te anketno istraživanje. Prve verzije scenarija evaluirali su pripadnici akademske zajednice te su prezentirani na završnoj radionici na lokalnoj razini.
	Scenariji „Yalova unutar slobodnog tržišta”, „Yalova unutar socijalne Europe”, „Trend-scenarij u Yalovi” te „Interni orijentirana Yalova” temelje se na skupu postavki povezanih s ključnim neizvjesnim vanjskim faktorima: globalizacijom, EU-om i budućnošću socijalnih i mjera vezanih uz okoliš s jedne te odnosima Turske i EU-a s druge strane.
Pourebahim i dr., 2011/ okrug Kuala Langat (Malezija) -	Utvrđivanje optimalnog načina korištenja zemljišta za održivi razvoj obalnih područja.
	Analizirani su postojeći dokumenti i razvojne strategije te organizirane radionice sa stručnjacima na kojima su razrađeni kriteriji i indikatori korištenja zemljišta. Potom je izrađena baza podataka u ArcGIS-u. Scenariji su definirani i provedena je analiza prikladnosti različitih načina korištenja zemljišta.
	Korištenje zemljišta u trima scenarijima počiva na različitim čimbenicima održivog razvoja. Vrednovanjem scenarija, postojećih planova i smjernica, raspoloživosti zemljišta te postojećeg načina korištenja zemljišta predložen je optimalni plan za održivo korištenje zemljišta u obalnom području.
Thapa i Murayama, 2012/ dolina Katmandu (Nepal)/ 2050.	Prognoziiranje varijanti urbanog razvoja.
	Razvijen je model promjene korištenja zemljišta (umjetnih neuronskih mreža) na temelju daljinskih istraživanja, karata načina korištenja zemljišta, digitalnog modela reljefa te socioekonomskih pokazatelja. Simulacijama modela ispitane su varijante urbanog razvoja.
	Razmotreni su spontani scenarij, scenarij zaštite okoliša i scenarij očuvanja resursa.
Liu i dr., 2007/ dio urbane regije Wuhana (Kina)/ 2020	Razvoj integriranog GIS analitičkog sustava za upravljanje korištenjem zemljišta.
	Analizirani su podsustavi stanovništvo, gospodarstvo, postojeći način korištenja zemljišta i okoliš, identificirane su moguće promjene načina korištenja zemljišta, izrađen je, verificiran i validiran model te su izrađeni i sagledani scenariji.
	Prvi scenarij razmatra promjene korištenja zemljišta prema sadašnjim razvojnim trendovima, a drugi utjecaj lokalnog upravljanja na urbanizaciju i preinake ekonomske strukture.
Pettit i Pullar, 200-/ Zaljev Hervey (Australija)/ 2021.	Izrada i vrednovanje scenarija planiranja korištenja zemljišta te usporedba različitih tehnika planiranja u sklopu izrade doktorske disertacije.
	Scenariji planiranja razvijaju se na temelju planskih dokumenata i modeliraju pomoću modela disagregacije, linearnog programiranja i multikriterijske analize. Scenariji se vrednuju na temelju glavnih ciljeva navedenih u planskim dokumentima te doručuju kroz proces vrednovanja. U konačnici se formulira završni scenarij planiranja.
	Razrađeni su scenariji planiranja korištenja zemljišta: „Budući trendovi”, „Maksimiziranje zapošljavanja” i „Održivi razvoj”.

Izvor/ prostor/ vremenski okvir	Svrha izrade scenarija
	Postupak izrade scenarija
	Izrađeni scenariji
Bryan i dr., 2011/ regija Mallee (Australija) -	Dio analize „budućnosti pejzaža” radi boljeg donošenja odluka u strateškome regionalnom planiranju, prepoznavanjem koristi i troškova specifičnih prostornoplanskih mjera.
	Scenariji su izrađeni u suradnji s dionicima. Potom su upotrijebljene kvantitativne tehnike, povezivanje niza prostornih informacija i modela. Linearno programiranje pokazalo se osobito korisnim za regionalno planiranje, s obzirom na skup optimalnih ishoda temeljenih na jasno identificiranim ciljevima.
	Scenarijima se željelo ispitati kako promjene vanjskih faktora utječu na ostvarenje regionalnih ciljeva. Uz trend-scenarij, razmotreni su blago zagrijavanje/suša, umjereno zagrijavanje/suša te veliko zagrijavanje/suša. Analiza „budućnosti pejzaža” unutar različitih mogućnosti planiranja i scenarija omogućuje usporedbu relativnog utjecaja unutarnjih odluka (strateškoga prostornog planiranja) u odnosu na vanjske faktore (promjene klime i cijene energenata).
Sleeter i dr., 2012/ SAD (na nacionalnoj i razini 84 ekološke regije)/ 2100.	Razvoj metode prenošenja projekcija iz SRES scenarija na razinu ekoloških regija u SAD-u.
	Inicijalni narativni opisi izrađeni su prema mišljenjima stručnjaka i pregledom relevantne literature te rafinirani kroz kvantitativni postupak. U okvir modela inkorporirani su rezultati modela IMAGE 2.2, inventara promjena zemljišnog pokrova i načina korištenja zemljišta 1973. – 2000. te znanje stručnjaka, odnosno njihova interpretacija glavnih faktora promjena. Mišljenje stručnjaka dobiveno je putem radionice i potom ad-hoc konzultacija.
	Razrađena su dva globalna (A1B i B1) i dva regionalna (A2 i B2) scenarija, s razlikama primjerice u ekonomskom rastu i tehnološkom razvoju, demografskim i promjenama zemljišnog pokrova i načina korištenja zemljišta.

Izvor: radovi i publikacije navedene u lijevom stupcu

Scenariji na nižim prostornim razinama često se zasnivaju na scenarijima izrađenima na višim razinama. Tako su Sleeter i dr. (2012) prikazali metode i rezultate prenošenja globalnih SRES scenarija¹⁰ na razinu ekoregija u SAD-a. Pokazatelji promjena zemljišnog pokrova i načina korištenja zemljišta do kojih su došli konzistentni su s izvornim pretpostavkama globalnih scenarija, ali i lokalnim trendovima promjene zemljišnog pokrova i načina korištenja zemljišta. No Özkaynak i Rodríguez-Labajos (2010) upozoravaju da se scenariji koji se izrađuju na lokalnoj razini često prenose s viših razina, ili razvijaju unutar graničnih uvjeta svjetske i nacionalnih razina, bez temeljitog uzimanja u obzir lokalnih uvjeta. Sukladno tome, izrada scenarija lokalne razine koji dobro integriraju svjetske i nacionalne utjecaje s lokalnim faktorima i izborima aktera ostaje izazov (Özkaynak i Rodríguez-Labajos, 2010). Osim toga primjer projekta MedAction upozorio je na poteškoće u prenošenju rezultata lokalnih scenarija na više

Scenarios at lower spatial levels often rely on scenarios developed at higher levels. Sleeter et al. (2012) showed the methods and results of down-scaling global SRES scenarios¹⁰ to ecological regions of the conterminous United States. The found indicators of land-use and land-cover change were consistent with the original global scenario assumptions, and also with local scale land-use and land-cover change histories. However, Özkaynak and Rodríguez-Labajos (2010) warned that scenarios built at the local level are often downscaled from higher scales, or developed within the boundary conditions of global and national scales, without taking local conditions thoroughly into account. In accordance with this, constructing local-scale scenarios that integrate global and national influences well with local factors and actors' choices remains a challenge (Özkaynak and Rodríguez-Labajos, 2010). Furthermore, the example of the MedAction project pointed to difficulties in upscaling the results of local scenarios due to the small sample

10 Riječ je o scenarijima Međuvladina panela o promjeni klime izrađenima radi boljeg razumijevanja implikacija budućih klimatskih promjena diljem svijeta. Naslov izvještaja temeljenog na scenarijima u izvorniku je *Special Report on Emission Scenarios*, zbog čega su scenariji postali poznati kao SRES scenariji (Alcamo, 2001).

10 This concerns the scenarios of the Intergovernmental Panel on Climate Change developed in order to understand better the implications of future climate change throughout the world. The title of the report based on scenarios is *Special Report on Emission Scenarios*, and because of that the scenarios became known as SRES scenarios (Alcamo, 2001).

Tab. 3. A review of selected examples from other countries

Source/ Area/ Time frame/	The purpose of scenario development
	The procedure of scenario development
	Developed scenarios
Barbanente et al., 2002/ Tunis (Tunis)/ 2020.	A case study within the <i>Concerted Action</i> project, with the objective of making an analysis of the interdependency between structural changes in agriculture, subsequent migration from rural to urban areas and the growth of Tunis.
	Scenarios were developed following interviews with local stakeholders, presentation of the project, definition of the problems, selection of problem areas through a modified version of Delphi study, and a future workshop.
	Scenarios “Tower City”, “Eco City”, and “Human City” for Metropolitan Tunis included visions, possible constraints, and problems to tackle, and strategies to apply in order to accomplish set goals.
Geneletti, 2012/ Caia (Mozambique)/ 2018.	Comparison of the environmental effects of different spatial planning policies.
	Five different spatial plan policies were developed in collaboration with the planning team. Future land-use scenarios were generated through spatial modelling within a GIS. “What if?” planning support system was used.
	Scenarios are maps that represent future land uses under a combination of different spatial plan policies “P” (zoning regulations and location of infrastructure and services) and population growth projections (low, medium, and high).
Özkaynak, 2008/ Yalova (Turkey)/ 2020.	Scenario construction and analysis to contribute to planning and governance of the city of Yalova, i.e. to support integrated assessment of alternative development trajectories from economic, social and environmental perspectives. Integration of structural influences at global and national scales with local factors and choices of social actors.
	Various global scenario studies and relevant documents were reviewed, and main global, regional and national uncertainties recognised. Following a methodology called “shaping factors and shaping actors” (Bertrand et al., 1999), four trajectories for the city of Yalova were presented, and interests among various actors, the power networks, and their potential to become agents of change explored. In-depth interviews, focus groups, workshops, and a questionnaire survey were used. The resulting draft scenarios were evaluated by academics. The scenarios were presented at local level in the final workshop.
	Scenarios “Yalova within free markets”, “Yalova within social Europe”, “Business as usual in Yalova”, and “Inward-looking Yalova” are based on a set of assumptions associated with two key external uncertainties: globalisation, the EU, and the future of social and environmental policies on the one hand, and Turkey’s relations with the EU, on the other.
Pourebahim et al., 2011/ Kuala Langat District (Malaysia) -	Determining the optimal land-use suitability for future sustainable development in the coastal area.
	Existing documents and development strategies were analysed and workshops with experts conducted, in which criteria and indicators of land use were explored. Following this, a GIS database was developed. Scenarios were defined and a suitability analysis for different land uses conducted.
	Land use in three scenarios is based on different factors of sustainable development. By evaluating various scenarios, existing plans and guidelines, land availability and current uses, the optimum plan for sustainable coastal land uses was proposed.
Thapa and Murayama, 2012/ Kathmandu Valley (Nepal)/ 2050.	Predicting alternative urban growth allocations.
	A land-use change (artificial neural network) model was developed based on remote sensing, land-use maps, a digital elevation model, and socioeconomic indicators. Through model simulations, future spatial growth allocations were analysed.
	Three scenarios were analysed: spontaneous, environment-protecting, and resources-saving.
Liu et al., 2007/ the urban fringe of Wuhan City (China)/ 2020.	Developing an integrated GIS-based analysis system for supporting land-use management.
	Four subsystems were analysed: the population, economic, current land use, and environmental subsystems; potential land-use changes identified; a model constructed, verified, and validated; scenarios drafted and investigated.
	The first scenario predicts land-use changes under the present developmental mode, while the second one considers impacts of local policies on urbanisation, and modification of economic structure.
Pettit and Pullar, 200-/ Hervey Bay (Australia)/ 2021.	Developing and evaluating land-use scenarios, and comparing different planning techniques in the frame of a doctoral dissertation.
	Planning scenarios are developed on the basis of planning documents and modelled (a model of disaggregation, linear programming, and multiple criteria analysis are used). Scenarios are evaluated in relation to main objectives stated in planning documents and re-worked through the evaluation process. A final planning scenario is formulated at the end.
	The following land use scenarios were drafted: “Future Trends”, “Maximise Employment”, and “Sustainable Development”.

Source/ Area/ Time frame/	The purpose of scenario development
	The procedure of scenario development
	Developed scenarios
Bryan et al., 2011/ Mallee region (Australia)/-	A part of the landscape futures analysis to improve decision-making in strategic regional planning, by understanding the benefits and costs of specific planning policies.
	Scenarios were developed in co-operation with stakeholders. Following that, quantitative techniques, integration of a variety of detailed spatial information and models were used. The linear programming-based approach was found to be particularly useful for regional planning because it produces a set of optimal outcomes based on clearly identified objectives.
	Future scenarios were designed to assess how changes in external drivers affect the impacts of achieving regional targets. Besides a baseline scenario, mild, moderate, and severe warming/drying scenarios were considered. The assessment of landscape futures under different policy options and scenarios enables the comparison of the relative influence of internal decisions (strategic spatial policy options) versus external factors (changes in climate and commodity prices).
Sleeter et al., 2012/ USA (at the national level and the level of 84 ecological regions)/ 2100.	Developing methods to downscale projections from the SRES scenarios to ecological regions of the conterminous United States.
	Initial draft narratives were developed by using expert opinion and a review of relevant literature, and refined throughout the quantitative process. In the frame of a model the IMAGE 2.2. model outputs, the land-use and land-cover change 1973 – 2000 inventory, and expert knowledge (i.e. their interpretation of major driving forces of change) were incorporated. Expert knowledge was elicited through a workshop, followed by ad-hoc consultations.
	Two global (A1B and B1) and two regional (A2 and B2) scenarios were developed, with differences in e.g. economic growth and technological development, demographics and change in land use and land cover.

Source: papers and publications of authors referred to in the left-hand column

prostorne razine zbog malog uzorka i (ne)representativnosti te problema povezivanja različitih percepcija – dok su scenarije više razine izrađivali znanstvenici i dionici na regionalnoj i nacionalnoj razini, lokalne scenarije izrađivali su lokalni dionici (Kok i dr., 2006a; Kok i dr., 2006b).

size and (non)representability, as well as issues in merging different perceptions – while scenarios at upper levels were designed by scientists and stakeholders at regional and national levels, local scenarios were drafted by local stakeholders (Kok et al., 2006a; Kok et al., 2006b).

Scenariji prema tipovima

Analiza izloženih primjera pokazala je relevantnost prije izloženih osnovnih tipova scenarija: eksplorativnoga/normativnoga, kvalitativnoga/kvantitativnoga, stručnoga/participativnoga i osnovnoga/upravljačkoga karaktera. Pritom su u stvarnosti scenariji često kombinacije više „idealnih” tipova. Scenariji omogućuju povezivanje deskriptivnih i narativnih elemenata, odnosno kvalitativnih i kvantitativnih informacija (Swart i dr., 2004). Dio navedenih radova metodološki je usmjeren i posvećen upravo daljnjem razvoju pojedinih kvalitativnih i kvantitativnih tehnika izrade scenarija ili izazovima njihove integracije.

Općenito, narativni pristup uključuje važne kvalitativne čimbenike koji oblikuju razvoj kao što su vrijednosti, ponašanje i institucije, pružajući šire gledište u odnosu na samo matematičko modelira-

Scenarios in relation to types

The analysis of listed examples showed the relevance of the previously described basic types of scenarios: of explorative/normative, qualitative/quantitative, expert/participatory, baseline/policy character. In reality, scenarios are often combinations of several “ideal” types. Scenarios facilitate the integration of descriptive and narrative elements, and qualitative and quantitative information (Swart et al., 2004). Some of the analysed studies were methodologically focused and oriented toward further development of specific qualitative and quantitative techniques of scenario construction or toward challenges regarding their integration.

Generally, the scenario narrative includes important qualitative factors shaping development such as values, behaviours and institutions, which provide a broader perspective than the mathemat-

nje (Swart i dr., 2004). S druge strane, zbog ograničenja numeričkih modela kompleksnost sustava i raspon mogućih scenarija moraju se reducirati za simulaciju scenarija (npr. Walz i dr., 2007). Foa i Howard (2006) navode pak da scenarijskom planiranju često nedostaje metodološka specifičnost u tome što se oslanja na subjektivne analize dobivene putem radionica i konzultacija s dionicima više nego na kvantitativno modeliranje. Vezano uz opasnost od prevelike primjene neformalnih pristupa, Neumann i Øverland (2004) napominju: iako se budućnost ne može spoznati, to ne znači da metode koje se primjenjuju za razmatranje mogućnosti budućeg razvoja ne mogu počivati na znanstvenim standardima.

Rezultati kvantitativnih modela, primjerice modela promjene korištenja i namjene zemljišta, osjetljivi su na kvalitetu ulaznih podataka, strukturu modela i parametre modela (Verburg i dr., 2013). Dobri modeli nisu uvijek dostupni i potrebni su specijalizirani znanstvenici/stručnjaci za njihovu upotrebu ili interpretaciju rezultata (Alcamo, 2008). I iako su iscrpne računske procedure modela uglavnom presložene i teže razumljive nestručnjacima, njihova osnovna struktura, pretpostavke i ograničenja trebaju biti što eksplicitnije i jasnije navedeni (Klosterman, 2007; Alcamo, 2001). Vrlo su važni transparentnost pretpostavki o uzročnim odnosima u osnovi i kvalitativnih scenarija (mentalni modeli) i kvantitativnih scenarija (formalizirani modeli) te prihvatljiv stupanj znanstvene rigoroznosti u izradi scenarija (Alcamo i dr., 2006).

U izradi scenarija često sudjeluju dionici, ili imaju priliku utjecati na doradu i rafiniranje scenarija koje su izradili stručnjaci. Scenariji olakšavaju diskusiju planerskih opcija među skupinama dionika, stručnjacima i različitim razinama uprave (Shearer, 2005) te podupiru proces učenja za skupine i pojedince (Ringland, 2006). Multidisciplinarni su, multidimenzionalni i temeljeni na različitim iskustvima i osobnostima sudionika (Masini i Vasquez, 2000). Celino i Concilio (2010) opisuju izradu scenarija u sklopu izrade socijalnog i ekonomskog plana regionalnog parka koji obuhvaća deltu rijeke Po (Veneto), gdje su scenariji zamišljeni kao alati

ical modelling alone (Swart et al., 2004). On the other hand, given the limitations of numerical models and the complexity of the system, the range of possible scenarios has to be reduced for scenario simulation (e.g. Walz et al., 2007). Foa and Howard (2006), however, state that scenario planning often lacks methodological specificity, in that it relies upon subjective analyses produced through workshops and stakeholder consultation rather than upon quantitative modelling. Connected to the threat of overuse of informal approaches, Neumann and Øverland (2004) stress that although the future is unknowable, it does not follow that the methods used to discuss possibilities of future development cannot be held to scientific standards.

Quantitative model outcomes, such as land-use and land-cover change models, are vulnerable to uncertainty in input data, structural uncertainties in the model and uncertainties in model parameters (Verburg et al., 2013). Good models are not always available and specialised personnel are needed to run them or interpret their output (Alcamo, 2008). And although the model's detailed computational procedures are generally too involved for non-experts to understand, their underlying structure, assumptions, and limitations should be as explicitly and clearly stated as possible (Klosterman, 2007; Alcamo, 2001). The transparency of assumptions on causal relationships at the foundation of both qualitative (mental models) and quantitative (formalised models) scenarios is of great importance, as is an appropriate degree of scientific rigour in scenario construction (Alcamo et al., 2006).

Stakeholders are often included in the process of scenario development, or alternatively they can influence the refinement of scenarios previously constructed by experts. Scenarios facilitate the discussion of planning options across stakeholder groups, professional disciplines, and levels of management (Shearer, 2005), and support the process of learning for groups and individuals (Ringland, 2006). They are multidisciplinary, multidimensional, and drawn from different experiences and personalities (Masini and Vasquez, 2000). Celino and Concilio (2010) describe scenario development in the course of Social and Economic Plan development of the regional park in the area of the Po delta (Veneto), where scenarios were conceived as a means to

koji bi osigurali kontinuirani angažman mnogih aktera, jer su akteri koji izrađuju scenarije upravo oni koji primjenjuju zamisli, donose odluke i poduzimaju akcije. No, kao što je pokazalo iskustvo Barbanente i dr. (2002) na izradi scenarija u Tunisu, odabir i uključivanje važnih dionika u proces mogu biti vrlo teški, zbog indiferentnosti dionika prema ciljevima projekta ili nepovjerenja prema njegovoj korisnosti, nepoznavanja metodologije, nenaviknutosti na participativni proces te osobito nevoljkosti dionika da iznesu mišljenje o delikatnim pitanjima. U skladu s tim Rotmans i dr. (2000) napominju da pridavanje veće važnosti participativnom pristupu ne znači da će biti lako doista i uključiti dionike. Alcamo i dr. (2006) smatraju da valja raditi na većoj relevantnosti scenarija za korisnike, kreativnosti razmišljanja i vjerodostojnosti scenarija, između ostaloga i u smislu unutarnje logike, konzistentnosti i koherentnosti. Transparentnost scenarija, koja podrazumijeva da korisnik scenarija razumije što je učinjeno u izradi scenarija i korake u izradi te vjeruje da bi mogao ponoviti proces i da bi se pri ponavljanju došlo do sličnih rezultata, povećava kredibilnost scenarija (Coates, 2000).

Zaključak

Na temelju analize tipologija scenarija izdvojeni su osnovni tipovi scenarija relevantni u istraživanju i planiranju prostora: a) eksplorativni, deskriptivni, prognozirajući – normativni, anticipativni, retroprognozirajući scenariji, b) kvalitativni – kvantitativni, c) stručni – participativni, d) osnovni – upravljački scenariji te e) ostali tipovi scenarija. Analiza odabranih primjera upotrebe metode scenarija u istraživanju i planiranju prostora pokazala je sljedeće:

1) Metoda scenarija u širem kontekstu prostornoga uređenja prisutna je u različitim svjetskim državama i prostornim razinama: nacionalnoj, regionalnoj i lokalnoj.

2) U pravilu se izrada scenarija temelji na analizi komponenata urbanog i ruralnog, odnosno integralnog razvoja uopće, vrednovanju više varijanti mogućega budućeg razvoja i postavljanju

assure the continuous engagement of multiple factors, given that the actors who construct scenarios are the same as the ones who implement ideas, make decisions and take actions. However, as shown by the experience of Barbanente et al. (2002) in scenario construction in Tunis, the selection and involvement of key stakeholders in the process can be very difficult, either because of indifference on the part of the stakeholders towards the goals of the project or uncertainty about its usefulness, the unfamiliar approach that was used, the fact that many would-be participants were unaccustomed to participatory procedures, and especially the reluctance of stakeholders to reveal their opinions on delicate issues. In accordance with this, Rotmans et al. (2000) notice the increasing importance of participation does not mean it is easy actually to include stakeholders. Alcamo et al. (2006) argue for working on the greater relevance of scenarios for users; creativity of thinking; credibility of scenarios, among other things also in the sense of internal logic, consistency, and coherence. Transparency of scenarios, meaning that the scenario user understands what was done during scenario development, understands the steps in the development, believes that he/she could duplicate the process and that having duplicated it similar results would occur, builds greater credibility in the scenario (Coates, 2000).

Conclusion

On the basis of an analysis of scenario typologies, underlying scenarios relevant in spatial research and planning were recognised: a) explorative, descriptive, forecasting – normative, anticipatory, backcasting; b) qualitative – quantitative; c) expert – participatory; d) baseline – policy; and e) other types of scenarios. The analysis of selected examples of the scenario method used in spatial research and planning showed the following:

1. The scenario method in the wide context of spatial planning exists in different countries on different spatial levels: national, regional, and local;

2. As a rule, scenario construction is based on analysis of components of urban and rural, or integral development, and evaluation of alternatives of possible future developments, combined

čvrstih temelja strategija i specifičnih mjera planiranja i upravljanja.

3) Metoda scenarija povezana je s integralnim pristupom prostornom razvoju, ali i regionalno i lokalno specifičnim temama. O prostornoj razini i obilježjima prostora te pitanjima/temama kojima se scenariji bave ovisi koji se faktori i na koji način razmatraju u procesu razvijanja scenarija.

4) Scenariji su tematska i metodološka poveznica istraživanja u okviru znanosti o okolišu i prostornog planiranja, što se posebno odnosi na promišljanje održivog razvoja, procjene utjecaja na okoliš, zaštitu okoliša i istraživanje promjena zemljišnog pokrova i načina korištenja zemljišta.

5) Scenariji na nižim prostornim razinama često se zasnivaju na scenarijima izrađenima na višim razinama.

6) U izloženim primjerima zastupljeni su tipovi scenarija eksplorativnoga/normativnoga, kvalitativnoga/kvantitativnoga, stručnoga/participativnoga i osnovnoga/upravljačkoga karaktera, što pokazuje relevantnost izdvojene tipologije u istraživanju i planiranju prostora.

Korisnost metode scenarija u istraživanju i planiranju prostora proizlazi tako i iz samoga procesa izrade, koji podrazumijeva povećanje znanja o razvojnim trendovima i prostornim elementima za sve koji su uključeni u proces, te konačnoga produkta, koji može voditi konkretnim strategijama i mjerama upravljanja. Potrebno je planirati i djelovati s motrišta različitih mogućih budućnosti.

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to provide a firm ground for strategies and specific planning and policy measures;

3. The scenario method is connected to the integral approach to spatial development, but also to regionally and locally specific topics. The selection and approach to factors considered in the scenario development process depends on the spatial level, characteristics of areas in question, and main topics/issues in scenarios;

4. Scenarios are thematic and methodological links between environmental science research and spatial planning. These especially concern topics such as sustainable development, environmental assessments, environmental protection, and research of land-use and land-cover change;

5. Scenarios at lower spatial levels are often based on scenarios constructed for higher levels;

6. The selected examples encompassed types of scenarios of the explorative/normative, qualitative/quantitative, expert/participatory and baseline/policy characters, which shows the relevance of the described typology in spatial research and planning.

The usefulness of the scenario method in spatial research and planning stems from the process of scenario development, which includes an increase in the knowledge base regarding development trends and spatial elements for everyone included in the process, and the final product, which can lead to concrete strategies and policy measures. It is necessary to plan and act in the context of multiple possible futures.

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