

Interactive comment on “Population Growth–Land Use/Land Cover Transformations–Water Quality Nexus in Upper Ganga River Basin” by Anoop Kumar Shukla et al.

Anonymous Referee #2

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General comments: The authors have a clear understanding of his topic area and have applied remote sensing and data collation techniques to answer investigate the impacts of demographic changes on water quality in the upper Ganga River Basin. However I believe considerable work is needed to bring the paper to publishable standard.

My major concerns are threefold: 1) What is it about this paper that is academically novel? Is it the application of existing methods to a new area? Or the evaluation of new methodology? The authors need to make this much clearer as the current introduction suggests that the paper aims to identify drivers; however the method takes drivers as given and the conclusions focus on the utility of the method... which aspect of the

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research are important to academia as a whole? 2) There is an imbalance in the level of detail applied throughout. Some areas provide too much detail (I don't think the equation for growth rate needs five lines of explanation and an equation) whereas some key aspects of the methodology (e.g. radiometric correction) aren't described at all and there is little critical interegation of the results (why are they the way they are – what factors contribute and what doesn't). There is a need to work on structuring the data to make it make better sense 3) The paper needs a thorough restructure as it is repetitive, provides considerable amounts of extraneous material and doesn't clearly signpost what is relevant to read. The language would benefit from a thorough proof read by a native English speaker also.

Technical/Specific comments: 1. There is too great a level (e.g. population figures to the person on page 18. Round to the nearest 1000?) 2. Check English 3. Identify a clear research question. 4. Explain why it is novel – this is very important and does not come across well in the current draft. 5. Find a clear argument that flows throughout the paper and only select figures and data that make it easier for the reader to understand this argument. E.g. Remove superfluous data such as the city populations on page 18. 6. Section 5.1 could be summarised in a paragraph of text. I over-simplify but much of it can be covered by the following sentence: “Growth rates for urban and rural areas were calculated from official statistics (Figure 3)”. Is the individual city data relevant? How does it fit to the overall argument? Would spatial/mapped data be more useful or relevant when compared with RS data? Figure 3 simply repeats statistics shown in the text. 7. The remote sensing work seems well carried out. However more detail is needed on the interpretation of the confusion matrices etc. (what is confused with what?; why?; what does this mean for the interpretation of the results?) 8. There is too much detail in some areas (e.g. full description of equation for population growth rate; detail of full mann-kendall method etc.) Only add detail like this if it is needed to help the reader understand the method, or if there is new method development else use references. Much of the Mann-Kendal work in 5.4.1 should be in methods not results.

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