



THE CHARACTERISATION OF A RIVER BASIN DISTRICT

Case study on the construction of the baseline scenario

*Inspired from
the Oise case (F)*

*Most elements picked from "Réalisation de scénarios de
référence sur le bassin de l'Oise et de l'Aisne",
Agence de l'eau Seine-Normandie, 2002*

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Go further 7

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Note

*This case study is inspired
from a real case
and uses real data.
Relevant practical informa-
tion is thus provided in the
manual (source of data...).
However, as it is intended as
an interactive presentation,
it is recommended to ensure
as much participation
as possible rather than to
deliver data directly.*

COMMENTS

Key ideas

Baseline scenario (BS) is not clearly addressed in WFD. Almost all elements come from WATECO Guidance.

BS is one of the essential elements of the characterisation: it will describe likely evolution of uses and pressures in the district until 2015. It will thus be intensely used for determining potential gaps between business as usual evolutions and the goal at that time. As the detection of potential gaps is the basis for the definition of supplementary measures, all elements brought by the scenario will be highly useful.

This slide is intended as a quick reminder of the concept before presenting the case study itself. Important points to stress on:

- i- BS forecasts what would happen in the case past trends would be followed, without implementing WFD
- ii- construction of BS is an open exercise: interested parties ought to be involved so that outcomes are endorsed by all actors.
- iii- BS is included in the characterisation. It is not an autonomous work but is deeply integrated in WFD procedure
- iv- it is important to broaden the scope suggested in annex III given the use of BS: it ought to address all factors influencing water supply

Go further

Guidance documents (main text, accompanying documents) "*Economics and the environment*" (working group 2.6). On baseline scenario: see Accompanying document, pp.114-131

http://forum.europa.eu.int/Public/irc/env/wfd/library?l=/framework_directive/guidance_documents&vm=detailed&sb=Title

BASELINE SCENARIO UNDER WFD

- Only mentioned in the directive
 - × annex III: one aspect of the 2004 characterisation
- What role for the baseline scenario?
 - × forecast what would happen in a given river basin district *without* WFD
 - × basis of risk of non-compliance analysis
 - × feeds economic analysis

Most elements come from WATECO Guidance

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YOUR NOTES

COMMENTS

Key ideas


The flow chart identifies when the construction of the BS takes place in the general WFD procedure, and details the key steps recommended for achieving a relevant outcome:

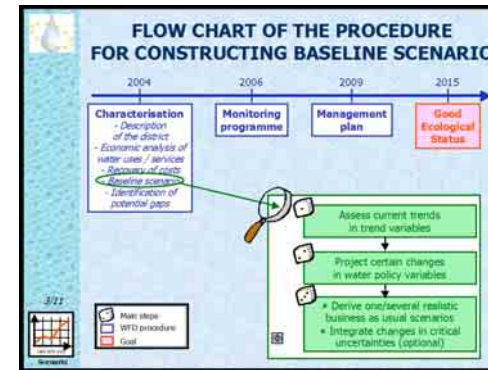
- × BS is a sub-task of the characterisation. Deadline is December 2004 thus
- × current situation and recent trends are assessed first. E.g. how domestic consumption of water has evolved in recent years.
- × changes likely to influence water supply are integrated in order to adjust first estimates. E.g. consider the impacts of a national/regional funding plan for the improvement of the quality of water
- × integration of changes in critical uncertainties will allow deriving realistic alternative scenarios. E.g. creation or extension of a large transport infrastructure (railway, airport...) is likely to lead to evolutions in demography, economic activity, etc. All these changes will have a direct impact on water supply.

Note

i-Dices appearing on the flow chart identify the main steps of the process.

They are used in the following slides to allow trainees to always identify the stage of the procedure being presented.

ii-Examples of the different types of variables referred to in the flow chart are available in the Go further section. Click on the  icon to switch to the relevant slide.



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YOUR NOTES

COMMENTS

Key ideas

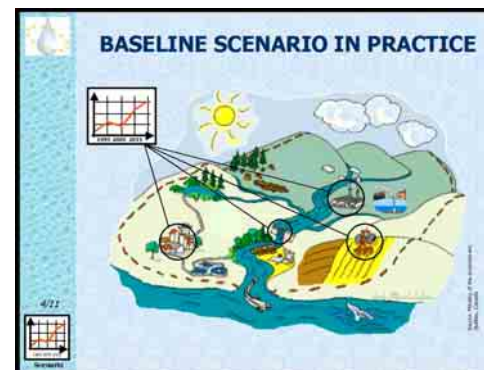
Identification on the virtual district map of the water body to which the case study refers: an aquifer.

Note

This case study picks up many elements from the Oise river basin case (F). However, for the purpose of the presentation, fake data is also mixed with real one.

Factual and descriptive information from the real case is provided all along the manual to allow a concrete description of the case. As the goal is to make it as interactive as possible, trainees should be involved in the analysis of the different stages of the designation procedure.

Go further



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YOUR NOTES

COMMENTS

Key ideas

Initial description of the case

General information regarding the basin is provided on the slide:

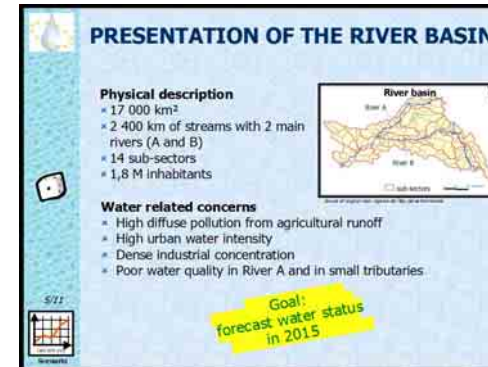
i- 17 000 km²; 2 400 km of streams; 2 main rivers (called A and B here); 14 sub-sectors with 118 hydrographic zones

ii-1.8 million inhabitants; population is concentrated a)in the South West of the basin, along river A and close to major city located right downstream
b)in the East close to another large city

iii-industry is concentrated along main streams (farm product and paper industry... upstream; chemical and metal industry... downstream)

iv-agriculture is present in all parts of the basin, particularly in the East (more rural); though decreasing, bovine breeding remains the main activity; it is being replaced by other intensive breeding in some sectors (porcine breeding, poultry...)

v-quality of the surface water is globally rather poor due to discharges from agriculture, industry and towns (both from wastewater treatment plants and from stormwater runoff); nitrate is globally a serious concern: all the basin is designated as "vulnerable zone" under the nitrate directive; quality is locally so bad that it hinders possibilities to restore a good status



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1

YOUR NOTES

COMMENTS

Key ideas

Quantitative data used is produced at municipal level and aggregated both at sub-sector and basin level. Quality is monitored in each hydrographic zone, but assessment carried out for BS is made at 14 points located in the downstream part of each sub-sector.

A two-level process was carried out for elaborating the BS:

- × experts' judgement regarding the likely impact of the reduction of discharge on surface water quality
- × simulation with an existing spatial model in order both to validate and to get more detailed data

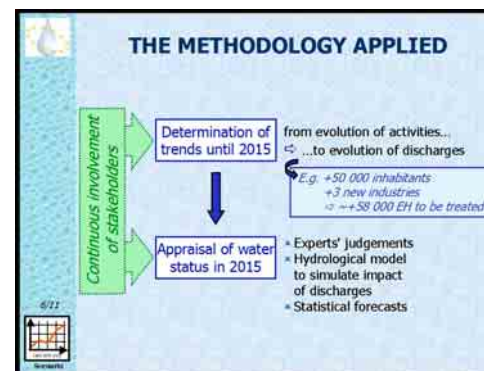
It is interesting to indicate that experts' judgement has revealed to be relevant and coherent with model simulations.

Other experts were involved in the BS process in order to identify growing trends and to deliver projections on major changes: evolution of industrial sector, new processes, growing environmental concerns and potential impact, etc. This aspect is useful regarding the second and third steps of the BS elaboration process.

Last but not least, stakeholders were strongly involved and local meetings were held gathering representatives from main sectors concerned. Collective endorsement of initial description, of assumptions applied and of projections is indeed essential for the next steps of WFD implementation, particularly the definition of required measures. Such an open process is also necessary as BS elaboration is based on a multidisciplinary approach involving economic and technical expertise in particular.

Note

Click on the blue arrow to switch to slide "Go further 3" which details the role of public participation.



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YOUR NOTES

COMMENTS

Key ideas

Recent trends have been assessed and short-term projections have been constructed.

Some advice may be delivered regarding the construction of BS:

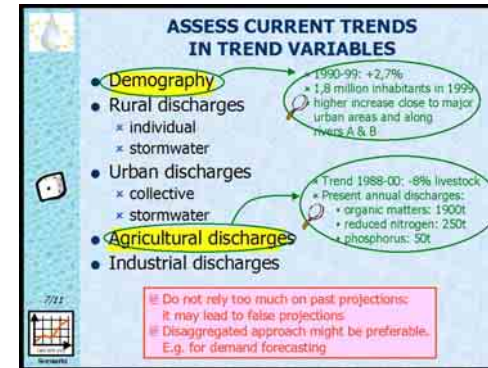
- × not to rely too much on past trends as may not allow identifying recent changes going on and may lead to erroneous projections. As a consequence it may be useful to examine alternative realistic scenarios. Here, mere projection of demographic past trends would lead to estimate a total population of 2,03 millions inhabitants in 2015 (+10%). However, as several major infrastructures are planned (motorway, extension of navigation canal, high speed train connection...), it is considered that the population is in fact likely to reach 2,1 millions inhabitants in 2015 (+14%).
- × identify data with high/low level of confidence: it will reduce ambiguities and misunderstanding and will allow to launch further investigation where such data is essential.

Note

An indicative list of data to be collected for task 1 is provided in slide "Go further 3" which you can directly reach when clicking on the red frame

Go further

Specific tables may be used at this stage to identify key factors and compile information. Example of such tables used during the elaboration of a demand forecasting exercise is provided in WATECO Guidance (accompanying document, p. 122.



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YOUR NOTES

COMMENTS

Task 2 intends to integrate changes in water policy variables (e.g. planned investments). This task will try to answer the following questions:

- × what additional quantities of pollution will be abated in the future (e.g. following the construction of additional sewage treatment works)?
- × what will be the effects of planned policies on water availability for the water services and uses (e.g. regulation policies, storage equipment policies...)?

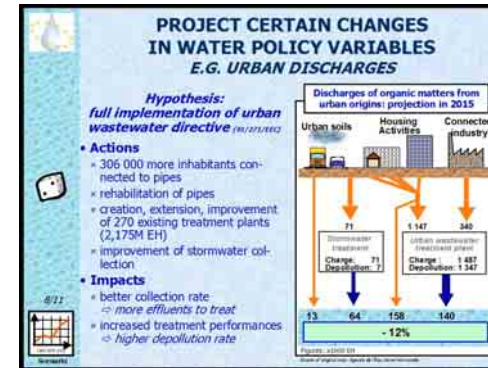
Here, as an illustration, focus is put on discharge from urban origins: wastewater treatment, stormwater runoff. The key element in the projection is the implementation of the urban wastewater directive, which requires that effluents from urban areas of more than 2000 EH are treated by the end of year 2005. Concretely, this means here that works will be needed to improve the rate of connection to networks, to upgrade treatment plants, etc. Increase of the quantity of effluents treated and of pollution removed may be assessed, given elements provided at task 1 (demographic changes...).

Simulated figures for organic matters (OM) show an expectable 12% decrease. For industry and agriculture, figures are respectively -31% and -58% (for OM too). Reduction of discharge of OM at basin scale would thus be around -29%.

Such projections indicate that main reductions may be expected for discharges from industrial and agricultural origins, whereas the reduction of urban discharge will be more limited. Although such figures are only projections, they provide policy makers with helpful information. E.g. business as usual evolution will allow to halve discharge of organic matters from agriculture sector. It may then be reasonable to consider that supplementary efforts may target other parameter and/or activity.

Note

A recommended approach for this task is provided in slide "Go further 4" which you can directly reach when clicking on the main text



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YOUR NOTES

COMMENTS

Key ideas

This task will provide information as regards the potential status of water in 2015, on the basis of task 1, which allowed estimating the increase of discharge.

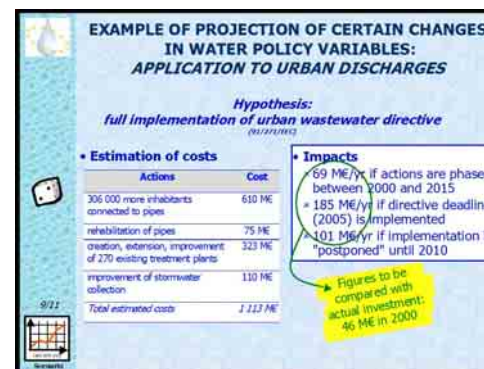
In the basin, costs derived from the actions to be carried out as described on slide 8 are estimated. The total amount reaches 1113M€. This may be considered as the cost of implementation of wastewater directive in the basin.

Annual level of expenses may thus be estimated in different ways:

- * with regards to the deadline set by the urban wastewater directive (2005), i.e. 6 years (as figures are based on 1999 estimates): annual cost would be 185M€
- * with regards to the achievement of good status (2015): annual cost would be much lower: 69M€
- * with regards to a "postponed" deadline until 2010: this is considered as the implementation of the directive is already late. It appears difficult then to comply with the general 2005 deadline. In such conditions, annual cost would be 101M€.

This theoretic estimates demonstrate that in all cases, major increase of annual level of investment will be needed: in 2000, "only" 46M€ have been invested in the basin with regards to discharge from urban origins.

Go further



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2

YOUR NOTES

COMMENTS

Key ideas

At this stage, the goal is to assess the potential impact of more uncertain changes in technology (shift in consumption...), environment at large (climate change...), policy (revised agriculture policy...), etc.

As it is not possible to consider all such possibilities, it is recommended to integrate those likely to have impact on key issues in the basin.

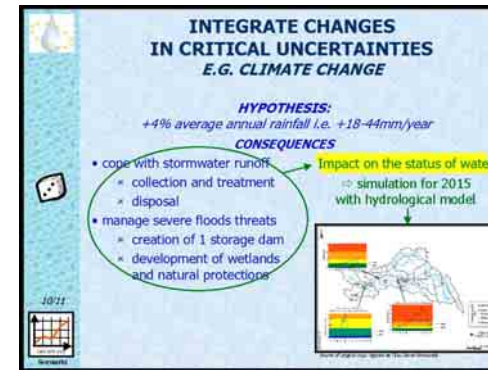
In the present river basin, as diffuse pollution from agricultural origins is an important concern in the basin, one "critical uncertainty" to consider is the possibility of changes in agricultural policies and the potential impact on this concern.

Here, impact of climate change is addressed as an example, with potential consequences on floods. The consequences for quality may be dual:

- × more pollution may be discharged as runoff will increase
- × the development of natural protections and wetlands may contribute to some extent to depollution thanks to natural processes.

Note

Some of the key issues to examine during this task are listed in slide "Go further 5" which you can directly reach when clicking on the main text



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YOUR NOTES

COMMENTS

Key ideas

Combination of all trends and information gives an overview of the likely status of surface water in the basin. However, although general overview is not much different between experts' judgement and model simulation, it appears that once more parameters are taken into account by the model, projections regarding the status may be more pessimistic (e.g. nitrates concentrations may lead to non-conformity of the entire basin).

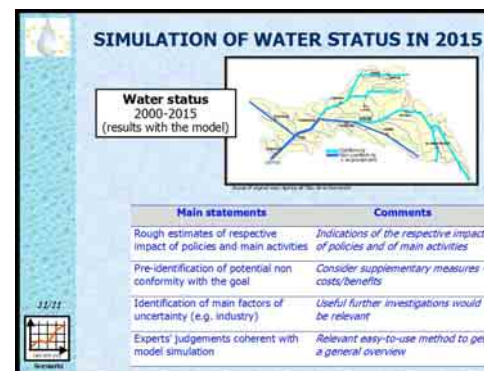
The key here is the (still awaited) definition of "good status": conformity would be possible in the case "good ecological potential" would be agreed.

In spite of uncertainties regarding the real potential of reaching the goal, the construction of the BS is highly instructive:

- × it gives a good overview of the likely situation
- × it shows that experts' judgement may be used for providing rough estimates: it is easier than using a model and may be enough for determining trends
- × though limited by some aspects, BS highlights key issues which may deserve further investigations, what is highly useful in the view of the construction of the programme of measures
- × as data has been compiled at local level, it is possible to determine local trends and then to pre-determine possible gaps with WFD goal
- × though roughly, it gives general trends which may be different than expected evolutions. This may thus be very useful when designing policies in order to address key concerns in priority

Note

Some elements regarding the uncertainty of simulations are listed in slide "Go further 6" which you can directly reach when clicking on the frame



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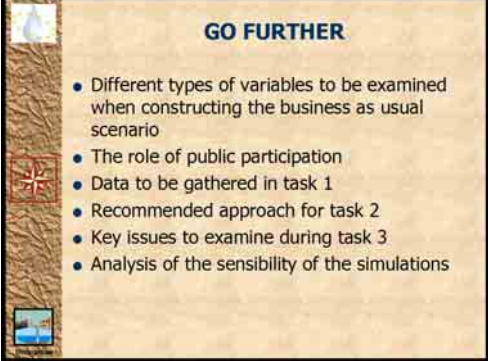
1

YOUR NOTES

COMMENTS

Key ideas

The Go further section compiles elements from WATECO Guidance in order both to provide some definitions and to deliver suggestions and ideas on how to carry out the BS.



GO FURTHER

- Different types of variables to be examined when constructing the business as usual scenario
- The role of public participation
- Data to be gathered in task 1
- Recommended approach for task 2
- Key issues to examine during task 3
- Analysis of the sensibility of the simulations

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Go further 1



YOUR NOTES

COMMENTS

Key ideas

The construction of BS follows 3 stages, which consist in combining different types of variables. This slides gives examples of each category of variables used.

Note

To go back to initial slide, click on the button on top of the margin.

DIFFERENT TYPES OF VARIABLES	
Variables	Example
Trend variables	<ul style="list-style-type: none">× Changes in demographic factors. ↳ e.g. population growth in specific urban areas× Economic growth and changes in economic activity composition ↳ e.g. growth of the relative importance of services (bank instead of mining industry...)× Changes in land planning ↳ e.g. new areas dedicated to specific economic activities, land management in the catchment for reducing erosion
Water policy variables	<ul style="list-style-type: none">× Planned investments in the water sector ↳ e.g. for developing water services or for restoring the natural environment/mitigating for damaging caused by given water uses× Development of new technologies likely to impact on water use for industrial production and related pressures.
Critical uncertainties	<ul style="list-style-type: none">× Changes in social values and policy drivers ↳ e.g. globalisation / regionalisation; policies relying on economics, technology vs. on values and lifestyles× Changes in natural conditions ↳ e.g. climate change× Changes in non-water sector policies ↳ e.g. changes in agricultural policy or industrial policy that will affect economic sectors

Source: WATECO Guidance (accompanying document), p.115.

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Go further 2



YOUR NOTES

COMMENTS

Key ideas

As indicated in the course of the presentation, public participation is essential. It is intended to take place at each stage of the construction of BS, and not at one or another limited phase.

Note

To go back to initial slide, click on the button on top of the margin.

THE ROLE OF PUBLIC PARTICIPATION		
Task	Role of public participation	Output
Task 1	System analysis and choice of determinant assumptions 20- depth interviews with main stakeholders, experts and institutions of the district, aimed at: - defining the key variables that determine the water system in the district according to the interlocutors; - proposing a hierarchy for these variables (more or less determinant); - describing their range of variation	Overview of general trends in key variables Short term projections
Task 2	Scenario building based on task 1 inputs and participation from stakeholders, experts, representatives, scientists through working groups, thematic workshops, etc...	Baseline scenario without uncertainty
Task 3	Large-scale debate on the proposed scenarios: presentation at various policy levels, large communication, and collection of opinions from the public. The list of assumptions that underlie the scenarios should be delivered as clearly as possible to allow transparency and possibilities for criticism and reformulating, etc.	Alternative baseline scenarios incorporating uncertainty
Task 4 (optional)	Amendment of scenarios, and quantification refinement: based on previous tasks, derive and calculate the precise significance of scenarios for their systems and instruments: investment and subsidizing system, pricing, technical actions, policy organisation, etc. Organisation of large-scale publication and participative discussions.	Exploratory scenarios

Source: WATERCO Guidance (Accompanying document), p.139

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Go further 3



YOUR NOTES

COMMENTS

Key ideas

This slide provides plenty of examples of the different types of data to gather at stage 1.

Note

To go back to initial slide, click on the button on top of the margin.

DATA TO BE GATHERED IN TASK 1		
Action	Key points	Output
Identify trends in physical parameters	<ul style="list-style-type: none">Map evolution of:<ul style="list-style-type: none">trends in water status over the past relevant periodE.g. evolution of pollution and ecological quality	Overview of general trends in the hydrological system in the RBD
Identify trends in socioeconomic drivers influencing water uses and water services and impacts	<ul style="list-style-type: none">Map evolution of:<ul style="list-style-type: none">equipmentE.g. water distribution and sewage, rates of households and industries connected to public networkpricingE.g. pricing policies, average pricesusesE.g. hydroptives, navigation, angling, etc. and related impactsE.g. power produced, transportation volumes, number of angling people, etc.	Overview of general trends in water uses and services in the RBD
Identify trends in water policies and regulations	<ul style="list-style-type: none">List past and existing national water policiesState the level of compliance with water-related environmental directives (e.g. Habitats directive) and describe past investments and effortsDescribe trends in rates of:<ul style="list-style-type: none">a. equipment in water distribution treatment and in sewage treatment capacities;b. agri-environmental policies implementation;c. industrial compliance.	Overview of general trends in the implementation of present water policies and regulations.

Source: WATCO Guidance (Accompanying document), p.117

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Go further 4



YOUR NOTES

COMMENTS

Key ideas

This slide gives examples of the approach that can be usefully carried out for task 2, taking care of uncertainty and of the limits of extending recent trends without carefully examining recent or coming changes.

Note

To go back to initial slide, click on the button on top of the margin.

RECOMMENDED APPROACH FOR TASK 2		
Action	Key points	Output
Make assumptions about the future dynamics of basin variables identified in Task 1.	<ul style="list-style-type: none">determine whether parameters have stabilised (e.g. household connections to public networks, tax levels)determine the supposed effect of proposed future policy measures on the water status (e.g. new investment programmes, new national/regional, already planned institutional changes and public equipment policies such as energy transportation, etc.; what possible effect on water quality and availability?)	Assumptions on the future dynamics of trends
Make projections based on certain trends	<ul style="list-style-type: none">derive the projected values of the different parameters for 2015check the general consistency of the different trends, explain the apparent inconsistencies (e.g. how can we explain a forecast of growing investments along with a supposed decrease in river quality? Because of a rise in general pollution flows out from economic growth)Propose one or several combinations of assumptions on trends	Baseline or business as usual projections of the RBO in 2015

Source: WATER2 Guidebook (Accompanying document), p.121.

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Go further 5



YOUR NOTES

COMMENTS

Key ideas

As indicated in the presentation, task 3 aims at integrating critical uncertainties in the simulation. Although lots of such variables could be considered here, this slides provides some representative examples.

Note

To go back to initial slide, click on the button on top of the margin.

Action	Key points	Output
Identify changes to the parameters that are uncertain and could have significant impacts on the water policy	<ul style="list-style-type: none">Pay special attention to:<ul style="list-style-type: none">increase in magnitude and frequency of uncertain events (policy and technological shifts, meteorological events such as floods and drought occurrence)possible reactions and feedbacks from the environment:<ul style="list-style-type: none">acceleration of water quality improvement due to enhancing of auto-purification by the water environment;adaptation of new quality parameters previously hidden (again recommended use of modeling)possible social changes having significant impacts on the water system: consumption habits (housing, land planning, ...), institutional design of water policypossible economic changes having significant impacts on the water system: economic growth cycles, investment flows, employment, economic policy, taxing system, etc.associate and merge analyses of "demand" and of "supply" of water. Baseline scenarios are particularly necessary for preventing the dissociation of supply policies and demand-side management, "putting offer and demand in the same image".	Alternative baseline scenarios

Source: WATER21 Guidelines (Accompanying document), p.127

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Go further 6



YOUR NOTES

COMMENTS

Key ideas

Although information and data were fairly available for the BS in this basin, it is important to keep in mind that the level of confidence in data is essential. In several cases however, nothing can seriously be done against a low confidence, or only at high cost (e.g. production of specific data). In such a case, it cannot be considered that the scenario can't be constructed. Therefore, it is important to put it clearly that confidence in data is low and to quantify the level of uncertainty of the estimated result as precisely as possible.

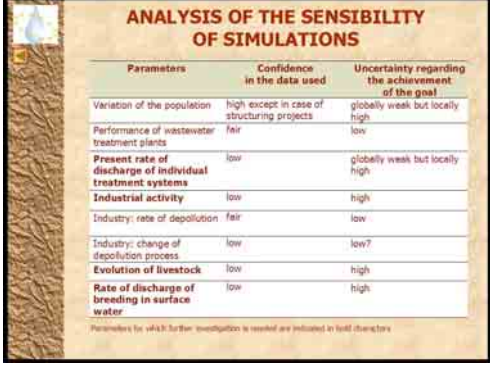
Uncertainty of information is not a problem in itself, but it may become one in some cases, for instance:

- × when it refers to essential issue
- × when it is difficult to determine the level of uncertainty
- × when information is combined with other of high uncertainty
- × when funding programme is determined, etc.

A table like the one provided on present slide may thus usefully be constructed as it will help determining which further investigations are needed.

Note

To go back to initial slide, click on the button on top of the margin.



Parameters	Confidence in the data used	Uncertainty regarding the achievement of the goal
Variation of the population	high except in case of structuring projects	globally weak but locally high
Performance of wastewater treatment plants	fair	low
Present rate of discharge of individual treatment systems	low	globally weak but locally high
Industrial activity	low	high
Industry: rate of depollution	fair	low
Industry: change of depollution process	low	low?
Evolution of livestock	low	high
Rate of discharge of breeding in surface water	low	high

Parameters for which further investigation is needed are indicated in bold characters

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Go further 7



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