



8 HOW MIGHT ECOSYSTEMS AND THEIR SERVICES CHANGE IN SPAIN UNDER PLAUSIBLE FUTURE SCENARIOS?

The necessity of a long view

KEY FINDINGS

- The results of future scenarios of the SNEA show similarities and differences compared to other scenarios at different territorial scales (globally, regionally and locally). The identification of winners and losers in each scenario is an important step in guiding acceptable future responses.
- The economic model in all of the scenarios appears to be inextricably linked to direct drivers of change, such as climate change or land-use change.
- In the scenarios, an economic model based on local production and consumption circuits appears to be more sustainable and to improve ecosystem services. In contrast, a global economic model that does not establish proactive environmental policies can have serious consequences in terms of social inequality and insecurity.
- The differences between rural and urban areas are one of the main conflicts identified under the five examined future scenarios. There are two scenarios that are completely polarized and two in which a mutual understanding of needs is finally achieved.
- As a result of the survey one of the most common response options is related to changes in food consumption and distribution. This may involve changes in other services, such as genetics and local ecological knowledge, but it must take into account the need to protect the services of soil fertility and erosion control.
- The technification of ecosystem services is already nearly inevitable in all scenarios, coming into conflict with biodiversity conservation in some cases. It is essential to note that under these scenarios, the key aspects are not only technological but also social. Therefore, it appears that the political dimension of governance and the importance of the role of different stakeholders under a new social pact show a differential trend compared to other technological scenarios.

APPROACH AND OBJECTIVES OF THE SCENARIOS

Scenarios can be defined as 'a consistent and plausible picture of a possible future's alternative reality that informs the main issues of a policy debate' (EEA, 2009). The four examined global scenarios are structured around assumptions, discussions on rationale and drivers.

The Millennium Ecosystem Assessment presented four internally consistent scenarios that explore aspects of plausible global futures and their implications for ecosystem services and human wellbeing. Scenario development is a way to explore possibilities for the future that cannot be predicted by the extrapolation of past and current trends. The future could be far better or worse than any of the scenarios, depending on choices made by key decision makers and other people in society who bring about change (Figure 8.3). Their purpose in developing stories is to encourage decision makers to consider certain positive and negative implications of the different development trajectories (MA, 2005).

The objectives for conducting a scenario analysis were as follows:

- To support scientific study and the exploration of driving trends under the SNEA through dialogues involving the knowledge of different stakeholders.
- To generate future storylines that can contribute to increasing awareness of the relationships between ecosystem services and human wellbeing, especially among decision makers.
- To obtain proposals for response options to address global change and to test their social support.

STAKEHOLDERS AS PARTICIPANTS AND TARGETS

The selection of participants followed from the selection conducted in the previous phase of the project for participation in a survey in 2010: 1. Other agents considered in the Millennium Ecosystem Assessments were reviewed. 2. Classification criteria of importance and influence (de Groot et al., 2006) were taken into account. 3. Those who answered the survey and wanted to participate in this workshop were taken into consideration. 4. Proportional balance between different stakeholders was achieved (Table 8.1).





Stakeholders were selected to develop an interdisciplinary, multi-sector approach. A total of 138 individuals participated in the study : (i) preliminary survey (Study 1), 32 people from 28 organizations; (ii)

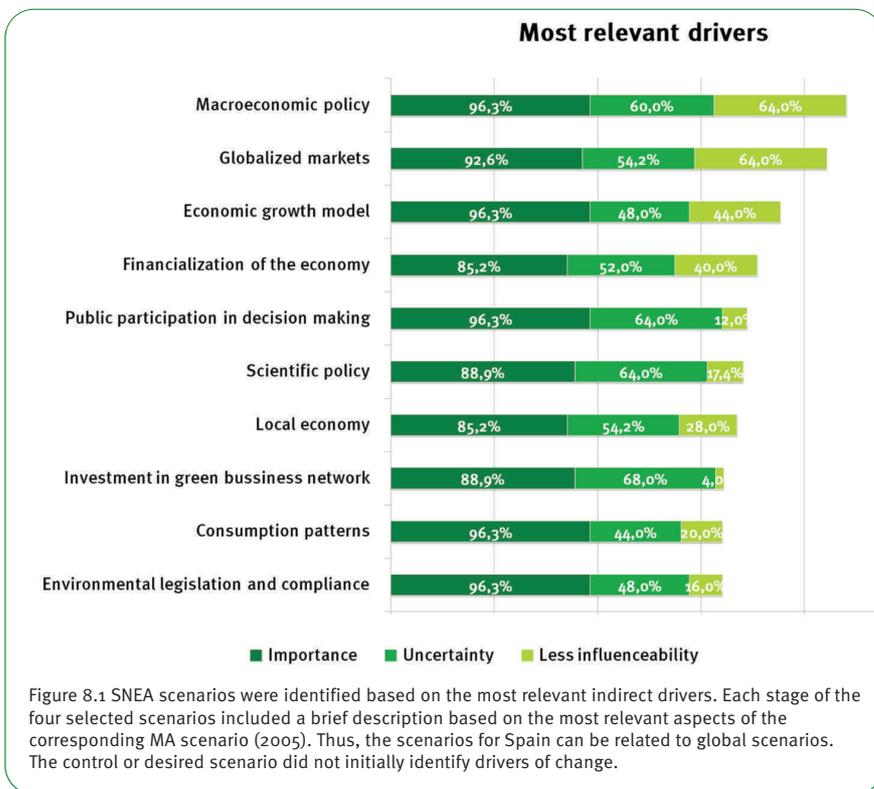
workshop, 49 people from 42 organizations; and (iii) final survey 2, answered by 57 people from 55 organizations. This constitutes **a total of 87 different individuals from 78 different organizations.**

Table 8.1. Stakeholder participation during the future scenarios under the SNEA

| STAKEHOLDER | Survey 1 | | Workshop | | Survey2 | | TOTAL (Different) | |
|----------------------------------|-----------|---------------|-----------|---------------|-----------|---------------|-------------------|---------------|
| | Persons | Organizations | Persons | Organizations | Persons | Organizations | Persons | Organizations |
| Academia | 12 | 9 | 15 | 13 | 18 | 16 | 25 | 22 |
| Public administration | 3 | 2 | 8 | 4 | 9 | 9 | 14 | 10 |
| NGO and foundations | 6 | 6 | 8 | 8 | 8 | 8 | 12 | 12 |
| Companies | 3 | 3 | 5 | 5 | 9 | 9 | 13 | 13 |
| Professional associations | 4 | 4 | 6 | 6 | 6 | 6 | 11 | 10 |
| Natural protected areas managers | 3 | 3 | 5 | 4 | 3 | 3 | 6 | 5 |
| Environmental Media | 0 | 0 | 1 | 1 | 1 | 1 | 2 | 2 |
| Other | 1 | 1 | 1 | 1 | 3 | 3 | 4 | 4 |
| TOTAL | 32 | 28 | 49 | 42 | 57 | 55 | 87 | 78 |

BUILDING THE SCENARIOS

As a first step, the two axes based on the most important and uncertain indirect drivers of change were characterized in terms of their future development (EEA, 2009). Based on the results of the Spanish biophysical ecosystem assessment and according to stakeholders' opinions Survey 1), economic and socio-political drivers of change are the most important and less influenceable (Figure 8.1). Therefore, the first axis proposed was economic governance (global vs. local), representing the degree and scale of connection between and within institutions, especially economic connections; one end of this axis corresponded to the trend towards globalization and the reduction of trade barriers and the other to the trend towards regionalization or localization of the economy. The second axis consisted of environmental policies (proactive vs. reactive), explaining whether the policies are designed to prevent undesirable ecological consequences (proactive) or to respond to environmental problems when they become apparent.



The preliminary survey revealed the ranking of the 22 most significant drivers according to their degree of importance, uncertainty and lower capacity of influence (Figure 8.1).



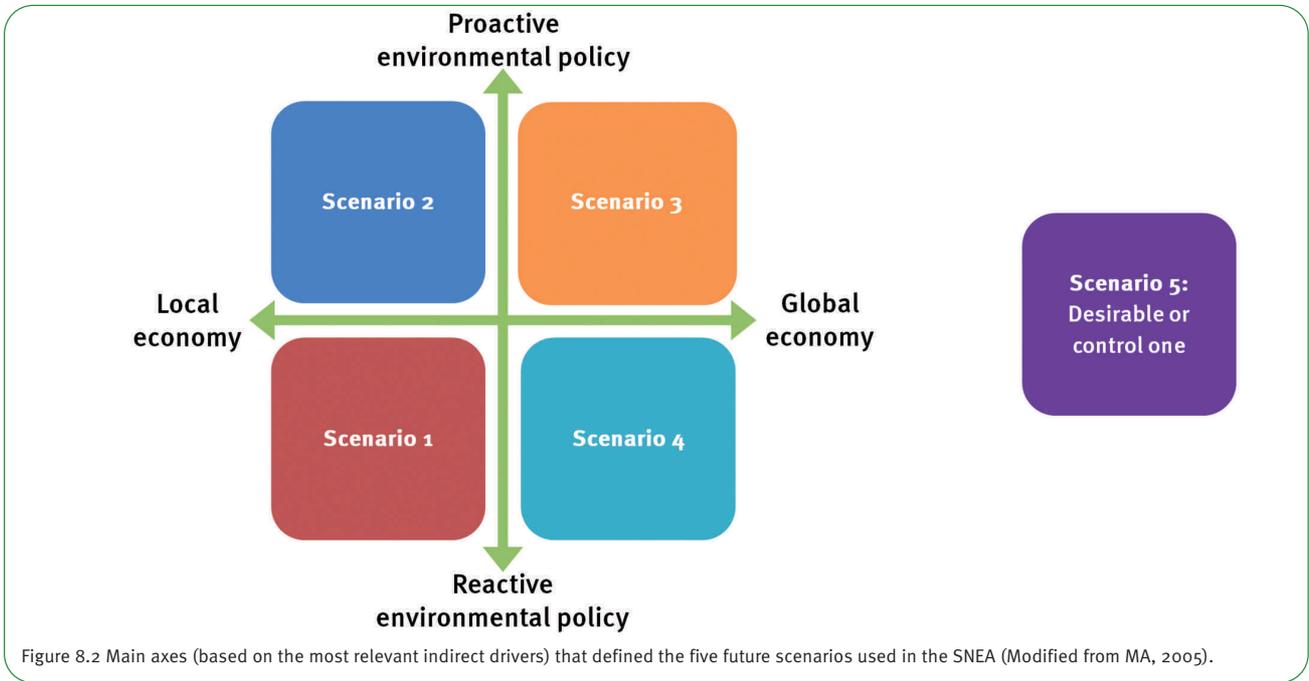


Figure 8.2 Main axes (based on the most relevant indirect drivers) that defined the five future scenarios used in the SNEA (Modified from MA, 2005).

DESCRIPTIONS OF THE SCENARIOS

1. Technopolarized

There is a high polarization of territorial, demographic, economic and human wellbeing-related conditions under this scenario (Figure 8.4). Movements of goods and people are infrequent. In rural areas, there has been a concentration of the population in the main villages (usually more than 5.000 people). The majority of the population lives in urban areas. Technology plays a “repairing” role for environmental impacts. Comfort and economic growth are more important values than sustainability.

2. Eco well-being

This is a scenario involving an extremely local economy and participatory governance as well as proactive environmental policies, such as a social pact aimed at a zero ecological deficit (Figure 8.4). A more balanced urban-rural distribution of the population is reached by means of a paradigm shift from economic growth to a new paradigm of care. There has been a radical change in energetic and consumption models, decreasing consumption rates. These changes are rooted in a cultural change, promoted by grassroots movements. Lifestyles show a time distribution that

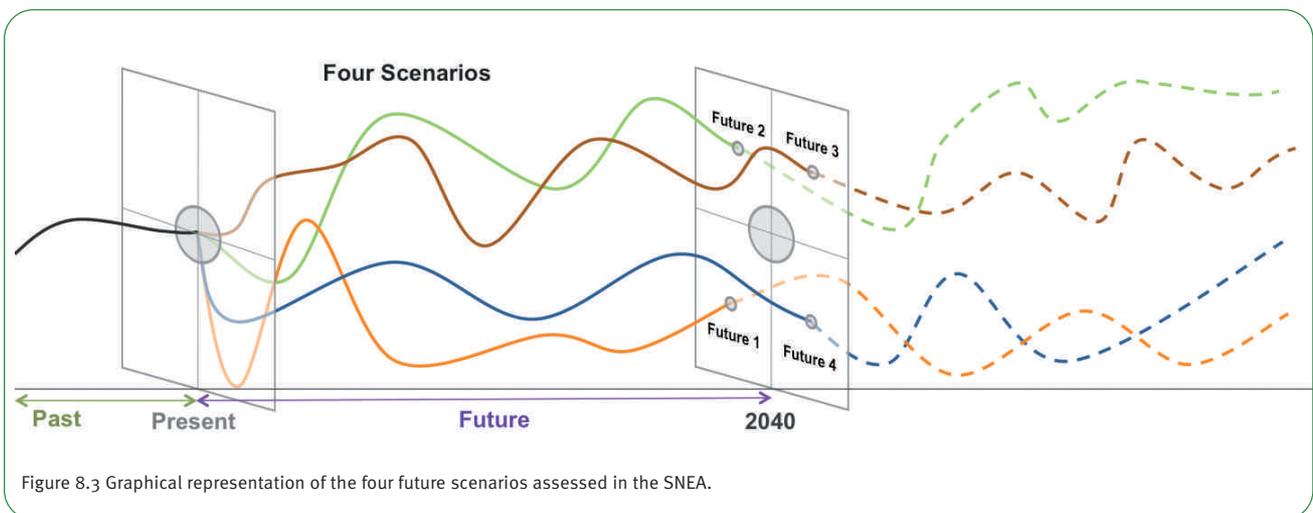


Figure 8.3 Graphical representation of the four future scenarios assessed in the SNEA.





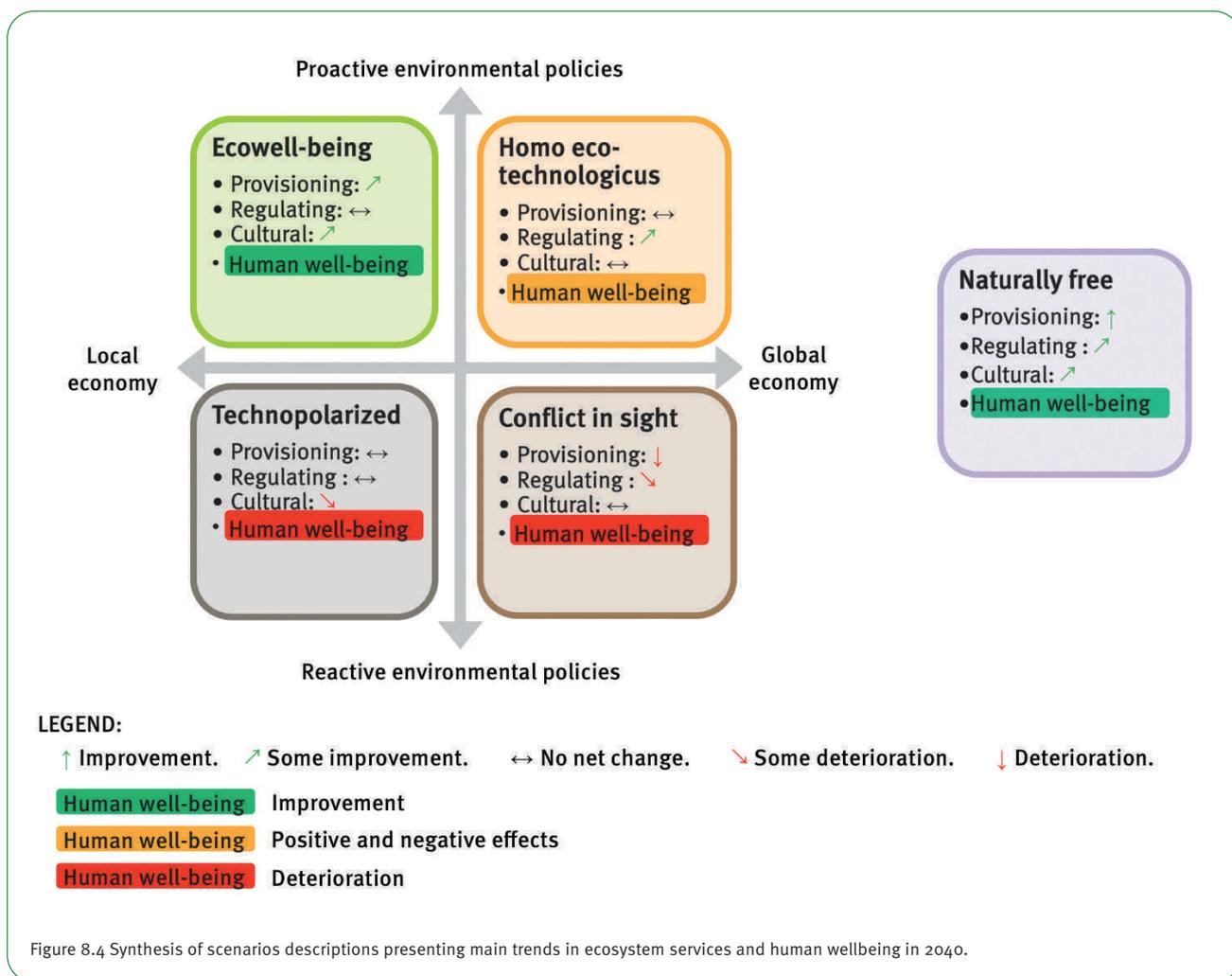
goes beyond work and commuting. Less daily transport and more telecommuting are keys for a slower lifestyle.

3. Homo eco-technologicus

This scenario involves a predominantly urban society structured around what is "environmentally correct" in technological terms but with the social and rural market functioning as a service factory for the city (Figure 8.4). Services have been intensified, especially those related to commodities, such as agricultural products, water and renewable energies. Cities are modern and designed to be totally efficient. The population is still growing in global terms, which has led to conservation policies in cities. Strong international regulations protect production and manufacturing to de-carbonize the global economy.

4. Conflict in sight

In the context of the global economy and reactive environmental policies, this scenario predicts environmental degradation, vulnerability, dependency, inequality and social conflict in Spain in 2040 (Figure 8.4). The coastline is highly urbanized. Much of the population has migrated to the North due to climate conditions. There is not a great deal of technological development occurring at the Spanish scale. The economic elite live in green areas or enjoy holidays there. Rural areas are like a 'museum' or are used as leisure areas. Most of population lives in cities with few resources. There is a great deal of social unrest due to inequity. Large infrastructures have increased because mobility and seasonality are key to understanding life in 2040.





5. Naturally free

Sustainability, social equity, good health, culture and the valuable understanding of the interdependence between humans and ecosystems naturally provide us with a great deal of freedom.

At the Spanish scale, bioregions represent the new administrative and organizational units. Participatory democracy is the governance system in this scenario, in which every social actor is involved. Ecological production and consumption as well as collaborative consumption are mainstream practices. Social environmental awareness influences companies and their practices. The urban and rural population distribution is in balance. Working hours are also distributed amongst the population.

RESULTS OF THE SCENARIOS

When considering ecosystem services and human wellbeing, the 'Eco well-being' and 'Naturally free' scenarios (2 and 5) are the most favorable for human well-being. The application of technology in provisioning services makes a difference. In the 'Technopolarized' and 'Conflict in sight' scenarios, intensifying provisioning services due to the progress of technology linked to reactive environmental policies have consequences for the environment and social inequity.

Regulating services are sensitive to other changes in provisioning services, such as intensification. The worsening trends of these services require more time to revert and improve, according to the dialogue of the scenario. Erosion control and maintenance of soil fertility as well as the urban-rural distribution of the population are related to land-use change, which is the main direct driver in the Spanish baseline scenario. Therefore, facing land-use change requires effective measures in terms of erosion control and the maintenance of soil fertility based on a complex rationale that drives new models of cities and new relationships between rural and urban ecosystems.

Among cultural services, local ecological knowledge is currently an endangered ecosystem service (in the baseline scenario), and declines in this service represent a major trend; its aggravation is a major trend within different scenarios. This worsening trend can be reverted only by consistent policies and initiatives. This ecosystem service is one of the key evolutionary links between cultural diversity and biodiversity. It plays a critical role in ecosystem resilience and human



wellbeing. Only the combination of these diverse types of knowledge leads to increased human wellbeing and improving trends in ecosystem services.

These scenarios identified possible trends of ecosystem services and human wellbeing for the future. In the scenarios where human wellbeing is improved (Eco well-being, naturally free), the resilience of ecosystems also increases, and social networks (e.g., social movements, NGOs) play a key role in changing the economic growth paradigm toward a paradigm of care.

RESPONSE OPTIONS

To increase resilience in ecosystems, response options are needed. Backcasting is a method for developing proposals considering the 5 scenarios as well as current trends and the status of ecosystem services. As a result of the workshop, 205 proposals were included in a questionnaire. This final survey (Survey 2) revealed the social support for different types of options, which allowed us to develop new means of encouraging different stakeholders into action. There are specific response options for every ecosystem service that was discussed in the scenarios as well as specific actions for every social actor.

Nine out of the ten least-valued response options attempt to set stronger boundaries for different stakeholders in relation to factors such as consumption, property, working hours, public administration and personal carbon emissions.

The identification of winners and losers in each scenario is an important step for guiding future responses. The sub-global scenarios highlighted the importance of scale in determining winners and losers.

The exercise of running future scenarios can contribute to the ongoing dialogue regarding alternatives for emerging from the current recession in Spain. The consequences of actual decisions can indicate interesting parallels in the future scenarios collected here.



Table 8.2 The 10 proposals valued as most important (1=extremely important, 2=important, 3=moderately important, 4=not at all important) by the different stakeholder involved in the future scenarios process

| | 1 | 2 | 3 | 4 |
|---|----|----|---|---|
| Designing a new strategy to combat forest fires, more focused on prevention rather than extinction | 32 | 18 | 1 | 0 |
| Development of demographic and economic policies to resettle the rural population to stop the abandonment of rural areas | 30 | 16 | 2 | 0 |
| Promoting environmental education aimed at adults, specially programs for decision makers | 28 | 18 | 3 | 0 |
| Promoting reconciliation between work and personal life | 24 | 15 | 3 | 0 |
| Monitoring and compliance obligations with existing environmental legislation in water | 26 | 23 | 1 | 0 |
| Development of mechanisms for demand management (not only the supply) of water supply services applicable to all sectors, not only in the domestic one, to encourage saving and efficient use of water | 33 | 18 | 5 | 0 |
| Searching and implementing of new development and welfare indicators that go beyond GDP and achieve capture the degree of human well-being | 26 | 13 | 5 | 0 |
| Changing the current Spanish legislation on genetic material, ensuring the conservation of native seeds and the right of farmers to save, use and commercialize traditional varieties. | 31 | 13 | 7 | 0 |
| Progress in achieving the environmental objectives of the Water Framework Directive | 28 | 19 | 3 | 1 |
| Ensure appropriate transfer of technology and the fair and equitable sharing of benefits arising from the sustainable use of genetic resources under the CBD, ensuring that local and traditional populations are not excluded from these uses. | 26 | 23 | 1 | 1 |

