

Kennis voor Klimaat

Knowledge for Climate

Report on Midterm review of Climate proof fresh water supply

Ad Jeuken, 12 October, 2012

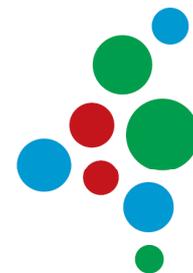
Introduction

This report of the midterm review of theme 2 Climate proof fresh water supplies summarizes the main critical and positive remarks of the reviewers, the response of the consortium and the discussion with the audience during the session on October 4th. In addition, recognised critics are translated into possible action for the consortium in the near future. We make a distinction between critical remarks of the reviewers that need further clarification, remarks that call for additional discussion and remarks that call for further action. The full text of the review and additional remarks made during the session can be found in the appendix.

Summary of question and reaction of the consortium

The reviewers comments might be summarized in a number of main points that need to be addressed in the follow up.

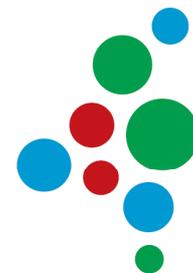
1. First of all there are a few questions that are out of the scope of the theme 2 research program. The scope of the program has been carefully chosen at the start of the program in relation to other themes and the Delta program. This does not mean that these choices hold forever. However, it will be difficult to solve 'missing issues' within theme 2 alone. Therefore, if relevant we have turned a question in a program wide recommendation. The following questions relate to the 'scope' of the program.
 - a. *"The research is solely directed to the low lying parts of the Netherlands"*. This has been a choice at the start of the program. Theme 3 is doing research on the higher sandy soils in brook systems, albeit with a wider focus than fresh water supply strategies. If solutions under research in theme 2 also have potential for the higher parts of the country this will at least be indicated in the end results of theme 2. This might for instance be the case for types of drainage and underground storage
 - b. *"Some important water quality issues seem to be lacking in theme 2"*. Reviewer Edmunds is mentioning a few of these aspects. As far as theme 2 goes, are water quality aspects besides chloride part of the research in the applicability of ASR system (also with attention to long term effects) and part of the research on vulnerability of nature areas. Effects of low flows on water quality were originally planned in a literature study as part of work package 1 (upstream effects) but has been cancelled in consultation with the Delta program since the expectation was that this would not lead to any new insights compared to the studies already done by KWR (Zwolsman et al...). A certain lack on water quality projects within the KfC program has already gotten the attention of the program board.
 - c. *"There are worries formulated in several ways on the the use of models and scenario's" Is the uncertainty associated with this use sufficiently reckognised?*. Especially reviewer Beven is critical on this point but at the same time aware that other themes and the Delta program have to play a role in this. Under point 3 we come back on how within theme 2 we deal with this issue. Theme 6 (Climate projections) is the theme that is working on improvement of coupling of models (downscaling and connection of climate and hydrological models), an update of climate scenario's (planned for 2013), coincidence of climate phenomena (on the



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- d. *Use of ASR in more urban, industrial areas and its benefits for buffering peak rain events.* These secondary benefits of underground storage are recognised and will be illuminated in the more policy oriented reports but are not the subject of the scientific research.
 - e. *There might be 2 visions needed: one for areas that have fresh surface water available and one for areas that don't.* We doubt if this would be helpful. Within the same definition fits the mismatch in time of fresh rain water between summer and winter which could be seen as 'supply' to the islands in the south-western Delta that do not have fresh surface water available. The challenge in these areas is to make this rainwater source better available throughout the year. In the case South Western Delta we at least distinguish between the two areas in problem definition and available adaptation options.
3. Last but not least we treat the reviewers comments and follow up discussion that we recognize that should lead to adjustments in either our research approach or communication of results:
- a. *"Give more attention to the treatment of all kinds of uncertainties".* Partly the 25 page short review report has not made clear enough what we do on this point, partly we feel that we can do better. A few suggestions how to proceed:
 - i. Determine more systematically what are the most vulnerable areas and most critical decisions, what changes in boundary conditions (from upstream to local) are they most sensible for, and what uncertainty (type, origin etc.) is connected to these possible changes. So we can better assess if we are using the right tools to tackle the problem (fit for purpose).
 - ii. Progress on what we are already doing in work package 5, that is accept the existence of uncertainty and think of robustness and resilience and adaptive planning as a strategy to better cope with current variability. As mentioned in the discussion: "we do not need climate change" to strive for a more robust water supply and demand system. WP 5 is lagging behind in time and will be delivering its main results coming 1,5 year. Therefore, we will increase communication on the role of uncertainty and ways to cope with it within and outside the program coming years. Besides in direct discussions with stakeholders we will use popular media and Delta program national knowledge conference and international conferences as a stage.
 - iii. Try to give insight in robustness across scales, at least national versus regional. The issue was raised by Joost Schrijnen and needs further discussion. We will make use of his invitation to discuss this in the near future.
 - iv. Be more clear how we do use models and how we try to reduce uncertainty through calibration and validation (how are control runs performing). Examples are the use of the questionnaire for the calibration of the agent based model, and the validation of the probabilistic rootzone modelling.
 - b. *It is unclear what is meant exactly by upscaling of results:* The consortium recognises that this should not be underestimated and that this 'promise' should be made more practical in the near future. As mentioned under 2d we will not make a major final assessment but we will try to go as far as possible to draw generalized lessons about the potential of different strategies for the low-lying parts of the Netherlands. Therefore this issue will get more attention in the next year in the consortium wide discussions and in the elaboration of conclusions in the case studies.



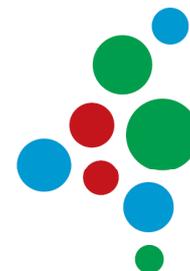
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- c. *The international perspective is for a large part not visible. As some other themes have done we did not include an international comparison of strategies in our program yet. In the first half of 2013 we however plan to do an inter comparison with other international river basins. In follow up projects we will pay further attention to exporting gained knowledge and insights abroad. This will be done by the individual knowledge partners but also in joint initiatives under 'top sector water'. At the same time almost all individual researchers within the consortium are cooperating internationally, sharing knowledge and writing papers. This will of course be continued.*
- d. *The program is invisible in national policy debate on fresh water supply although it is well connected to the operational delta program and regional stakeholders. We expect that there will be more and more occasions in the near future where we will be able to highlight the role of knowledge and associated uncertainty in the national debate. A first occasion will be the national knowledge conference of the delta program. Further more we will be better able in coming 2 years to show the potential of more integrated regional solutions for fresh water supply and we will continue to regularly exchange insights with the Delta program. We do realise that not all the knowledge gained within the program will be readily applicable for the stakeholders. Within the case studies and with partners such as STOWA we will continue to translate results, within possible limits of scientific liability, to generic and practical estimates, rules of thumb, good practices etc.*

To conclude

We have appreciated the comments of the reviewers and found them very useful. This report has tried to summarize the first ideas how to improve the program in the remaining years in response of the review. Within the consortium we will further elaborate the above mentioned actions in upcoming meetings. On occasions we hope to make use of the reviewers knowledge and capacity also in the coming years.



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Appendix: Critical remarks made by the reviewers

Prof. Keith Beven, Lancaster University

Written review

Scientific

I recognise the limitations of a short(ish) mid-term report but it is actually difficult to really tell much about the quality and innovation of the vision because so much detail is lacking, especially about how the multiple sources of uncertainty are going to be handled. There is much on robustness, but not much detail or critique about robustness to what (uncertain) magnitudes of pressures. The only mention of a link to theme 3.5 is that they have produced an uncertainty terminology (though this has been done before in the Netherlands and EU projects like Harmoni). What is the simple assessment model that will be used in evaluating robustness (something like Box 3.4??)? Is it fit for purpose (it is not clear how some of the detail of local ASR schemes might be included for example)?

I would have expected some assessment (or reference to) of the capabilities of the climate models and NHI model in reproducing current conditions in evaluating the value of predictions for future conditions. Is it the case in the Netherlands that downscaling is used to correct for significant biases in precipitation predictions, for example. I would also have expected to see critical evaluation of the agent-based modelling techniques to be used. While the surveys on which they are based have not yet been carried out, how far have such models been validated elsewhere? How far will the surveys this year be influenced by the strange weather this year / or the relaxation time since 2003?

The section 2.3 on upstream influences on low flows in the Rhine seemed particularly thin given the real significance of such impacts on the Netherlands. Here we were given some indicator of performance – a factor of 6-8 between SCENES and previous studies. There was no indication of consistency of climate scenarios to be used (and bias corrections in the Alps can be particularly high) in modelling impacts. Percentage uses of surface and groundwater did not seem relevant (p17) – it is the potential changes in absolute use that is important. This may be uncertain but is also critical to the future

The new stochastic methodology for assessing salinity hazard to crops (p26) is great (but is there any verification) but is not consistent with the SWAP modelling (p28). The associated workshop might well have been enticing but what will actually be done in this project?

There is no mention of any work on current and future salinity problems in other parts of the world. It has been a real issue in Australia for example – both in the Murray-Darling and Western Australia.

Innovative work their on stakeholder involvement in integrated catchment management might be worth investigating.

As an outsider, the relationship between KfC and the Delta Program is not at all clear. The third paragraph on p.25 seems important but there is not enough detail to make a proper assessment

A similar comment might be made about links to other parts of the programme – some comments about agent based approaches in

the Theme 3 studies of Hoog Nederland are made but does not give the impression that is integrated. Other potential links, e.g. to reuse of urban waters are presumably relevant but are not mentioned.

There is not a strong impression that the different components of the work are really integrated – there would seem to be a lot of detailed work that needs to be completed to bring it all together for 2014.

There is not much on how the Case Studies will be extrapolated to other areas with rather different characteristics – except through the simple assessment model. Seems to be a lack of a clear methodology for evaluation of models, ensuring consistency of models being used, and how uncertainties will be evaluated in the (not clearly specified) risk assessment method.

Societal

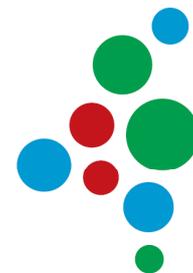
There have been a number of knowledge transfer activities already – these seem to have been mostly aimed at organizations and policy makers – some plan might be needed for dissemination of good practice down to farmer level. It is not clear how the new foundation “Doe meer met regenwater” fits in to this, since it also has international aims.

Additional remarks during the review session

Some positive remarks

There is a good overall vision of the issues pertinent to these areas in Laag Nederland. The salinity issue in particular is one where this project could have an important international impact.

Some of the papers that have already appeared and much of the work is of very high quality, albeit sometimes concerned with points of detail rather than impacts of change.



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- Invisible to reviewers if and how important 'niches' match with delta program (aren't there any gaps?). Linkages between different parts of the KfC program also not visible.
- Question: Are the models used fit for purpose? How is performance over control periods
- Ask the question how much do you want to invest to become more robust irrespective of uncertain magnitudes of climate forcings. Example new building level of 5.5meter in Rotterdam
- Don't under estimate upscaling (really difficult, different models at different scales may use different types of parameterisations.
- Be aware of epistemic uncertainty when taking questionnaire (do people have in mind 2003 or 2012).

Prof W M Edmunds

Written review

Scientific.

The research topic (see title) relates to drought and salinisation, yet many of the issues discussed are not just drought focused, but should be considered in terms of climate variability (including flooding, alternating extreme events and intensities of precipitation. Some change in emphasis might be considered within next 2 years (not least in view of recent European weather and jet stream uncertainties. Mitigation of the drought impacts could include optimising storage of major rainfall events (in drought years or floods.

Even more effort might be made to relate research excellence and its results to societal needs

Important that Dutch programme is always measured against international effort (noted that each researcher asked to abstract 5 relevant studies). Long term monitoring needs to be designed into the results since the benefits of a 4-year intensive programme such as this will only be realised in future decades.

There is little mention of the natural (or created) ecosystems and how these are affected by water shortage, within the research design. Increased storage capacity is a central theme of the programme. The work on ASR is highly appropriate but more thought should be given to low permeability including (sub)urban and industrial areas.

Thus surface runoff can be minimised with sustainable urban drainage (SUDS) with an enhancement of groundwater recharge. Also underground cisterns to avoid PE should be considered. The quality aspects of ASR can be site specific and require testing over several years (i.e longer than the programme).

In 3.2, there is no mention of waste-water reuse.

Droughts will lead to the greater concentration of contaminants (or dilution under sudden flood events). Should receive attention under water quality, noting also the impacts of rising water levels.

Societal

1) The results of the questionnaire will be interesting. To what extent are farmers and other stakeholders involved in the research design?

2) Local solutions to supply side (water harvesting etc.) provide incentives for local people/farmers and lessen dependency on centralized water provision

3) There is no mention of water pricing as an instrument in demand management

Additional remarks during the review session

- Interested in consideration of energy use of water supply system opposed to more localized solutions.
- Be aware of water quality issues connected to ASR on the long term.
- Think of other sources for fresh water; sewage, brackish water, think different qualities.

Prof.ir. Joost Schrijnen – Former director Delta program South-Western Delta

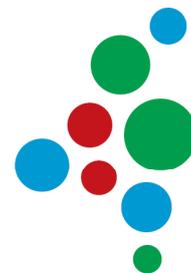
Written review

Some positive remarks

The report gives a clear indication that this is a research programme in good health.

The factsheet idea is excellent and should be Major deliverable for interpreting the science – practical applicable knowledge.

Water quality aspects are stressed and the synergy between quality and quantity is an essential part of the programme.



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1. The vision statement on page 9 needs reflection. "there is no shortage of fresh water but mismatch between supply and demand". This seems to be related with surface water supply and less to ground water and rain. So perhaps two visions are necessary.
2. The urgency of the possible shortage of water supply in relation to damage and cost of solutions is not yet clarified. That is of course done in the Deltaprogram. As far as I can see the cost of better and robust supply are not so very high in relation to damage. (Other supply route for Gouda).
3. In consideration should be taken a more substantial estuarium in the dutch delta that needs more fresh water. This might be possible without high costs and with another supply system of Gouda. So this questions has to be part of the considerations.

Additional remarks during the review session

- Try to take into account into robustness thinking over different scales and with changing objectives (future vision)
- The potential success of national strategies (for example a more open Haringvliet) strongly depends on success of local solutions

Peter Glas – Waterboard de Dommel

Written review

Limitation of the scope to lower parts of the NL, whereas major problems also occur in higher parts of NL where water supply from external sources is no realistic option.

So far the interaction with the policy community outside the partner institutions has been very limited (absent in my official/formal capacity). To underline this: the programme has in my experience not once been mentioned in any official meeting on policy levels in connection to the Delta program. It may be too early yet but this is something to be aware of and take action on towards the second half of the program.

Additional remarks during the review session

- There seems to be an 'out of phase' problem between KfC and Delta program. The right questions are asked but will the answers be given in time.

Some positive remarks

The definition of system robustness (pg 24) might give perhaps more steering to the different options that are considered within the deltaprogram matrix.

Buffering underground seems to be effective and cost effective too.

Some positive remarks

Critical attitude toward existing insights/assumptions about vulnerability of crops and ecosystems.

Broad involvement of stakeholder