

## SETTING POLICY TARGETS FOR THE FUTURE OF AGRICULTURE IN EU 2020 – A METHODOLOGICAL APPROACH

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### **Abstract**

Setting targets in a foresight exercise is of crucial importance for both orienting future policy directions as well as assessing the achievement of policy concerns. The focus of the present paper is on the development of a methodological framework for setting objectives and targets in a foresight study. This framework builds upon a range of approaches that run in parallel in order to assure that all important issues as to the problem at hand are taken into consideration, while it is also combined with participatory approaches, where experts' knowledge is used for serving validation purposes. The framework developed is then applied in AG2020 - a foresight exercise at the EU level, exploring potential policy options for the sustainable development of agriculture in EU by 2020 - with the aim to present the experience gained and difficulties raising towards finalizing objectives and targets used in this specific foresight exercise.

**Keywords:** objectives and targets, foresight, participatory planning, policy, EU agricultural policy

**JEL classification:**

### **1. Introduction**

The meeting of the European Union Agricultural Council in 1997 stated that 'European agriculture as an economic sector should be versatile, sustainable, competitive and spread throughout Europe, including the less favoured and mountainous regions, contributing thus to their economic development. At the same time, it must be capable of maintaining the countryside, conserving nature and making a key contribution to the vitality of rural life. Furthermore, it should be able to respond to consumers' concern and demand regarding food quality and safety, environmental protection and the safeguarding of animal welfare' (SCENAR 2020, [1]).

The agricultural sector is thereby considered as one of the most important production sectors of the global economy, as it largely determines the population's survival and quality of life through the quantity / quality and safety of agricultural production. Agriculture is also considered as a sector determining the *development potential* of a significant part of the European territory - the *rural regions* - and is largely associated with the economic prosperity, tradition, production systems, culture etc. of the European local regions' population – the *farmers* (Giaoutzi and Stratigea, [2] and [3]).

Moreover, increasing population growth rates at a global scale impose a significant increase on food demand, affecting the agricultural production pattern worldwide. Economic performance in the agri-sector, on the other hand, implies a sort of intensification of production and use of additives, which may affect the quality of products but also harm the quality of land and water resources, placing thus at risk the future development of the sector.

The above discussion stress the importance of the environmental, but also the social and economic dimension of the agricultural sector, implying the necessity for *future policies in agriculture* to focus on *sustainability targets*, incorporating at the same time the *quality-safety* dimension of agricultural production.

Along these lines, the *focus* of the present paper is on the development of a methodological framework for setting objectives and targets in a foresight study, while it also elaborates on its application in a specific foresight exercise, the AG2020<sup>1</sup> project, aiming at the structuring of backcasting policy scenarios for the sustainable development of agriculture in EU by 2020. The *structure* of the paper has as follows: in Section 2 is shortly discussed the AG2020 framework; Section 3 elaborates on the definitions of the basic concepts used in the paper; Section 4 presents the proposed methodological framework for indulging in objectives and targets; Section 5 presents the application of this framework in AG2020, for the setting of objectives and targets to be used for the structuring of policy scenarios for the sustainable future development of agriculture in EU 2020; while finally, in Section 6 some conclusions are drawn.

## **2. The Ag2020 Framework**

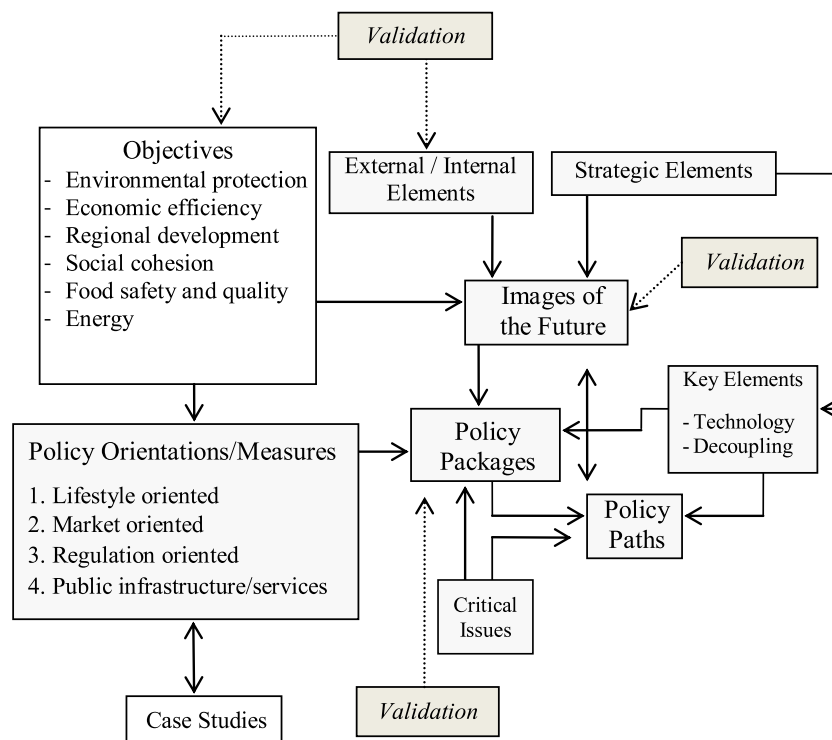
The AG2020 project has developed an innovative backcasting methodology for structuring backcasting policy scenarios at the European level for the sustainable development of agriculture in 2020. The structuring of these strategic policy instruments was based on the following elements (Giaoutzi and Stratigea, [4]; Giaoutzi et al., [5]; Giaoutzi and Stratigea, [2] and [3]):

- objectives and targets in AG2020,
- baseline scenario,
- the Images of the Future, and
- the policy framework.

In the first part of the AG2020 process, *objectives and targets* were set for orienting the future of the EU Common Agricultural Policy towards the desired ends. On this basis, the *baseline scenario* was structured to identify the scale of changes needed in order to pursue the selected targets. These, together with the external/internal and strategic elements (Figure 1), were used for building the AG2020 *Images of the Future*.

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<sup>1</sup> AG2020 Project: Foresight Analysis for World Agricultural Markets (2020) and Europe, 6<sup>th</sup> Framework Programme, Contract No.: 44280-AG2020, STREP, 2007-2009.

**Figure 1: Strategic policy scenarios – The AG2020 framework**

Source: Giaoutzi and Stratigea, [2] and [3]; Giaoutzi and Stratigea, [6]; Giaoutzi et al., [7] (after POSSUM, [8])

In the second part, the alternative policy options were selected. These relate to the policy measures, packages and paths; the scale of required changes; and the principles for their implementation, based on the acceptability, lead-times, dynamic effects and adaptability criteria, in the AG2020 context.

### 3. Defiition Of Concepts

As the agricultural sector is a sector closely relating to many aspects of the environmental, economic but also social reality, there is a certain need for developing inter-disciplinary approaches in policy studies in the sector. In this respect, it is considered of importance the establishment of a common ground for discussion among different specialities, thus reaching interdisciplinary communication, while avoiding misinterpretation of terms (i.e. goal, objectives and targets). The scope of the present section is to clarify the concepts of goal, objectives and targets for making policy decisions in the context of a foresight exercise.

In the international literature and in many national policy documents, a *goal* has been frequently used interchangeably with the term *objective*. More specifically (see also Figure 2):

- a *goal* is a more general description of a desired direction, a long term aim of the society e.g. sustainable development, and can be further translated into several objectives; while
- an *objective* is more specific than a goal and can be partly achieved during the planning period (WHO, [9]).

Moreover, a *target*, as defined by World Health Organization (WHO, [9]) is ‘... an intermediate result towards the achievement of goals and objectives; it is more specific, has a time horizon and is frequently, though not always, quantified’, while ‘... a goal refers to the long-range aims of the society and is usually expressed in rather general terms’ (Figure 2). *Targets* are also defined as ‘... explicit endpoints of public policy, expressed in terms of relevant indicators, to be pursued within a given time horizon with a systematic monitoring of progress towards their achievement’ (Egenhofer, [10]).

The relationships among goals, objectives and targets can be seen in Figure 2, where each goal can be further translated into several objectives. To each objective can be addressed quantifiable and non- quantifiable targets. Reaching objectives and goals, in this respect,

implies reaching endpoints of targets. Furthermore, quantifiable targets can be presented by properly defined indicators, which will be used, during the process for monitoring and evaluation purposes.

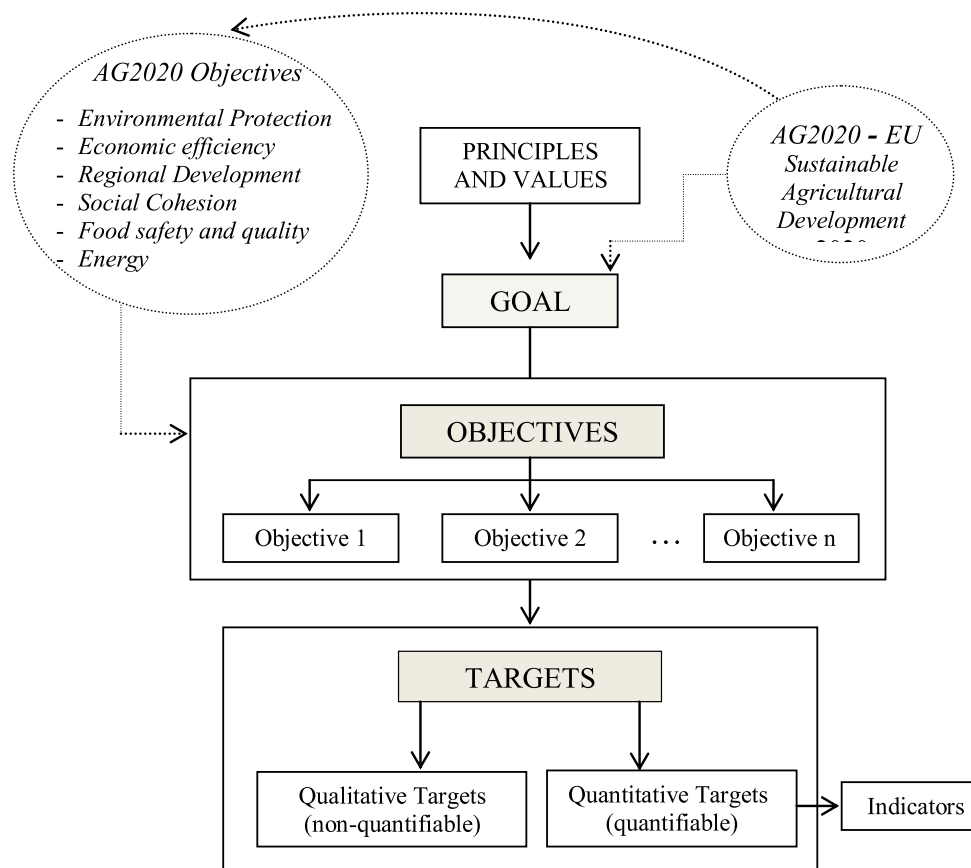
The following three different *categories* of targets can be distinguished (Egenhofer, [10]):

- *Hard targets*: refer to targets that are mandatory within a certain structure e.g. EU target for the reduction of greenhouse gas (GHG) emissions under the Kyoto Protocol. For the EU member states, these are legally binding and thus enforceable and if they are not achieved, sanctions will kick in. They rely on standard EU policy formulations and implementation and they are by definition compatible with the internal market<sup>2</sup>.
- *Indicative targets*: similar to the previous category, but distinct as to the level of commitment required, e.g. the EU renewable energy targets for electricity and biofuels. These targets are still mandatory in the sense that member states need to make an effort to meet them. Their difference from hard targets is that member states can still divert to some extent from these indicative targets, if there is a good excuse for that, while it is unclear how failure in achievement will be sanctioned.
- *Aspirational targets*: these express long-term objectives or aspirations, e.g. EU target stating that ‘the overall global mean surface temperature increase should not exceed 2°C above pre-industrial levels’ or that ‘a 15-30% reduction in CO<sub>2</sub> emissions by 2020 should be reached’ or the ‘Lisbon target’ of ‘making EU the most competitive economy in the world’ (EU, [11]). Such targets are meant to guide policy making towards a certain direction.

Setting hard targets seems to be less problematic as they are legally binding and thus enforceable, they rely on standard EU policy formulation and implementation and they are by definition compatible with the internal market. More problematic seem to be the *indicative* or *aspirational targets* or EU targets that express a *vision* of where the EU and its member states want to go at a certain time.

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<sup>2</sup> By definition the EU law is compatible with EU primary, secondary and case law such as the provisions on the internal market and competition.

**Figure 2: Goals, objectives and targets**

Source: Giaoutzi and Stratigea, 2007a

In any case, targets have to be *realistic* and *plausible* within a given time frame. If targets set are very ambitious, they may result in excessive costs, which in turn render targets politically untenable. This might eventually lead to a reversal of policies (Egenhofer, [10]). Targets should also be formulated into quantifiable measures (indicators), so that conclusions can be drawn about the level of their attainability. This of course does not imply the exclusion of qualitative targets for those objectives, which cannot be expressed in quantitative terms. Also, targets may serve only one objective at a time, therefore the selection of targets should take that into account.

Finally, it should be kept in mind that targets can be set either at the *EU level* or at the *member state level*. The spatial level used for the selection of targets depends on the purpose of the targets' setting exercise. Practically:

- *hard targets* aim at legally binding member states and are set at the EU level;
- *indicative and aspirational targets* stimulate member states towards a certain direction and use the overall EU targets. These can be treated at a member state level, based on national characteristics, economic structure, social values, etc.

#### **4. Defining Policy Targets - A Methodological Framework**

In the following is discussed the methodological framework developed for the identification of policy targets. The steps followed in this framework are shown in Figure 3 and are presented in the following.

##### **4.1. Indulging On The Objectives**

The first step of the methodological approach refers to the identification of objectives. As objectives are practically reflecting a certain dimension of the goal, their selection is to a large extent based on the goal pursued. From a range of goal-specific potential objectives, a limited number can be selected through a *selection process* that is mainly based on:

- *Significance*: objectives should be significant, and be translated into discrete targets e.g. energy security. It is important to '*choose an appropriate baseline to ensure that different sectors and/or states face similar challenges*' (Egenhofer, [10]:3).
- *Realistic and achievable*: there should be some guarantee that the required results can be achieved in an efficient way and at a reasonable cost, i.e. 'what is needed' is broadly in line with 'what is possible'.
- *Properly formulated*: the most critical point is to formulate objectives in a proper way. It is particularly important to define the required policy outcome, e.g. near-zero carbon power generation, rather than prescribe the possible solutions e.g. renewables, nuclear. In that way, the market will be able to choose the most efficient solutions. However, sectoral targets, e.g. for renewables, may be needed for a transition period, to avoid crowding out certain technologies, which would result in a smaller technology portfolio for near-zero-carbon technologies than otherwise would be the case. For example most, if not all, renewable generation technologies will need to be subsidized for a certain period, in order to bring down the costs. Thus flexibility on the type and range of solutions can be assured (Egenhofer, [10]).

#### **4.2. Defining A Comprehensive Set Of Potential Targets**

Policy targets have particular value when focusing on the policy-implementation process and its outcomes. As Stead [12] points out, they are the means towards influencing the achievement of policy concerns.

Potential policy targets are usually selected by means of a 'top-down' approach combined with a 'bottom up' approach, used for convergence, validation and checking purposes (see Figure 3).

The '*top-down*' approach represents a deductive, comprehensive and systematic strategy using a framework, where targets are derived from principles, objectives, sectors, issues and causal relationships (POSSUM, [8]). The 'top-down' approach is materialized through a number of:

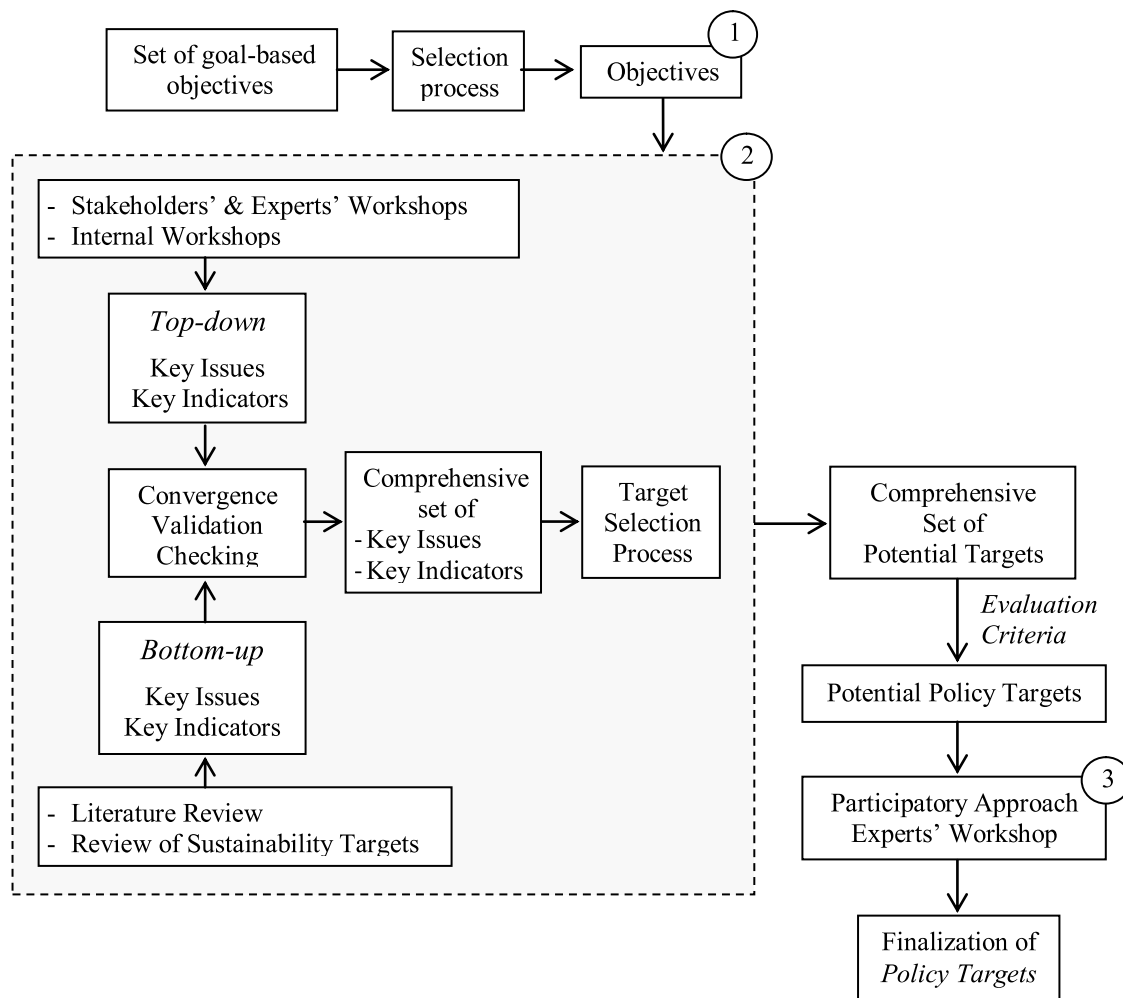
- *Internal workshops*: identifying important issues for future policy on the issue at hand (hotspots), emerging or likely to emerge till target year.
- *Stakeholders' and experts' workshops*: where intelligence is gathered from experts and stakeholders in respect to strategic policy issues of relevance in building future policy scenarios.

The '*bottom-up*' approach is considered as an inductive, knowledge-based strategy, involving:

- *Literature review*: various important issues for the potential future of the issue at hand (agricultural policy in this exercise) searched in the literature.
- *Review of sustainability targets*: where are collected a range of sustainability targets relating to the issue at study (agricultural sector in this exercise).

The outcomes of both the 'top-down' and 'bottom-up' approaches allow for checking that all key issues are considered, leading to a *comprehensive set of potential targets* for further elaboration (Figure 3). Potential policy targets are identified by both: *direct* elaboration, e.g. in the case of literature review or review of sustainability issues; and *indirect* elaboration, e.g. in the case of internal workshops or the stakeholders/experts workshops for gathering a range of different opinions on strategic policy issues.

**Figure 3: The steps carried out for setting policy targets in AG2020**



Moreover, as every study theme (e.g. agriculture, transport, urban development) has significant impacts on the social, economic as well as the environmental *domain*, targets should be considered within each of these policy domains. This implies the need for elaborating on key issues and respective key indicators in each specific domain considered by means of ‘top-down’ and ‘bottom-up’ approaches. Each domain thus comprises a set of potential key issues, along with potential key indicators to be used for the development of targets (Table 1). Key issues and key indicators are expressing the basis for defining sustainability targets in the different domains.

**Table 1: Key domains, issues and indicators**

Domains	Key Issues	Potential Indicators
Social	e.g. employment	e.g. number of new jobs
	...	...
Economic	e.g. competitiveness	... ..
	...	...
Environmental etc.	e.g. preservation of biodiversity	e.g. number of hectares cultivated
	...	...

Finally, it is of importance to take into consideration the context of the specific theme under study in order to be able to clarify implications at the different *spatial scales*, which need to be taken into account in the target definition process. For example, speaking of the agricultural sector implies the need to consider aspects of the global (WTO regulations), the European (CAP), but also the national/regional spatial scale.

In conclusion, targets are defined on the basis of a range of approaches, which run in parallel in order to handle disadvantages of each specific approach and incorporate:

- ‘Top-down’ and ‘bottom-up’ approaches used for monitoring, converging and validating targets, so that no important aspects of the study theme are left out;
- Domain-based and issue-based approaches; and
- Issues at a variety of spatial scales e.g. international, national and regional/local, corresponding to respective spatially referred targets.

The comprehensive set of potential targets identified by applying the above set of approaches needs to be further evaluated, before it is used in a specific study context. In searching the literature, two sets of evaluation criteria can be encountered.

The first set is defined by Maclaren [13], who presents a commonly used list of eleven (11) *evaluation criteria* to support the evaluation process of potential targets, i.e. provide a relevant and sound set of targets. These have as follows:

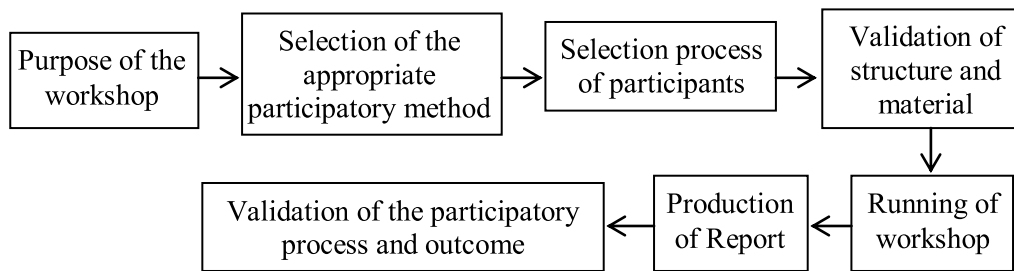
- Scientific validation: targets should be valid in scientific terms;
- Representativeness of a broad range of conditions: targets should be relevant in various contexts e.g. different geographical areas;
- Responsiveness to change: they should be capable of incorporating changes;
- Relevance to the needs of potential users: targets should be of relevance to the specific needs of potential users;
- Availability of accurate accessible data: reflects accuracy and accessibility of data;
- Availability of historical data: several time series should be available, in order to discern trends, evolution patterns etc.;
- Comprehensibility by potential users: targets should be easily and clearly grasped by users;
- Comparability with targets developed in other jurisdictions: targets developed within different jurisdictions should be comparable;
- Cost-effectiveness to collection: collection of the necessary data on targets shouldn't be a very costly process;
- Attractiveness to the media: reflecting the power of the targets for communication purposes; and
- Unambiguity: refers to the quite clear picture reflected by a certain target.

The second group of evaluation criteria is set by the EU {COM(2001)144 final, [14]}, expressing mainly the policy point of view in the evaluation process, where potential targets are evaluated on the basis of the following criteria:

- Policy-relevance: referring to the capability of addressing key policy issues;
- Responsiveness: stressing the need for sufficient changes in response to enforced actions;
- Analytical soundness: reflecting scientific soundness;
- Measurability: focusing on feasibility in terms of current or planned data availability;
- Ease of interpretation: in terms of power to communicate essential information in a way that is unambiguous and easy to understand;
- Cost effectiveness: focusing on costs in respect to the value of the information derived.

Finally, one more selection criterion in the target identification process is the potential for setting *threshold values*, relating to the desired and acceptable conditions for each target. If target and threshold values cannot be defined for a specific target, the specific target should be avoided, although threshold values could be replaced by the desired trend direction (Mitchell et al., [15]).



**Figure 4: Planning and implementing participatory workshops**

## 5. Application Of The Methodological Framework - The AG2020 Example

For applying the previously presented framework in the agricultural sector, it should be kept in mind that, based on the three pillar model (environment, society, economy), sustainability in agriculture can be translated into ‘produce more, distribute justly and preserve the nature’ (Keiner, [16]). Of course such ‘ideal solutions’ within closed systems are doubted, since sustained solutions for one dimension are often incompatible with the sustainability of the rest of the two (Stimson et al., [17]; Keiner, [16]). Opposing to that, some others state that a sort of compromise among the objectives of the three pillar model could be accomplished in future development, mainly based on technological advances (Keiner, [16]). Or stated different, a ‘trade-off approach’ between the targets of the three pillar model needs to be adopted, seeking for a targets’ setting approach that will assure a complementary perspective of the main aspects in respect to agricultural policy, being the approach adopted in the present section.

The application of the proposed methodological approach is presented in the following, aiming to conclude with a properly defined and validated set of objectives and targets to be used for building policy scenarios for the future of EU agriculture in 2020.

### 5.1. Setting The AG2020 Objectives

The objectives selected in AG2020 are expressing sustainability in the agricultural sector, from the point of view of AG2020, and are encompassing (Giaoutzi and Stratigea, [4] and [18]):

- environmental protection, aiming at the preservation of the ecological balance of physical and biological systems, for present and future generations;
- economic efficiency, based on the concept of “... *attaining the maximum flow of income that can be created, while at least maintaining the renewable stocks or assets that yield these benefits*” (Stimson et al., [17]:40);
- regional development, aiming at the reduction of disparities in rural areas and the equal access to opportunities e.g. employment, income, services;
- food quality and safety that aim to promote food safety and trust in agricultural qualitative products for consumers, a trend that will continue receiving attention in both industrialized and in less developed countries (Unnevehr and Roberts, [19]);
- social cohesion, aspiring to maintain the stability of social and cultural systems, by pursuing a healthy and productive life in harmony with the environment; and
- energy production that aims at reaching the EU climate change target of reducing 20% GHG emissions compared to 1990. For this objective, EU has planned its long term energy policy up to 2020.

The objective of *environmental protection* is of the most impelling, since it associates with both: the long term survival of a society, in today’s times, characterized by considerable environmental degradation and high risks; and the long term survival of agriculture. Future sustainable agricultural development involves the establishment of a new relationship between agriculture and the environment, building upon a new perspective of preserving the overall balance and value of the natural capital stock, based on a long-term view of the real environmental costs and benefits of agricultural production {COM(2000)20 final, [20]}. It is

also an objective, which may mobilize new solutions, involving structural changes and technological innovations in agricultural production.

The objective of *economic efficiency* is associated with the attainment of optimal and effective use of scarce resources. Efficiency is of relevance for agriculture, since it contributes to the overall efficiency of the system, by acting as a driving force for the restructuring of activities, technology developments for a more effective use of resources, changing life-styles and consumption patterns, etc.

*Regional development* is another very important objective, especially in the context of the EU enlargement process. Development of rural regions can be based not only on the agricultural sector, but also on complementary activities, triggering their competitive advantages and encouraging diversification of activities and innovation. These may largely contribute to the territorial, social and economic cohesion of the European rural regions. Rural development may result into a higher value-added production and a stronger economic basis, by increasing competitiveness, growth and job creation, in line with the Lisbon Strategy. This concern is reflected in the last CAP reform through the second pillar for the adoption of a coherent integrated rural development policy {COM(1999)22 final, [21]}.

The objective of *health and food safety* is of enormous relevance for consumers in the last decade. 'Food scare' has caused an increase in consumers' awareness in terms of food health and safety, which in turn has strengthened demand for qualitative and safe food (Buller and Hoggart, [22]). Growing concern for health and well-being has influenced the patterns of consumers' demand towards healthy food and 'natural' products as well as 'functional'<sup>3</sup> products. The above trend has specific impacts on the production patterns in agriculture, as for example the increasing emphasis on specific types of production (e.g. organic production). As the share of well informed and aware consumers seeking for healthier and qualitative food grows, relevant adjustments of agricultural production in terms of agricultural practices adopted should be of increasing importance in Europe, driven by 'food scare', health and environmental concerns (EEA, [23]).

Finally, *social cohesion* as well as *energy production* is added to the set of the AG2020 objectives, as these constitute long range objectives of the EU, already expressed in various policy documents.

## **5.2. Defining Of AG2020 Targets**

The focus of this section is on the identification of *targets* for the sustainable development of agriculture in Europe 2020, on the basis of the above presented objectives.

Defining targets, in this respect, is a process that starts with the identification of a pool of key issues within each objective, together with potential indicators. These are the outcome of the top-down and bottom-up as well as domain-based search, while issues arising at various spatial scales are also considered (see Figure 3 - section 4.2). Moreover, targets relating to the above issues are set, reflecting also EU's objectives (if any) (see Table 2 below). The outcome of this step is a comprehensive set of potential targets, which is further elaborated by taking into consideration the sets of evaluation criteria previously presented (section 4.2). 'Filtering' the pool of targets through the predetermined evaluation criteria leads to a final potential set of targets to be used in the specific study. Work at this step is carried out at the project level (partners of the consortium).

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<sup>3</sup> Foods which are intended to be consumed as part of the normal diet and that contain biologically active components, which offer the potential of enhanced health or reduced risk of disease. Examples of functional foods include foods that contain specific minerals, vitamins, fatty acids or dietary fibre, foods with added biologically active substances (European Food Information Council - EUFIC).

In a second step, the previously defined key issues and respective indicators as well as the set of potential targets are subject to further elaboration, carried out in an experts' workshop. For this purpose, five experts and professionals are involved in a *focus group discussion*.

The *scope* of this step is to conclude with a smaller, more relevant, set of targets by further elaborating the set of potential targets.

The *participatory method* used in this workshop is the *focus groups methodology*. The method was selected on the basis of its capacity to create synergies among scientific specializations, which in combination with the expertise of the participants would reach to the desired end.

The *selection of experts* was based on a set of evaluation criteria, out of which the most relevant experts from a pool of potential candidates were selected. The profile of those involved in the focus group discussion is presented in Table 3 below.

The work undertaken in the focus groups workshop has as follows:

- it started with the presentation of the broader context of the AG2020 methodological framework;
- then discussion was stimulated among participants on the issues raised by the previous presentation, with emphasis on the objectives and targets defined so far;
- it follows the writing of a short report by each participant;
- the reports were distributed among participants, where questions are raising on the written positions;
- a new round of discussion followed, in which many points were clarified and better understood; and finally
- certain revisions in the content of the individual reports is taking place, where opinions expressed in the second round exhibit in many cases convergence.

Based on a deliberately presented input of the A2020 project, the focus groups discussion produced collective judgments in respective issues, building upon already existing knowledge and information created within the AG2020 consortium. So the output of the experts' discussions has led considerations on key issues and respective targets to a more mature stage, incorporating a more elaborated and reduced number of key issues, selected on the basis of their *relevance* to the specific goal of the foresight study (see Table 4).

**Table 2: Comprehensive set of policy targets in AG2020**

OBJECTIVES	Key Issues	Potential Indicators	EU Target Year 2020 (agriculture-related)	Source: EU or other Document
Environmental protection	GHG Emissions	Emissions of CO <sub>2</sub> from agriculture, including soil C storage	GHG emissions decrease (CO <sub>2</sub> equivalents) of xx % compared to 1990 emissions	Kyoto and later agreements
		Emissions of N <sub>2</sub> O from agriculture (in CO <sub>2</sub> equiv.)	GHG emissions decrease (CO <sub>2</sub> equivalents) of xx % compared to 1990 emissions	Kyoto and later agreements
		CH <sub>4</sub> emissions from agriculture (in CO <sub>2</sub> equiv.)	GHG emissions decrease (CO <sub>2</sub> equivalents) of xx % compared to 1990 emissions	Kyoto and later agreements
	Nutrient surplus	N surplus	Decrease %	Water Framework Directive
		P surplus	Decrease %	Water Framework Directive; upcoming Soil Protection Framework Directive
		Nitrate leaching	Decrease %	Water Framework Directive; Groundwater Directive
	Eutrophication and acidification	NH <sub>3</sub> emissions	Decrease %	The Thematic Strategy on Air Pollution; NEC Directive
	Pesticide use – Water pollution	Pesticide application rates	Decrease %	Water Framework Directive; Groundwater Directive; Pesticides Directive
		Share of organic farming	Increase %	
	Biodiversity and Landscape	Arable land as share of total land use	Regional and territorial development benefiting	COM/2006/0216 final: Communication from

OBJECTIVES	Key Issues	Potential Indicators	EU Target Year 2020 (agriculture-related)	Source: EU or other Document
	quality	Biodiversity index	biodiversity	the Commission - Halting the loss of biodiversity by 2010 and beyond - Sustaining ecosystem services for human well-being. {SEC(2006) 621} Technical Annexes to COM/2006/216: EU Action Plan to 2010 and beyond and indicators
		Share of terrestrial NATURA 2000 areas	Increase	Habitats Directive; Bird's Directive; NATURA 2000 Network
		Share of aquatic NATURA 2000 areas	Increase	Habitats Directive; Birds' Directive; NATURA 2000 Network
Economic efficiency	Reducing support	EU subsidies as fraction of farm income	Market oriented agriculture	CAP
	Competitive advantage	Agricultural structure		
		Productivity		
		Crop production	Improve competitive advantage of farming activity in the EU	COM(2005) 304 final
		Animal production		
		Production systems		
		Farm income		
		Farm costs		
Investments				
Research expenditure				
Regional Development	Socioeconomic conditions (disparities / distributional aspects)	Household income		
		Educational level		
		Employment		
	Agricultural situation	Share of employees in agriculture as fraction of total economically active population in region	Agenda 2000 - a comprehensive rural development policy  CAP – integrated rural development	
		Income from non-agri activities as share of total income in agri-sector in region		
		Level of multifunctionality		
	Accessibility and land use patterns			
Rural population		Retain agricultural labour force	Agenda 2000, A CAP for the Future	
Social cohesion	Social cohesion	Combating poverty and social exclusion	Increase social cohesion of European territory	EU Regional Policy objective (economic and social cohesion); Lisbon Strategy; COM(2001)264 final, 15.5.2001
Food quality and safety	Consumer information and awareness	Demand for diversified food		COM(2001)264 final, 15.5.2001
		Food safety issue		12.1.2000
		Consumer concern		COM (1999) 719 final, White Paper on Food Safety
		Share of products labelled with national or European quality labels		
	Sustainable food production - Health standards	Pesticide use	High level of human health and consumers' protection	
		GMO crops		
		Pharmaceutical use		
	Share of organic farming			
Food traceability		Traceability of feed and food and their ingredients	COM (1999) 719 final, White Paper on Food Safety	
Animal welfare	Share of organic farming	Protection of animal health and welfare		

OBJECTIVES	Key Issues	Potential Indicators	EU Target Year 2020 (agriculture-related)	Source: EU or other Document	
Energy	Energy consumption of agriculture	Farm energy consumption			
	Biofuel production	Agricultural area used for bio-energy crops	10% biofuels share in overall EU road transport fuel consumption	Biofuel Directive	
	Biomass production				
	Use of waste	Amount of energy produced from waste & biomass waste products for biofuel			
		Amount of energy produced from waste & biomass waste products for electricity and heat			

**Table 3: Profile of experts involved in the participatory workshop**

a/a	Title	Name	Organization
1	Professor	S1	Athens Agricultural University – Dept. of Agricultural Economy and Development
2	Professor	S2	Athens Agricultural University – Dept. of Agricultural Economy and Development
3	Assistant Professor	S3	Athens Agricultural University – Dept. of Agricultural Economy and Development
4	Chairman of the Institute	S4	Institute of Forest Research
5	Head of Section	S5	Ministry of Agriculture

The key issues and respective targets delivered by the experts' focus groups discussions were subject to subsequent discussions within the AG2020 consortium, in which they were further refined by partners, in order to be finalized and be used in the backcasting approach for building policy scenarios for the EU agriculture in 2020. Out of this step comes out the final set of objectives and targets, which are presented in Table 5.

**Table 4: Sustainability Targets in AG2020 resulting from the focus groups discussion**

Objectives	Key Issue	EU Target Year 2020 (agriculture-related)
Environmental protection	NOx Emissions (in CO <sub>2</sub> equivalents) (GHG)	20% Decrease of GHG emissions by 2020 compared to 1990 emissions
	Nitrate leaching	Decrease nitrate leaching %
	Pesticide use	Decrease pesticide application rates
	Biodiversity and landscape quality	Regional and territorial development benefiting biodiversity (Share of terrestrial/aquatic NATURA 2000 areas, share of arable land etc.)
Economic efficiency	Gradual abolishment of subsidies Increasing competitive advantage	Market oriented agriculture - Improve competitive advantage of farming activity in the EU – Increase product mix
Regional Development	Multifunctionality	Integrated development of agricultural regions (Increasing level of multifunctionality of agricultural regions)
	Accessibility	Improve accessibility of agricultural regions
	Land use patterns	
Social cohesion	Combating poverty and social exclusion	Increase social cohesion of European territory
Food quality and safety	GMOs	No GMOs
	Share of organic farming	Increase market share of organic farming
	Product labelling	High level of product labelling

	Sustainable food production - Health standards	High level of human health and consumers' protection
	Food traceability	Traceability of feed and food and their ingredients
	Animal welfare	Protection of animal health and welfare
Energy	Farm energy consumption	Decrease
	Biofuel production	+10% (2020)
	Biomass production	+8.5 % (2010)
	Use of waste	Increase

## 6. Conclusions

In the present paper the focus is on the development of a methodological framework for setting objectives and targets in a foresight study, while it also presents the application of this framework in a specific foresight exercise at the EU level (AG2020 project) for setting objectives and targets for the structuring of backcasting policy scenarios, aiming at the sustainable development of agriculture in EU by 2020.

**Table 5: AG2020 proposed targets**

Targets	EU Target Year 2020	AG2020 Targets	Source
GHG Emissions (in CO <sub>2</sub> equiv.)	20% decrease of GHG emissions by 2020 compared to 1990 emissions	N <sub>2</sub> O and CH <sub>4</sub> in CO <sub>2</sub> equivalents	EU
Biodiversity	Halt loss of biodiversity (Set in 2001 for 2010)	Halting the loss of biodiversity by 2020 – High rate of halting	Council of the European Union [24], EURURALIS [25]
Competitiveness / Efficiency	Economically viable regions	Strong competitiveness / efficiency in the agri-food sector	EU – Lisbon Agenda
Multifunctionality	Increase the level of multifunctionality of agricultural regions	Multifunctionality of rural regions – High level	EU
Food and Feed traceability	Traceability of feed and food	Food and feed traceability – High rate	EU
Biobased economy	Blending targets: in transportation fuel 10% (2020)	Blending targets in 2020 transportation fuel 10% electricity 7% chemicals 10%	EU

Source: Giaoutzi et al., [5]; Giaoutzi and Stratigea [2] and [3]

It should be noted that the stage of formulating objectives and targets is a critical one in policy exercises as, to a large extent, it determines both the process and the final outcome (policy) of the foresight exercise. Moreover, the setting of objectives and targets in a certain policy study needs to reflect, in the best possible way, visions and expectations of the society, but also the technological and other potential needed for reaching desired ends. Finally, in a backcasting policy scenario framework, adopted in the context of the AG2020 project, objectives and targets are of crucial importance as they can shed light and in a way define the desired ends of a specific study.

It should be noted that assigning targets in a foresight exercise is fraught with certain difficulties. As such, can be indicatively referred the following:

- Targets may not refer to the same *time frame*. Some targets may refer to 2010 others to 2020.
- The *nature* of targets can differ. For example some targets are *hard* (EU energy targets for 2020), while other are *indicative* or *aspirational targets* e.g. the ‘Lisbon target’ of ‘making EU the most competitive economy in the world’.

- Certain targets refer to a more *general objective* e.g. GHG 20% decrease until the year 2020, referring to all sources of GHG emissions. Speaking of a specific sectoral foresight study, e.g. agriculture, there is a need for a certain reduction of GHG to the share of the agricultural sector, which is far from an easy task to carry out.
- Certain targets are defined at a different *spatial scale*, e.g. globally defined targets that need to be reduced to the EU level.
- Finally, in almost all *non-quantifiable targets* is not given a clear-cut quantitative target value. Instead they are presented in a rather vague form.

The methodological framework for setting objectives and targets, proposed in the present paper, aims to overcome those difficulties by building upon a variety of approaches that run in parallel. In this respect, it combines a top-down with a bottom-up approach, together with a domain-based searching for key issues, indicators and targets, while it also takes into account specificities relating to different spatial scales. Moreover, at the final stages, it takes also advantage of experts' knowledge. In this respect, the proposed framework can largely assure that all important issues of the problem at hand are taken into consideration in a proper way, while it leads to objectives and targets that are more mature and validated.

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