Reviewer#1

We sincerely thank reviewer 1 for their valuable comments on this manuscript. We have tried our best to incorporate all suggestions. Detailed answers to the specific questions are given in the following paragraphs.

Comment 1: Page 2, the main objective of the manuscript is presented in lines 10-12. However, there are repeated detailed objectives below. I would suggest a more clear structure for the Introduction section.
Response 1: The objective present in page 2, lines 10 - 12 *"The main objective of this work is to present a methodology to quantify uncertainties in SE and SY for ungauged basins using commonly used models and easily accessible datasets."* emphasises the importance of this research and explain its usefulness to readers. Specific objectives of the study are stated in page 5, line 5 - 10. As suggested by the reviewer, we have removed lines 10-12 in page 2 and tried to avoid any repetitions in the revised manuscript.

Comment 2: As for R in RUSLE, is it a rainfall and runoff erosivity factor according to the original model concept?
Response 2: Yes, R factor is used as rainfall and runoff erosivity factor according to the original model concept proposed by Wischmeier and Smith (1978).

Comment 3: In page 5, line 26, the discharge and sediment load records for 16 years are available at the stations. The manuscript should give more details on model calibration and validation.
Response 3: Sediment load records for Husepur gauging station (HSG) and Nanak sagar dam (NSD) are available for 16 and 40 years, respectively. RUSLE model was originally proposed to apply for long term (> 20 years) soil erosion estimation (Wischmeier, 1959; Nearing et al., 2017). Hence we have validated our model with average sediment load at NSD and HSG during the observation period. The results are presented in Figure 8, page 31.

Comment 4: There is a large reservoir built in 1962, which may play an imporant role in sediment trapping. The sedimentation rate data can be used for sediment yield calibration. The SDR should also consider the effect of reservoir trapping, though the model is empirical.
Response 4: Yes, Nanak Sagar reservoir has a significant effect on sediment trapping (6.4×10^5 tones/year). We have incorporated the effect of reservoir on soil erosionand sediment yield estimation by using the methodlogy proposed by Sharda and Ojasvi, 2016. Gross soil erosion for the Garra basin is estimated by extracting the area covered by the reservoir. It is called as gross soil erosion for free basin area (Total basin area – reservoir basin area). The gross soil erosion for free basin area and SDR are used to estimate sediment yield at Husepur.

Comment 5: When compared the annual rainfall and rainfall erosivity, I found the R factor is much lower than the regions with similar rainfall amount, I doubt the proposed the method for R estimation. As well, the very coarse rainfall data might be the dominant factor influencing the simulation results, rather then the R factor itself.
Response 5: In this study, we selected equation proposed by Babu et al. (1978) that was developed using the rainfall data from various meteorological stations in India (Eq. a in Table 2 in the manuscript). This equation is based on the linear regression between annual average rainfall amounts and R factor. Originally, this equation was proposed to estimate R factor in meter tonnes cm / ha hr unit which needs a multiplication factor of '9.8' to convert into MJ mm/ ha hr unit (Foster

et al., 1981). We had missed this factor in our estimate. After revision, we have incorporated the updated value of R factor and revised the subsequent results. Revised R factor are given in Table 1 and shown in Figure 1(c).

Please also see our response to comment 7.

Comment 6: Soil map is rough too, I would suggest to do a field survey for sampling, or obtain a relative detailed soil data.
Response 6: We have used NRSC soil data (1:50,000; 25 m), which is described in Table 1, page 23. This is the best soil dataset available for this region in terms of spatial resolution and is based on field surveys. Obtaining new field survey data for the study area will be repetitive, cumbersome and outside the scope of this study. We have re-classified the soil map into soil textural classes, namely loam, sand and sandy loam (Figure 2 (c), page 26) which is why it looks rough. On the other hand, this dataset has 11 soil classes (shown in Figure 1(b) below), and for each class, K factor is estimated.

Comment 7: As for LS factor, the maximum value is around 2500, this is extremely high due to the high gradients. This means the LS factor may be overestimated for the steep area, since the RUSLE model was originally developed for estimating soil erosion in relative gentle arable land.
Response 7: Yes, LS factor cannot be so high. It was a plotting error which has been corrected. Furhter, we have improved the value of slope length exponent (m). In the previous version, the exponent is estaimted assuming rill to interrill ratio (β) as 0.67. In the revised version, β is estaimted based on basin median slope (Morgan, 2016; McCool et al., 1997), which changed m from 0.40 to 0.14. The resulting LS factor is shown in Fig 1(a) below and its range is given in Table 1.

Table 1 compares the earlier and revised estaimtes of R and LS factors, and soil erosion. Table 2 presents the revised estiamtes of sediment yield at Nanak sagar dam (NSD) and Husepur gauging station (HSG). Compared to the earlier estimates, the revised estimates are closer to observed sediment yield at both the locations.

Comment 8: When I saw the data listed in Table 2, the resolution for different data may cause high uncertainties for modeling results. The resolution of the spatial data highly influence the data quality, such as LS factor, K-factor, C and P factor.
Response 8: Yes, due to variation of resolution of different data may produce uncertainty in the modelled results. In this work, we have tried to estimate and propagate the uncertainty using easily available and most commonly used dataset for the Indian region in soil erosion and sediment yield prediction. It is explained in “Limitation” section, page 13.

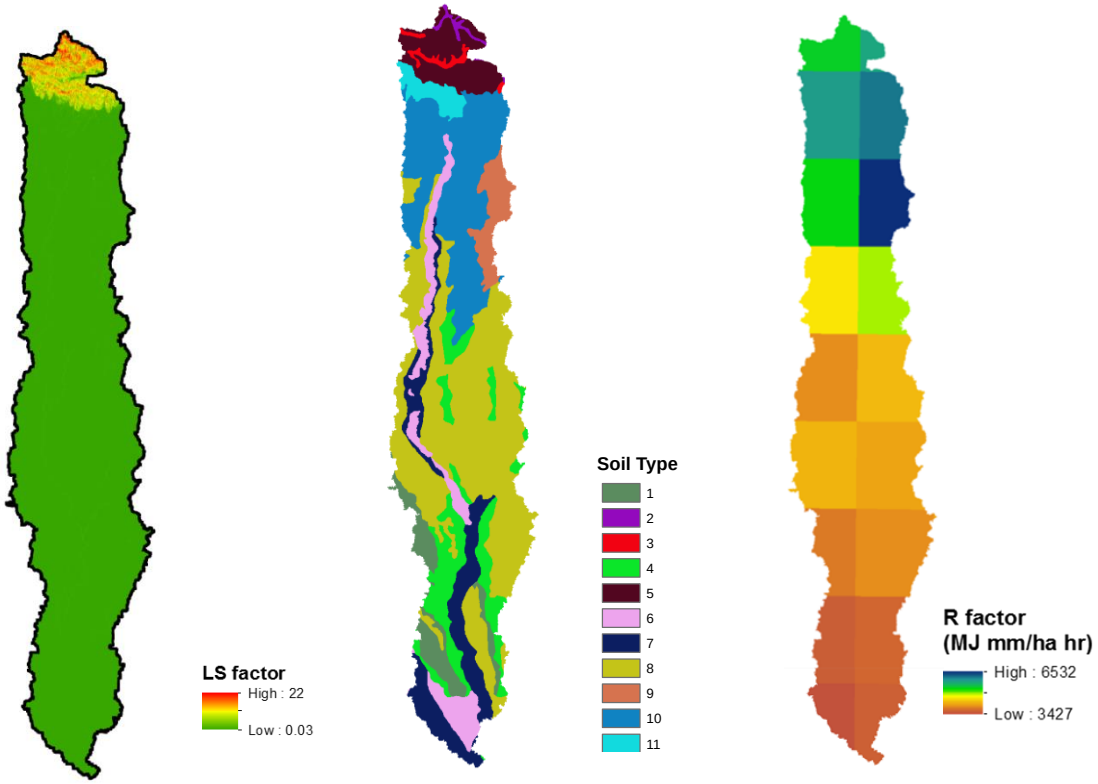

Figure 1 (a) Modified LS factor (b) Soil class map (c) Rainfall erosivity

Table 1 Earlier and modified R, LS and soil erosion values

Factor	R factor (MJ mm/ha hr year)		LS factor		Soil Erosion (t/ha/year)	
	Earlier	Revised	Earlier	Revised	Earlier	Revised
Minimum	666.5	6532	0.09	0.03	0	0
Maximum	349.7	3427	53	22	1356	1423
Mean	467.3	4579.5	5.4	0.6	20.4	23

Table 2 Earlier and modified sediment yield values (units)

Station	Observed	Earlier	Revised
Nanak Sagar	6.4×10^5	8×10^5	6.9×10^5
Husepur	7.2×10^6	7.9×10^6	6.7×10^6

References:

Babu, R., Tejwani, K. G., Agarwal, M. C., & Bhushan, L. S. Distribution of erosion index and iso-erodent map of Inia. Indian Journal of Soil Conservation, 1978.

Foster, G. R., McCool, D. K., Renard, K. G., & Moldenhauer, W. C. Conversion of the universal soil loss equation to SI metric units. Journal of Soil and Water Conservation, 36(6), 355-359, 1981.

McCool, D.K., Foster, G.R. & Weesies, G.S. Slope length and steepness factors. In Renard, K.G., Foster, G.R., Weesies, G.A., et al. (eds), Predicting soil erosion by water: a guide to conservation plan- ning with the Revised Universal Soil Loss Equation (RUSLE). USDA Agricultural Handbook 703, 1997.

Morgan, R. P. C., & Nearing, M. (Eds.). Handbook of erosion modelling. John Wiley & Sons, 2016.

Nearing, M. A., Yin, S. Q., Borrelli, P., & Polyakov, V. O. Rainfall erosivity: An historical review. Catena, 157, 357-362, 2017.

Sharda, V. N., & Ojasvi, P. R. A revised soil erosion budget for India: role of reservoir sedimentation and land-use protection measures. Earth Surface Processes and Landforms, 41(14), 2007-2023, 2016.

USDA. Sediment sources, yields, and delivery ratios. National Engineering Handbook, Section 3 Sedimentation, 1972.

Wischmeier, W.H. A rainfall erosion index for a universal soil loss equation. Soil Sci. Soc. Am. Proc. 23, 322–326, 1959.

Wischmeier, W. H., & Smith, D. D. Predicting rainfall erosion losses. Agricultural Handbook no. 537, US Department of Agriculture. Science and Education Administration, 1978.