Dear Reviewer,
Thanks for your time, efforts, work and contribution to the review of this paper.
Please find hereafter the list of corrections in red according to your comments. Please, note that some of your questions and comments are directly answered and/or commented in our previous paper (Dondeynaz et al, 2012) already published in HESS and referenced in this current manuscript. In this first paper, we described the data, variables, pre-processing data methodologies, data and coherence validation, … In the current manuscript, we described the methodology used for the modeling of the WatSan4Dev dataset and related analysis.

Best regards,
Celine Dondeynaz

GENERAL COMMENTS

1. The state of the art is poor and not enough to meet the standards of a scientific paper. There are numerous missing key references of applications and studies on Bayesian Networks modelling for water resources studies. (Castelletti and Soncini-Sessa; Susnik et al., Carmona et al., Molina et al.,)...among others.
   There are also missing key references and concepts for this topic.

As stated at the beginning of this manuscript, this paper is the second part of an already published one in HESS (Dondeynaz et al, 2012). The latter can be considered as the paper establishing the context of the research work, the dataset (WatSan4Dev) description (data pre-processing and processing methods, data coherence validation and data analysis, ...) and the variables (basic relationships between the variables, ...). There you can find the key bibliography in the domain of the water sector. In this current manuscript, we have considered to make only reference to that paper and summarize the main elements and concepts explained in that paper avoiding a duplication of the already published text.

Concerning the Bayesian Networks (BN) applied to the water sector, we have introduced a more extended but anyway synthetic review in line 22 p9 to line 14 p10: BN used as a tool for stakeholder participation, modeling pressures on water ecosystems and socio-economic aspects; and/or combined with hydrological dynamics at river basin level. We have included there the references mentioned in your comments and many others.

2. Authors have no mentioned the well known and most famous indicator for water accessibility "Water Poverty Index" developed for developing countries.

Dondeynaz et al 2012 uses extensively the Water Poverty Index (WPI) but also the Human Development Index (HDI) among other famous composite indicators as key references to check the coherency and validity of the data and the variables used in this paper. As you know, the Water Poverty Index is a composite indicator synthesizing a wide set of simple indicators (17 simple indicators grouped in 5 thematic sections or areas). The aim of this manuscript is to analyse the variations of Water Supply and Sanitation (WSS) in developing countries, their consequences and their origins. Due to the composite nature of WPI, this does not allow establishing-identifying the origin neither the consequences of the variations of the WSS (From variation of WSS, it is impossible to identify from the WPI alone which of the simple indicators is involved or affected without directly analyzing the variations of those simple indicators – i.e.what's the impact of the WSS variations on the "under five mortality" indicator in a country if you consider the WPI? What's the influence of the "income-per-capita" on the WSS analyzing the WPI?).

We have added a paragraph (lines 9-13 p5) explaining this point to avoid misunderstandings.

3. English grammar is poor and the text should be entirely revised by an English native person

The text has been proof read according to your comments by an external person. The quality of English has been improved and we paid particular attention to the description of the methodology and results.

4. Statistics are not justified in the entire modelling process. There are too many tables on some statistics but they are not well explained through the manuscript. Why do the authors choose these statistics variables and no others?

As already mentioned, this paper should be considered as the second part of Dondeynaz et al, 2012 published in HESS where an extensive use of multivariate analyses is done for verifying the validity and coherency of the data and variables used in this paper. In that paper, the choice of the variables and data has been largely detailed and explained.

The multivariate analyses are also extensively used in particular in this paper as statistical basis for designing the DAG (to establish the relationships among the different variables) of each model but also field knowledge in this thematic area has also been used taking advantage of the BN.

Tables on sensitivity analyses of models have been grouped and put in Appendix B to reduce their number, as well as tables reporting simulations for Profiles 4-5. Each simulation is then interpreted according to statistics reported in the corresponding table.

5. A linear law is presented with a R2 of only 0.5265...is that representative of a lineal behaviour?

In page 2510 (lines 16-21) of the online manuscript, authors wrote that "… this linear model only explains 52.65% (R2) of data variability … These examples [those not having a linear behaviour] cannot be explained by this linear model". However, the presented linear model is only used to highlight the general gap existing between Sanitation (S) and Water Supply (WS) in developing countries considered in this paper (21.82%). This is also "graphically" confirmed by Figure 7 but also by the UNICEF and WHO, 2008. (Complete reference: UNICEF, WHO: Progress on Drinking water and Sanitation: special focus on Sanitation, UNICEF, New York and WHO, Geneva, pp58, ISBN 978 92 806 4313 8, http://www.wssinfo.org/fileadmin/user_upload/resources/1251794333-JMP_08_en.pdf, 2008)

We have introduced complementary explanations (lines 9-15 p34) in this section to avoid any misunderstandings.

6. Modelling scale looks too broad for this type of applications (National). What about the details? In this sense, authors remarked that the mechanisms influencing Water Supply and Sanitation are too complex because of the cross-interaction between multiple factors and issues. I do not personally think that this type of broad or general scale models can help for modelling Water Supply and Sanitation. Even more, because these problems have a very strong local nature and they have many peculiarities.

Applications of Bayesian Networks to river basin, municipalities, reservoirs, rural areas… have been made by many researchers to observe the "local nature and peculiarities" of water resources management (as you mentioned in comment 1). These are local and operational tools to manage the

water supply infrastructure within a specific physical environment (not sure that sanitation services are included).

As one of its originalities, our research aims more at supporting strategies at national – regional scale in the framework of the MDGs to which the developing countries committed themselves. This modeling is an attempt to identify and measure specific behavior (group of countries or thematic sectors depending) according to multiple aspects instead of analyzing separately social development, basics services access, governance …We also included the Official Development Aid to measure its effects that are of interest for Donors. This work intends to refine/complement the Joint Monitoring Program (JMP) countries analysis through observing divergences related to this common set of variables provided worldwide.

SPECIFIC COMMENTS
Fig. 7 is not clear and should be improved.
It has been modified.