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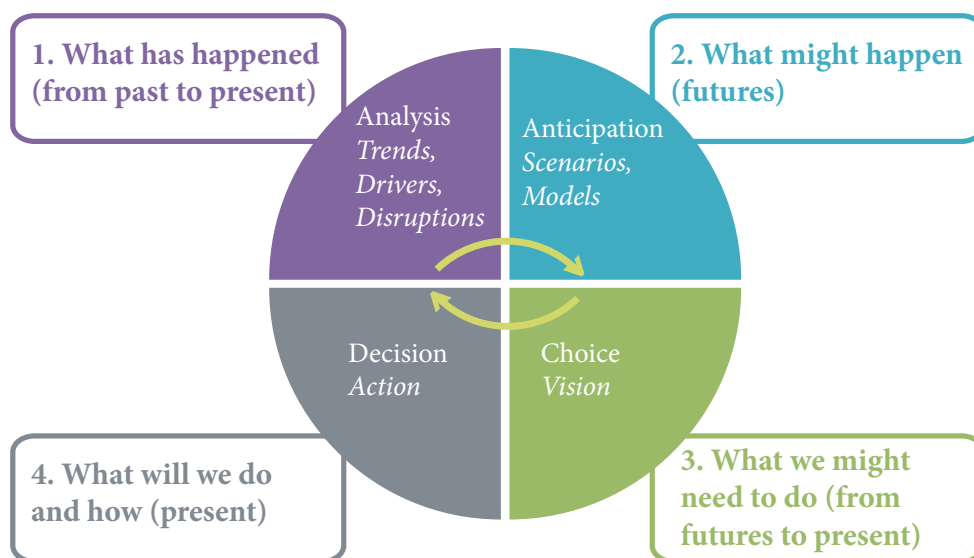
**A Glossary of Terms commonly  
used in Futures Studies**  
*Full Version*

Produced by the Forward Thinking Platform and supported by  
The Global Forum on Agricultural Research (GFAR)

September 2014

## Note for the users

Our future is unpredictable but we are not powerless to confront it. The future can be anticipated, explored, and its course can be changed. This is what the field of Futures Studies deals with. People can engage in thinking about the future through different means, with different objectives, in order to reduce uncertainties and prepare for what might happen. As shown below, Futures Studies allow us to navigate the past, the present and the future and inform us about the options, the choices we can make, and the actions we can take.



The glossary contains concise, easily understandable definitions of the most common terms used in Futures Studies. For each term it provides a definition and some Notes and Examples of use/References allowing you to get additional knowledge if you wish so. The glossary intends to help readers and writers to better understand the meaning of these terms and how to use them when applied to food, agriculture and rural development. It will also help make your conversations about the future more shareable, as requested to the Platform at the [2nd Global Conference on Agricultural Research](#).

This glossary was produced by volunteer members of the [Forward Thinking Platform](#), a network of foresight practitioners from different sectors and disciplines, supported by the [Global Forum on Agricultural Research \(GFAR\)](#). It is the product of a collective venture which included two rounds of peer-review and a user pre-test to improve its relevance, usefulness and user-friendliness. The definitions proposed make most people comfortable with them. However, they do not intend to prevail over others. The glossary is a living document and will be regularly updated. A shorter version with definitions only can also be downloaded at <http://bit.ly/FTPGlossaryShort>.

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## Anticipation

*The sense of expectation of an occurrence, [predicting](#) it and occasionally the act of preparing for it.*

### Note:

Anticipation covers all efforts to “know the future”. Systems of anticipation are incorporated in all phenomena, conscious or unconscious, physical or ideational; from a tree that loses its leaves in the autumn through to human planning. The term anticipation is used as a ‘cover’ term to describe different ways of ‘using the future, for example to make sense of, or decisions in, the present’.

### Examples of use/reference:

Anticipation has been widely studied within a number of different disciplines including biology, anthropology, cognitive and social sciences, but to date nobody has collected and systematically compared the results. This is now occurring through the [UNESCO Chair in Anticipatory Systems](#). The website is known as [Project Anticipation](#). It aims, amongst others, to centralize the study of anticipation for the first time, and to define the Discipline of Anticipation as a cohesive body of knowledge.

“Without anticipation there can be no freedom in making a decision”. (p6)

European Commission (2004) EUR 21262 – Foresight and the Transition to Regional Knowledge-based Economies, Draft final report of the expert group “[Blueprints for Foresight Actions in the Regions](#)”, Luxembourg: Office for Official Publications of the European Communities.

M. Godet, From Anticipation to Action: A Handbook of Strategic Prospective, Unesco Publishing, 1993.

## Backcasting

*The process of working backwards from the definition of a possible [future](#), in order to determine what needs to happen to make this [future](#) unfold and connect to the present.*

### Note:

We could, for example, envision sustainable intensification of agriculture feeding the world population in 2050 without jeopardizing natural resources and the environment for coming generations. Backcasting identifies what actions must be taken to get there in terms of policies, programs and international agreements, trade, behavioural changes, technologies and practices, capacity development, etc. Separating the “what needs to happen” into controllable and uncontrollable components is the function of “controllable forecasting,” a special case of backcasting.

### Examples of use/reference:

See examples of the use of backcasting in Briefs 03, 17 and 19 published in the GFAR series “[The futures of Agriculture](#)”

See also “[The Roads from Rio+20](#)”

Wangel J. (2011) [Exploring social structures and agency in backcasting studies for sustainable development](#), *Technological Forecasting and Social Change* 78(5): 872-882.

Carlsson-Kanyama A., Dreborg K.H., Moll H.C., Padovan D. (2008) Participative backcasting: A tool for involving stakeholders in local sustainability planning, *Futures* 40(1): 34-46.

D.B. Learner and F. Phillips (1979) Information-Theoretic Models for Controlled Forecasting in Marketing, in D.B. Montgomery and D.R. Wittink (eds.), *Market Measurement and Analysis: Proceedings of the ORSA/TIMS Marketing Science Conference*, Marketing Science Institute.

## Baseline

*A set of reference data used as a basis for comparison.*

### Note:

Baseline data refer to characteristics of current conditions as a basis for comparison with future observed conditions, or characteristics of future conditions projected under a reference scenario as a basis for comparison with future conditions under alternate scenarios.

### Examples of use/reference:

“The baseline projection is not a forecast about the future, but rather a plausible scenario elaborated on the basis of specific assumptions regarding the macroeconomic conditions, the agriculture and trade policy settings, weather conditions, longer term productivity trends and international market developments”. (p3) OECD-FAO Agricultural Outlook 2013-2022.

“Though it represents a starting point when dealing with foresight, the annual baseline does not constitute a forecast, but rather a benchmark of what could happen under a particular set of assumptions. Inherent uncertainties, including policy changes, weather, and other market variations, ensure that the future is highly unlikely to match baseline projections”. [BFAP - Scenario Planning](#)

Definition adapted from [Merriam-Webster Dictionary](#)

## Black swan

*A metaphor describing an extremely low-probability /unforeseen, high impact event that takes everyone by surprise.*

### Note:

It has become part of everyday language since Taleb published “The Black Swan: the impact of the highly improbable” in 2007. It is often used interchangeably with the term ‘Wild Card’. It is often rationalized after the fact with the benefit of hindsight, for example the Great depression was totally unexpected but was retrospectively considered as expectable.



## Examples of use/reference:

“Then there are the unknown unknowns, rare events that are completely unexpected and unimagined. These are Black Swans, so eloquently characterized by Taleb (2004, 2007). They can only be identified after their occurrence, since if we could have anticipated them before, they would not be Black Swans. Looking back at history, the internet was a Black Swan, as was the Great Depression of 1929–1933”. (p795) Makridakis S., Hogarth R. , Gaba A. (2009) Forecasting and uncertainty in the economic and business world, [International Journal of Forecasting](#) 25(4): 794-812.

## Breaks, Ruptures, Disruptions, Discontinuities

*Abrupt, major changes in the nature or direction of a trend.*

### Note:

A break (or a rupture) scenario presents a clear and definitive interruption in the projection of an on-going situation. A discontinuity is often associated with the concept of wild card and critical uncertainty. The kinds of disruptions described here are to be distinguished from “disruptive technologies” as that phrase was popularized by Prof. Clayton Christensen. Disruptive technologies disrupt markets slowly, because at first they are perceived as too simple or too cheap to take on the functions currently performed by more expensive, older machinery. Disruptive technologies are not clear and definitive interruptions.

## Examples of use/reference:

A major rupture in agricultural production would be the massive use of synthetic biology.

A “rupture scenario” can depict a preferred world like the AG1 scenario in Agrimonde which seeks to ensure the sustainability of agricultural and food systems.

“Discontinuities are those situations [...] where over time and extending beyond single events, change is rapid and fundamentally alters the previous pathways or expected direction of policies, events and planning regimes. [...] when discontinuities occur in society and government, the changes tend to be more significant because they can alter so many other domains.” (p297) Saritas O., Smith J. (2011) [The Big Picture: Trends, drivers, wild cards, discontinuities and weak signals](#), [Futures](#), 43(3): 292-312.

Definition adapted from [Practical Foresight Guide](#) and [World Future Society](#)

## Business as usual

*A path towards a future considered as the continuation of the current path.*

### Note:

“Business as usual” is also often considered as a likely future in the absence of major changes, or disruptive tipping points, in policy, technology, resource conditions or other driving forces and described through projection of current trends or mega trends.

## Examples of use/reference:

“In the absence of change towards a new, shared global framework for sustainable development of agriculture and food systems, a Business-As-Usual (BAU) trajectory would have severe implications for food and nutritional security, economic and social development, public health as well as environmental sustainability.”  
[Solutions for Sustainable Agriculture and Food Systems](#) (p10)

See also [International assessment of agricultural knowledge, science and technology for development \(IAASTD\)](#) .

## Causality

*A logical link between events where a cause precedes an effect and altering the cause alters the effect.*

### Note:

The simplest case is when the cause is almost always associated with the effect, i.e., moving a switch turns a light on. A cause can also prevent something from happening, e.g., a vaccine prevents an illness. Another type of causality is when something is necessary for an event to happen, but its occurrence does not trigger the effect; for instance, infrastructure is needed for economic growth, but by itself, it does not cause growth. Which causes are relevant depends on the goals and perspective of the person(s) analysing the causality. An anthropologist and an economist would usually consider different sets of causes when analysing the same phenomenon.

## Examples of use/reference:

“The idea behind considering the wholes and related elements as a system is based on the perception of ‘causality’. Causality explains the interrelatedness and interdependency of the elements. Interrelatedness is the connection between the elements of the set that make up the system and implies that the system taken as a whole has properties that differ from those of the simple sum of the effects of the individual relationships between pairs of elements. Interdependency is more specific and is the way relationships are conducted.”  
(p45) [Systems Thinking in Foresight](#)

Mitroff I., Silvers A. (2013) Probabilistic causality, *Technological Forecasting and Social Change* 80(8): 1629-1634.

Definition adapted from [Wikipedia](#)

## Complex systems

*Systems which are made up of multiple interacting components exhibiting emergent macro-behaviour and interact dynamically with their wider contexts.*

### Note:

In the context of Futures Studies, complex systems such as social/economic/natural systems are characterized

by macro-behaviour emerging from micro-interactions, feedbacks across different system levels and openness, sensitivity to initial conditions/path-dependence, and adaptation and evolution in interaction with its context. Foresight responds to the need to plan with complex systems which means that approaches to explore their future behaviours cannot be predictive, but have to investigate a wide diversity of potential future states and developments.

### Examples of use/reference:

Folke, C. (2006) Resilience: The emergence of a perspective for social-ecological systems analyses, *Global Environmental Change* 16(2006): 253-267.

Holland, J. (1998) *Emergence: From Chaos to Order*. Oxford University Press, Oxford.

Levin, S. (1999) *Fragile Dominion - Complexity and the Commons*.

M. Mitchell, *Complexity: A Guided Tour*, Oxford University Press, 2009.

[Alex Ryan: A Multidisciplinary Approach to Complex Systems Design](#)

[Cosma Rohilla Shalizi: Methods and Techniques of Complex Systems Science: An Overview](#)

## Delphi

*An anonymous survey method using iterative structured feedback to pool **expert** opinion on the future.*

### Note:

A Delphi is carried out in a series of rounds, each of which is modified by the results of the previous one. In Futures studies, it is used to make experts' tacit knowledge of the future more explicit. It is also used for longer-term assessments where extrapolations make no sense. It is designed to avoid domination by particular individuals. It is sometimes criticized for stressing consensus over divergence. Recently, several versions of round less online Delphi method have been developed.

### Examples of use/reference:

See "The Futures of Agriculture", Brief 19 and Brief 20

On online Delphi, see [Real-Time Delphi \(RTD\)](#)

Definition adapted from [Delphi Survey](#)

## Drivers, Driving forces

*Factors causing change, affecting or shaping the **future**.*

### Note:

Drivers are often characterized as "direct" or "indirect/underlying". A direct driver univocally influences an outcome in the system. An indirect driver (sometimes called a moderating or mediating variable) operates more diffusely, altering one or more direct drivers.

## Examples of use/reference:

“What’s a driver? In a world of cause and effect, it is the cause.”

[Learning From Technology Foresight Connections](#)

“Thus, drivers of change are those factors, forces or events [...] which may be amenable to changes according to one’s strategic choices, investments, R&D activities or foresight knowledge and strategies. They are both presently accessible and future relevant”. (p295) Saritas O., Smith J. (2011) [The Big Picture: Trends, drivers, wild cards, discontinuities and weak signals](#), *Futures* 43(3): 292-312.

Geographers also use the terms “[proximate causes](#)” and “underlying drivers”

Definition adapted from [Global Foresight Glossary](#) and [Drivers of Change in Ecosystems and Their Services](#)

## Emerging pattern

*A novel situation/new [trend](#) created by unforeseen recurrent events.*

### Note:

These events can also be called weak signals. Emerging patterns can transform the existing process substantially; most times, emerging patterns have little consequences or die off. Whereas a high degree of uncertainty is associated to the amplification/dissemination of an emerging pattern, it is not excluded that it will replace the current mainstream pattern in the future.

## Examples of use/reference:

The urban-to-rural migration is a typical emerging pattern taking place in many countries, for many different reasons. It is very little compared to massive rural to urban migration. Maybe it will die or maybe it will set the direction for the future? See more on [Return to Rural Communities: Resilience over Efficiency](#)

Definition adapted from [Practical Foresight Guide Chapter 11 – Foresight Glossary](#)

## Expert

*A person who has a special skill, knowledge, insight, or ability in a particular domain based on research, experience, judgment, or occupation.*

### Note:

In Futures Studies, experts bring different perspectives and knowledge for the exploration of future developments. The diversity of experts has to match the diversity of issues related to the topic being studied.

## Examples of use/reference:

“Experts bring the possibility to incorporate non recorded and/or qualitative data into the whole process

and to take advantage of an often unsuspected wealth of information. As stakeholders, invited experts can also directly apply the results or produce changes. However, there are some potential problems due to the recourse on experts' knowledge. The first problem is the aggregation of individual opinions into a common representation. The second problem relates to the fact that nobody is omniscient, and experts are bound by their understanding of the problem, their own interest and other factors. Biases may thus be introduced in the process. These can nevertheless be kept to a low level. Agreement on the collective decision-making procedure and the use of structured frameworks combined with brainstorming techniques allow the experts to go through a common mental process, facilitating the aggregation of their preferences.” (pxxi)  
[Participatory Prospective Analysis](#)

Definition adapted from [Wikipedia](#) and [Oxford Dictionaries](#)

## Exploration

An *anticipatory* inquiry that investigates a wide range of possible future developments, considered from a variety of perspectives.

### Note:

An exploration looks at the requirements, implications and consequences of a wide scope of possible developments, rather than defining the futures considered as most probable or most desirable. Explorative scenarios are often distinguished from predictive and normative scenarios.

### Examples of use/reference:

Hoogwijk, M., Faaij, A., van den Broek, R., Berndes, G., Gielen, D., & Turkenburg, W. (2003) Exploration of the ranges of the global potential of biomass for energy, *Biomass and Bioenergy* 25(2): 119-133.

van Ittersum, M. K., Rabbinge, R., & Van Latesteijn, H. C. (1998). Exploratory land use studies and their role in strategic policy making, *Agricultural Systems* 58(3): 309-330.

Definition adapted from [Online Foresight Guide](#)

## Extrapolation

*Application of a method or conclusion to a new situation assuming that existing trends will continue or similar methods will be applicable.*

### Note:

By extension, extrapolation relies on the assumption that an observed relationship will continue into the future.

### Examples of use/reference:

“Successful generalization or extrapolation basically demands that we know the underlying causal

mechanisms that drive the observed behavior, and can guarantee that they remain stable for the period of interest. [...] As such, extrapolation is a starting point for exploring scenarios and suggesting viable courses of action, but not for determining specific trends.” (p466) Piirainen K., Gonzalez R., Bragge J. (2012). [A systemic evaluation framework for futures research](#), *Futures* 44(5): 464-474.

Definition based on [Practical Foresight Guide](#)

## Forecast, Forecasting

*A statement that something is going to happen in the future, often based on current knowledge and trends. Forecasting is the process of making a forecast.*

### Note:

Forecast implies less certainty about the event's occurrence than a definitive prediction, but the terms are often used interchangeably. Forecast is usually applied to short-term futures – such as one year ahead.

### Examples of use/reference:

“The principle behind forecasting is to analyze past events, identify regularities (laws), and then use these as a basis for drawing conclusions about future events.” [Using Trends and Scenarios as Tools for Strategy Development](#) (p33)

Definition based on [World Future Society](#)

## Foresight

*A systematic, participatory and multi-disciplinary approach to explore mid- to long-term futures and drivers of change.*

### Note:

Foresight provides a space to different stakeholders and experts for systemic thinking and developing anticipatory knowledge. It explores future changes by anticipating and analysing possible future developments and challenges both qualitatively and quantitatively, and supports stakeholders to actively shape the future vision for today strategies and actions.

### Examples of use/reference:

“Foresight does not aim to predict the future or to unveil it as if it was already prefabricated – but rather to help us build it. It invites us to consider the future as something that we create or build, rather than as something already decided. The future is not already fact. It is not predetermined. On the contrary, it is open to many possible futures.” [Foresight and the Transition to Regional Knowledge-based Economies](#) (p21)

Definition adapted from [Online Foresight Guide](#) and [Global Foresight Glossary](#)

# Future

*The time yet to come.*

## Note:

In the plural, “futures” emphasizes that the future may take different forms and therefore, there is uncertainty about what the future will hold. In Futures Studies, the future is often considered with a mid-to long term time horizon, usually between 10 to 50 years ahead.

## Examples of use/reference:

“Needs and expectations of EU citizens are quickly evolving. What rural areas will be in the future in Europe mostly depends on what European society demands of these territories. Environmental, social or economic priorities also will determine the objectives of agricultural and rural policies.” The [2nd SCAR Foresight Exercise](#) (p33)

Definition based on [Practical Foresight Guide](#)

# Futures Studies

*A field of studies, focusing on a methodical **exploration** of what the **future** might be like.*

## Note:

Futures studies are a mosaic of approaches, objectives and methods. The plural makes it clear that our future is not predetermined.

## Examples of use/reference:

According to Borg (2003), futures studies generally can have four broad aims: (1) to create interesting future images, visions and scenarios; (2) to support planning and decision making; (3) to help solving the great global questions of humankind and (4) to develop applicable interdisciplinary methodology. Kuosa T. (2011) [Evolution of futures studies](#), *Futures* 43(3):327–336.

Borg, O. (2003). The Relationship between futures research and other disciplines and fields of knowledge. In: M. Vapaavuori, S. von Bruun (Eds.), *How We Research the Futures [in Finnish]?* Acta Futura Fennica No. 5. Helsinki, Vapokustannus, ISBN 951-98852-1-8 (2003), pp. 303–313.

Definition based on [Online Foresight Guide](#)

## Horizon scanning

A systematic method for gathering new insights on issues which may impact the *future*.

### Note:

Horizon scanning explores novel and unexpected issues as well as persistent problems and trends, including matters at the margins of current thinking that challenge past assumptions. It is often based on desk research, helping to develop the big picture behind the issues to be examined. Desk research involves a wide variety of sources, such as the Internet, government ministries and agencies, non-governmental organisations, international organisations and companies, research communities, and on-line and off-line databases and journals.

### Examples of use/reference:

Rockefeller Foundation Horizon Scanning and Trend Monitoring Report - Greater Horn of East Africa – February 2010

Horizon Scanning Programme: a new approach for policy making

Ramírez, R., Österman, R., Grönquist, D. (2013) Scenarios and early warnings as dynamic capabilities to frame managerial attention, *Technological Forecasting and Social Change* 80(4): 825-838.

Definition adapted from [Global Foresight Glossary](#), [Practical Foresight Guide](#), [Eionet Forum](#) and [Overview of Methodologies-OECD](#)

## Knowledge

Information about what the *future* could be before it exists, acquired through the practice of *Futures Studies*.

### Note:

Sometimes called “foreknowledge”, it is about human anticipation of alternative courses of events.

### Examples of use/reference:

“In distinction to normal science, foresight knowledge

1. is non-verifiable in nature since it does not give a representation of an empirical reality. It can, therefore, also not be related to the normal use “predictability” of events. The quality of foresight knowledge is discussed in terms of its plausibility rather than in terms how accurate it is in terms of the predictability of certain events. Foresight exercises are therefore often characterized as “explorative” in nature and not meant to produce predictions.
2. has a high degree of uncertainty and complexity whereby uncertainties exists concerning particular causal relationships and their relevance for the issue of concern.
3. thematises usually a coherent vision whereby relevant knowledge includes an anticipation of “the unknown”.” [Deliberating Foresight Knowledge for Policy and Foresight Knowledge Assessment](#) (p14)



## Mapping

*A process seeking to display how factors that have created the present and/or can create the **future** are inter-connected.*

### Examples of use/reference:

[Healthy Animals | Healthy Future 2025](#) employs systems mapping

Definition adapted from [Futures studies - The six pillars approach](#)

## Model

*A simplified representation of an object, an event or a process.*

### Note:

A model is built on assumptions and highlights the interactions believed to be the most important. In a broader sense, models include fuzzy cognitive representations used by in everyday life to assess decisions and make sense of the perceived information. More formalized models serve to validate assumptions about the structure and behaviour of the studied system and to simulate possible or probable past and future trajectories of this system.

### Examples of use/reference:

“Essentially, all models are wrong, but some are useful”. (p 424) Box, George E. P. and Norman R. Draper (1987) *Empirical Model-Building and Response Surfaces*, Wiley.

Reilly M., Willenbockel D. (2010) [Managing uncertainty: a review of food system scenario analysis and modelling](#), *Phil. Trans. R. Soc. B*, 365(2010): 3049-3063.

## Narrative, Storyline

*A coherent description of a **scenario** (or a family of scenarios), highlighting its main characteristics and dynamics, the relationships between key **driving forces** and their related outcomes.*

### Examples of use/reference:

“The scenario narrative gives voice to the important qualitative factors shaping development such as values, behaviors and institutions, providing a broader perspective than is possible from mathematical modeling alone. Recent combinations of long-term narratives with scenarios quantification are attempting to combine the advantages of both approaches ... “ (p141) Swart et al. (2004) *The problem of the future: sustainability science and scenario analysis*, *Global Environmental Change* 14(2004): 137–146.

The storylines of the [IPCC SRES Scenarios](#)

The narratives of the [Millennium Ecosystem Scenarios](#)

The narratives of the [3rd SCAR Foresight Exercise](#)

## Normative

*Describes a preferred scenario, or future.*

### Examples of use/reference:

“AG1 [Agrimonde 1] is a normative scenario. It seeks to ensure the sustainability of agricultural and food systems, and explores regional trajectories of changes that could help meet this goal.” [A normative and a positive trend scenario](#)

“In the end the groups generated quite a positive scenario for the Asia Pacific in 2050. This result was not surprising given the normative scenario method employed for this workshop, which was designed to identify ways to overcome a negative force, the impacts of climate change”. [The Futures of Low-Carbon Society](#) (p23)

## Outlook

*A description of a future state or development that is considered likely (or at least plausible) given clearly defined logic and assumptions.*

### Examples of use/reference:

“The Outlook is presented as one baseline scenario that is considered plausible given a range of conditioning assumptions. These assumptions portray a specific macroeconomic and demographic environment which shapes the evolution of demand and supply for agricultural and fish products”.

[OECD-FAO Agricultural Outlook 2013-202](#) (p19)

## Pathway

*A trajectory in time, reflecting a particular sequence of actions and consequences against a background of autonomous developments, leading to a specific future situation.*

### Note:

Pathways are described in the form of narratives, often underpinned by quantitative information. Multiple pathways to any given endpoint are possible, each involving different actions and consequences. For example, food production in a given region may increase by 10% over a decade (a given endpoint), but via diverse pathways e.g. via several discrete jumps or via steady annual growth, and via changes in technology or via area cultivated.

## Examples of use/reference:

Haasnoot et al. (2013) Dynamic adaptive policy pathways: A method for crafting robust decisions for a deeply uncertain world, *Global Environmental Change* 23(2013): 485-498.

## Plausible

*Judged to be reasonable because of its underlying assumptions, internal consistency and logical connection to reality.*

### Note:

Plausibility is often used as a scenario validation criterion. Plausibility does not mean that a future situation will happen. It means that the events grounding a scenario can be logically connected leading to its outcome. The plausibility of a scenario is a subjective characterization by those engaging with the scenario. In multi-stakeholder contexts, a scenario may therefore be viewed to be plausible or implausible by different actors. When a diverse group of actors is engaged to ensure that they view a set of scenarios as plausible, it is more likely that others outside the group will agree.

## Examples of use/reference:

“Plausibility refers to the structure of the argument, where truth-value is based on the convincingness, the credibility, of the discourse describing the future.” Page 26 van der Helm R. (2006) “Towards a clarification of probability, possibility and plausibility: how semantics could help futures practice to improve”, *Foresight*, 8(3): 17-27.

Amer M., Daim T.U., Jetter A. (2013) *A review of scenario planning*, *Futures* 46(1):23-40.  
[Foresight Alliance](#)

## Predictability

*The degree of confidence in a forecasting system based either on law derived from observations and experience or on scientific reasoning and structural modelling.*

### Note:

The estimation can be quantitative as well as qualitative. Predictability can either be applied to foretell a single event or properties of a stochastic process where the timing, frequency and magnitude of occurrence of individual events can be highly uncertain (e.g. based on geological knowledge a catastrophic earthquake in San Francisco is certain to happen within the next hundreds of years)

## Examples of use/reference:

Goodwin P., Wright G. (2010). *The limits of forecasting methods in anticipating rare events*, *Technological Forecasting and Social Change* 77(3): 355-368.

## Proactive

*Oriented towards acting in advance of a future situation, averting undesirable futures and working towards the realization of desirable futures.*

### Examples of use/reference:

“We live in a turbulent and uncertain world. Dealing with changing circumstances, as well as with the fast pace of change today, is extremely difficult. One response is to wait for events to happen and then to react to them. Increasingly, however, governments, businesses and organizations are realizing that if they stand still, changes will leave them somewhere that they do not want to be. An alternative is to be proactive by using foresight.” [APEC Center for Technology Foresight](#)

“La prospective is pre-active and pro-active. [...] In the face of the accelerating pace of change, the uncertainties of the future, and the increasing complexity of phenomena and interactions, an antifatalistic, pre-active (anticipating changes) and pro-active (provoking changes) attitude is essential.” [Godet and Roubelat \(1996\) Creating the future: The use and misuse of scenarios, Long Range Planning, 29\(2\): 164-171. \(p1-2\)](#)

## Probability

*The likelihood of something happening or changing.*

### Note:

Probability is often expressed numerically: “There is 60% chance of rain.” The notion of probability is used in many aspects of foresight and futures work, often using words such as ‘likely’, ‘unlikely’, ‘impossible’ and ‘certain’. For example, “Using the best available scientific and other evidence, the team explored the pressures on the global food system today, and how these will likely evolve between now and 2050.” [The Futures of Agriculture, Brief No.42. The Future of Food and Farming](#)

### Examples of use/reference:

“A probable future is a future that is more likely than some other future. Likelihood should mainly lead to ordinal ranking of alternative futures between more and less likely. Whether we select likely or less likely futures is a matter of study objectives”. (p26) [Page 26 van der Helm R. \(2006\) “Towards a clarification of probability, possibility and plausibility: how semantics could help futures practice to improve”, Foresight, 8\(3\): 17-27.](#)

The diagram in [Math is fun](#)

## Projection

*An expected value of one or more indicators at particular points in the future, based on the understanding of selected initial conditions and drivers.*

### Note:

A projection has a narrower scope than a scenario. For example, a projection could be the production of maize in Mexico in the year 2050 while a scenario would describe how social, economic, biophysical and other conditions unfold over time and affect the production of maize and potentially food security.

### Examples of use/reference:

“The projections presented reflect the magnitudes and trajectories we estimate the major food and agriculture variables may assume in the future; they are not meant to reflect how these variables may be required to evolve in the future in order to achieve some normative objective, e.g. ensure food security for all, eliminate undernourishment or reduce it to any given desired level, or avoid food overconsumption leading to obesity and related Non-Communicable Diseases.” Page i. FAO projection on food security by 2050 - [World Agriculture Towards 2030/2050](#)

Definition based on [The Free Dictionary](#) and [Eionet Forum](#)

## Prospective

*Refers to the French foresight method “La Prospective” which is based on the principle that the future is not written, but is to be built as a collective endeavour.*

### Note:

La Prospective is both a method and an attitude. It is a systematic and participatory process to gather knowledge about the future and build medium and long term visions, with the aim of guiding decisions to be taken in the present and mobilizing joint actions to build the desired future.

### Examples of use/reference:

“The prospective attitude does not wait for change and then react; it aims to master expected change (preactivity) and to induce a desired change (proactivity). Preactivity is what guides all approaches to future studies, forecasting, scenario planning and foresight. Proactivity is more voluntarist, and aims to bring about the desired changes by means of strategic planning.” [Godet M., \(2010\) Future memories, Technological Forecasting and Social Change, 77\(9\): 1457-1463. \(p1457\)](#)

Definition adapted from [Les Agendas 21](#)

## Qualitative

*Characterizes something that can be observed but not measured numerically.*

### Note:

Qualitative information can be as objective or subjective as quantitative information. A qualitative approach generally analyses in depth a few observations about a large number of characteristics and changing cause-effect relationships.

### Examples of use/reference:

“Generally quantitative methods are considered useful for narrowly focused projects having short time horizon, while qualitative methods are considered appropriate for projects having large scope and long time horizon”, Amer M., Daim T., Jetter A. (2012). *A review of scenario planning*, *Futures* 46(1): 23-40. page 31.

“In short, then, qualitative methods allow us to envision peripheral scenarios that comprise radical innovation. They tend to focus on explanation of the circumstances (technical, social, and political) under which such innovations are likely to unfold”. (p1064) Borch K. (2007) *Emerging technologies in favour of sustainable agriculture*, *Futures* 39(9):1045-1066.

Definition based on [Wikipedia](#) and [Oxford Dictionaries](#)

## Quantitative

*Characterizes something that can be observed and measured in magnitude and multitude.*

### Note:

A quantitative approach generally analyses many observations about a few characteristics and defined relationships. Projection and forecast are quantitative methods.

### Examples of use/reference:

“Quantitative methods are available for and have been applied to project agricultural research impacts on nutritional wellbeing, human health and the natural resource environment. However, due to the multifaceted nature of nutrition, health and the environment, less confidence can be placed in most quantitative assessments of predicted agricultural research impacts on these factors.” Page 14 - [Donor Methods to Prioritise Investments in Agricultural Research and Development](#)

Definition based on [Oxford Dictionaries](#) and [Wikipedia](#)

# Roadmap

## Note:

Usually, roadmapping is a normative tool where the desired future state (or possibly states) is pre-determined. Technology Roadmapping refers to forecasting studies including visions and detailed projections of future science and technology developments, products or environments. Roadmaps and roadmapping in futures studies are often related with technological foresight. Roadmaps often include graphic representation.

## Examples of use/reference:

“To achieve a low - carbon future, a new way of thinking must be adopted by the entire global population. Motivating such change is about learning what tools and strategies to deploy, or not, that can help both developed and developing countries to shift their priorities and expectations. Politics, political arrangements, economic priorities, population pressures, resource constraints and social system all must be assessed. Foresight allows the arrangement and rearrangement of all these variables to output a timeline, a roadmap, to a new world.” [Low Carbon Society - Final Report](#) (p26)

Borch K. (2007) Emerging technologies in favour of sustainable agriculture, *Futures* 39(9): 1045–1066.

Könnölä T., Scapolo F., Desruelle P., Mu R. (2011) [Foresight tackling societal challenges: Impacts and implications on policy-making](#), *Futures* 43(3): 252-264.

# Scenario

*A description of how the **future** may unfold according to an explicit, coherent and internally consistent set of assumptions about key relationships and **driving forces**.*

## Note:

A scenario consists of two key elements. (1) A description of the end-state i.e. what does the world look like at the end of the time horizon for which the scenario has been developed (e.g. the world in 2020, 2035, etc.). (2) A storyline (causal logic) explaining how this future came about, describing a sequence of events in a timeline. The selection of a name for the scenario helps with differentiation, communication and memorability. A scenario can be illustrated through images and model based quantification. It can be presented in different formats – narrative, animation, systems maps and story maps. Scenarios can be created using a variety of different building methods – deductive, inductive, incremental, normative, abductive.

## Examples of use/reference:

[Aids in Africa: Three Scenarios for 2025](#)

van der Heijden K. (2006) *Scenarios: The Art of Strategic Conversation*, Wiley and Sons.

[Shell Scenarios](#)

[UNIDO Technology Foresight Manual](#)

Wilkinson A., Roland Kupers R. (2014) *The Essence of Scenarios: Lessons from the Shell Experience*, Amsterdam University Press.

## Simulation

*Assessment of **system** behaviour undertaken by building and using **models** that are designed to behave in a manner analogous to a real system.*

### Note:

In Futures Studies, simulations usually use computer-based models or a game with human players, or a combination of both. Examples of application include changes in crop yields, the dynamics of rural communities, land use change in a watershed, or spatially explicit changes in global food supply and demand, etc.

### Examples of use/reference:

Haasnoot et al. (2013) *Dynamic adaptive policy pathways: A method for crafting robust decisions for a deeply uncertain world*, *Global Environmental Change* 23(2013): 485-498.

See also Briefs N° 9, 15, 27 and 30 in the Series “The Futures of Agriculture”

Definition adapted from [World Future Society](#) and [Global Foresight Glossary](#)

## Strategic planning

*Preparing for, or achieving, some future state.*

### Note:

Strategic planning is a normative method taking the objectives and aims of the eventual activities as ends for which the most effective means are sought. It is still commonly used as a top-down approach in corporate foresight and tend to focus on shorter-term, more predictable topics.

### Examples of use/reference:

Brief 3 of the series “The Futures of Agriculture” and *A Scenario-based Approach to Strategic Planning – Integrating Planning and Process Perspective of Strategy*

Definition adapted from [JRC Strategic Planning](#) and [Global Foresight Glossary](#)



## System

*A set of interconnected elements that is coherently organized in a pattern or structure. Systemic: relating to or affecting the whole of a system, rather than just some parts of it.*

### Note:

System thinking is a fundamental perspective (or paradigm) of Futures Studies; it is the lens through which futures thinkers view the world.

### Examples of use/reference:

“The concept of vulnerability and of resilience imposes a system thinking frame based on acknowledgement of the interdependencies between drivers, feedback loops and non-linear trends. Vulnerability and resilience of agri-food system can have multiple sources, and these sources may interact to generate unexpected responses.” Page 73 at [New Challenges for Agricultural Research](#)

Definitions adapted from [Foresight Glossary](#) and [Cambridge Dictionaries Online](#)

## Time Horizon, Time Frame

*The farthest point in the future that one will consider in a Futures Study. The time frame refers to the complete period (past-to-future) considered in a Futures Study.*

### Note:

In Futures Studies, the time horizon is not the same as the decision period/budget cycle but the two are related. The time horizon is a negotiated period of time that is as far as possible in the future to enable learning but no too far as to be perceived as irrelevant for exploration, planning and decision-making. This includes both historic and forward looking periods, the length of which is determined by the nature and purpose of the exercise. A time frame/horizon is typically thought of as being ‘short-term’, ‘medium-term’ and ‘long-term’, however, this is relative to the perspective of the study. For an economic forecast 10 years ahead is a ‘long’ time horizon, whereas for a foresight study, this would be considered fairly short-term.

### Examples of use/reference:

“Research on the development of agriculture and food production must have a long-term perspective. It needs to embrace various changes in farming systems for crop and livestock production, as well as alterations in land use. The process of change in production systems and land use takes time. A time-horizon of about 40 years (to the year 2050) was chosen for this research programme. This timeframe encouraged the consideration of issues lying well beyond those arising today while remained sufficiently contemporary to engage stakeholders and scientists.” (p6) [Future Agriculture – Livestock, Crops and Land Use](#)

Definition adapted from [Online Foresight Guide](#) and [World Future Society](#)

## Transition

*A shift of a **system** from one state to another.*

### Note:

In a transition, existing structures, institutions, culture and practices are changed or broken down and new or modified ones are established. Societal transitions are processes of large scale change that structurally alter the culture, structure and practices of a societal system.

### Examples of use/reference:

“It’s the journey that counts and not the destination’, some say. Transitions to a sustainable society are like discovery journeys into the unknown; they are about exploration, learning, discovery and change. Since the destination (what is a sustainable society) is unclear and the roads towards it highly uncertain, the only way forward is to take small steps and regularly evaluate whether we are coming closer to or drifting away from our ideal destination.” (Preface) [Transition Management](#)

## Trend, Megatrend

*General tendency or direction of a movement/change over time. A megatrend is a major trend, at global or large scale.*

### Note:

A trend may be strong or weak, increasing, decreasing or stable. There is no guarantee that a trend observed in the past will continue in the future. Megatrends are the great forces in societal development that will very likely affect the future in all areas over the next 10-15 years.

### Examples of use/reference:

“Trends are those change factors that arise from broadly generalizable change and innovation. They are experienced by everyone and often in more or less the same contexts insofar as they create broad parameters for shifts in attitudes, policies and business focus over periods of several years that usually have global reach. What is interesting about trends is that normally most players, organizations or even nations cannot do much to change them – they are larger than the power of individual organizations and often nation states as well”. (p294) Saritas O., Smith J. (2011) [The Big Picture – trends, drivers, wild cards, discontinuities and weak signals](#), *Futures*, 43(3): 292-312.

[KPMG - Future State 2030](#)

Definitions adapted from [Foresight Glossary](#)

# Uncertainty

*A state of having limited **knowledge** about the **future**.*

## Note:

Uncertainty is a feature of complex systems that cannot be ignored, avoided or reduced and must be engaged by exploring diverse futures and their consequences. It is associated with the system of concern, with a given model/methodology used to represent the system, and with the limits of available knowledge. Attention to inherent uncertainty reflects the potential for novelty, emergence and discontinuity. Uncertainty is different from risk. Risk is quantifiable, whereas uncertainty can be divided in two categories. In the first category, uncertainty is recognized to exist but it is not quantifiable; in the second category the source uncertainty itself is not or cannot be identified.

## Examples of use/reference:

Knight, Frank H., *The Economic Organization*. Harper Torchbooks, New York, ©1951

Rumsfeld, D. (2011) *Known and Unknown: A Memoir*, Penguin.

van der Sluijs, J.P. (2012) Uncertainty and dissent in climate risk assessment: A post-normal perspective, *Nature and Culture* 7(2012): 174-195.

Schoemaker, P.J.H. (1993) Multiple scenario development: Its conceptual and behavioral foundation, *Strategic Management Journal* 4(1993): 193-213.

# Vision, Visioning

*A compelling image of a (usually preferred) **future**. Visioning is the process of creating a series of images or visions of the **future**.*

## Note:

The term vision tends to be used to refer to a single and preferred future. Image is more associated with alternative futures. Bringing together the viewpoints of the various actors through the elaboration of shared visions could be the most important intangible output of a Futures Study. Developing these visions jointly can contribute to a shared sense of commitment and to motivate and guide people toward focusing their efforts on achieving certain goals.

## Examples of use/reference:

The WBCSD Vision 2050

The Visioning Briefs N° 2, 19, 20, 26, 35 and 36 in the Series “The Futures of Agriculture”

Definition adapted from [World Future Society](#), [Global Foresight Glossary](#) and [Eionet Forum](#)

## Weak signal

*An early indication of a potentially important new event or emerging phenomenon that could become an emerging pattern, a major driver or the source of a new trend.*

### Note:

This information/change can be social, demographic, technological, environmental, economic, and psychological. What is observed is warning us about the possibility of occurrence of unexpected future events. Weak signals can be searched for and identified through horizon scanning for example.

### Examples of use/reference:

“In other cases, the feeling is there of a trend emerging, of a fact, or better still a set of symptoms (those ‘weak signals’), that suggests a trend is beginning to appear that will have a major impact on the future.” [Foresight and the transition to regional knowledge-based economies, Page 36](#)

In the US corn belt, some mid-Western farmers are investing in fruit and vegetable production on their corn fields. “The success of this movement, still in its toddler stage, could affect more than just the farmers. ... A turn toward locally grown produce would lessen the dependency on California (now plagued by drought), slash carbon emissions from trucking, make produce available to more people, increase its appeal through freshness and perhaps even lower prices”. See full article [here](#).

## Wild Card

*A surprising and unpredictable event, that would result in considerable impacts (or consequences) that could change the course of the future.*

### Note:

Although it is often used interchangeably with the term Black Swan, it has a specific application to foresight and futures work. Wildcards can be used to make scenarios more imaginative, to enhance out-of-the-box thinking. They indicate deep disruptions to existing trends and established systems.

### Examples of use/reference:

“Wild cards and shocks are those surprise events and situations which can happen but usually have a low probability of doing so – but if they do their impact is very high. These situations tend to alter the fundamentals, and create new trajectories which can then create a new basis for additional challenges and opportunities that most stakeholders may not have previously considered or prepared for”. (p295) [Saritas O., Smith J. \(2011\) The Big Picture – trends, drivers, wild cards, discontinuities and weak signals, Futures, 43\(3\): 292-312.](#)

Definition based on [Future mapping](#)

# Worldview

*How people see the world, with an emphasis on their unconscious assumptions, and the principles that they do not call into question.*

## Note:

Worldviews shape individual mind sets, that is, people's habitual way of thinking or perceiving their situations and their roles. A worldview includes notions of "what is" as well as "what ought to be". Engaging, revealing and testing worldviews is important in foresight practices that recognize the future is not neutral but a playing field of power. Cultural theory suggests that people can be broadly classified in four groups of different worldviews and values.

Nature capricious – the belief is that life is a lottery and neither needs nor resources are controllable.

Nature benign – the belief is abundant resources, and that the state of nature is global stability/equilibrium.

Nature ephemeral – the belief is that resources are depleting and that the natural state of the world is a precarious balance.

Nature perverse/tolerant – the natural state of the world is unstable equilibrium and whilst human needs cannot be controlled, resources can.

Source: [Cultural Theory of Individual Perceptions of Environmental Risks](#)

## Examples of use/reference:

van Asselt, M.B.A. and J. Rotmans (1996) Uncertainty in Perspective, *Global Environment Change* 6(2): 121-157.

Douglas, M., and A. Wildavsky (1982) *Risk and culture: An essay on the selection of technical and environmental dangers*, Berkeley: University of California Press.

Koltko-Rivera, M.E. (2004) The Psychology of Worldviews, *Review of General Psychology* 8(1): 3-58.

Definition is adapted from [Global Foresight Glossary](#)

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