Enhancing resources management planning and decision making through simple and easy to use tools and participatory approaches

Lulseged Tamene, Kindu Mekonnen, Kifle Woldearegay, Tesfaye Yaekob, Girma Kassie, Zenebe Adimassu, Quang Bao Le

Introduction

Land use planning and landscape restoration decisions require detailed and spatially distributed information about the condition of resources and associated drivers at different levels. The availability of such information at the required scale and accuracy is limited in developing regions and remote areas. Most of the tools designed to facilitate land use and resources management planning also require complex data and modelling structure. There is thus a need to design 'easy to use' approaches and tools that can help make informed decisions using easily available data.

Objective

The main objectives include to: a) design a simple tool to assess the sediment yield reduction potential of different land use and management interventions at landscape scale (Fig. 1); b) test the applicability of the tool in a participatory manner.

Approach

- We demonstrate the structure and functioning of the tool formulated based on the commonly used Revised Universal Soil Loss Equation (RUSLE) incorporating spatially distributed sediment delivery ratio (SDR) to approximate the sediment delivery efficiency of landscapes (Fig. 2).
- In most cases a range of default values are suggested (for the different factors as well as coefficients) so that users can adjust considering their local conditions.
- In order to facilitate interpretation of results, the tool is designed to generate outputs in terms of quantitative values (mean, minimum, maximum, standard deviation), map and graphs.
- The model out puts (hotspot areas of concern and impact of management options) were tested with local farmers and extension agents.

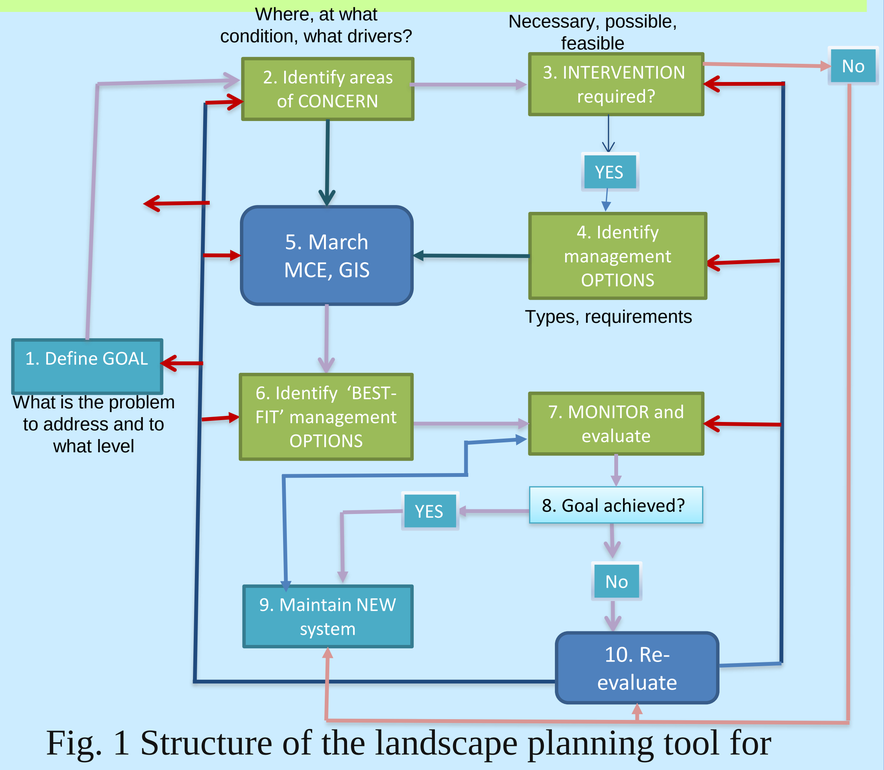

Fig. 1 Structure of the landscape planning tool for supporting adaptive land-use planning and management.

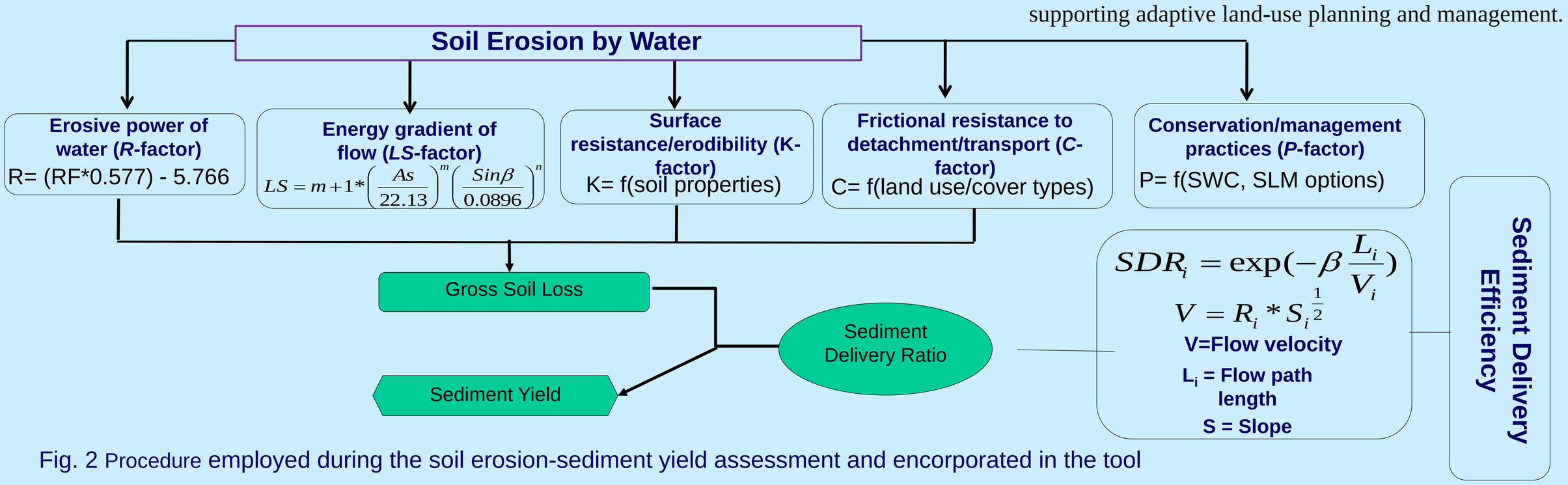

Fig. 2 Procedure employed during the soil erosion-sediment yield assessment and encorporated in the tool

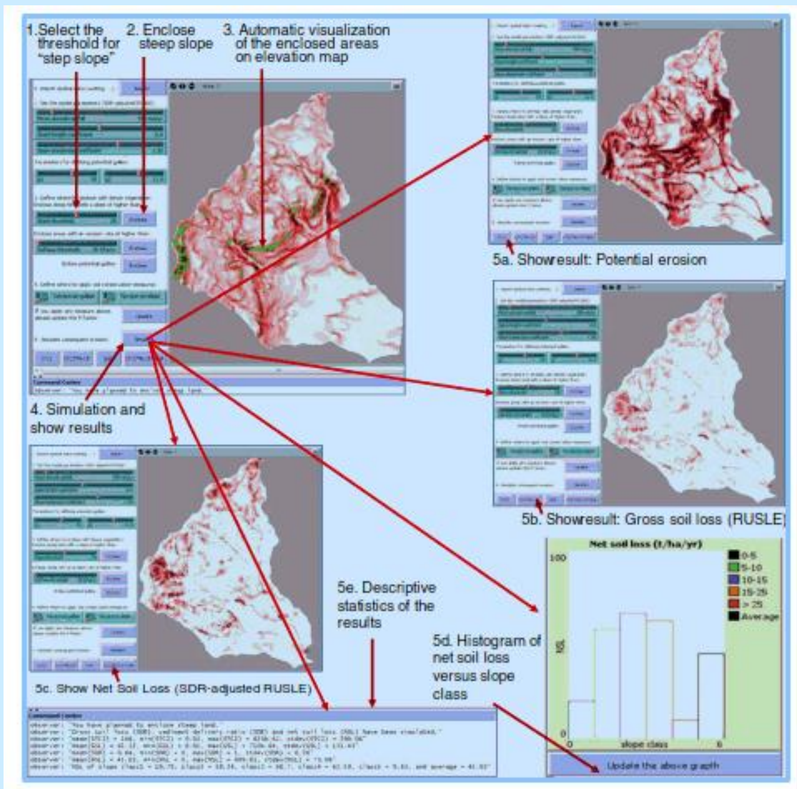

Fig. 3 Graphical user Interface (GUI) showing the different functions of the landscape planning tool

Results

The modelling interface (Fig. 3) facilitates: 1) data input, visualization and inspection; 2) selecting and/or adjusting coefficients; 3) running model for 'business as usual' and different scenarios; 4) viewing results in different formats, and 5) exporting outputs to facilitate integrated data analysis. The model is also designed to facilitate active participation of stakeholders in the adaptive land-use learning/planning cycles: identify hotspot areas of intervention and suggest potential management intervention for each specific location (Fig. 4).

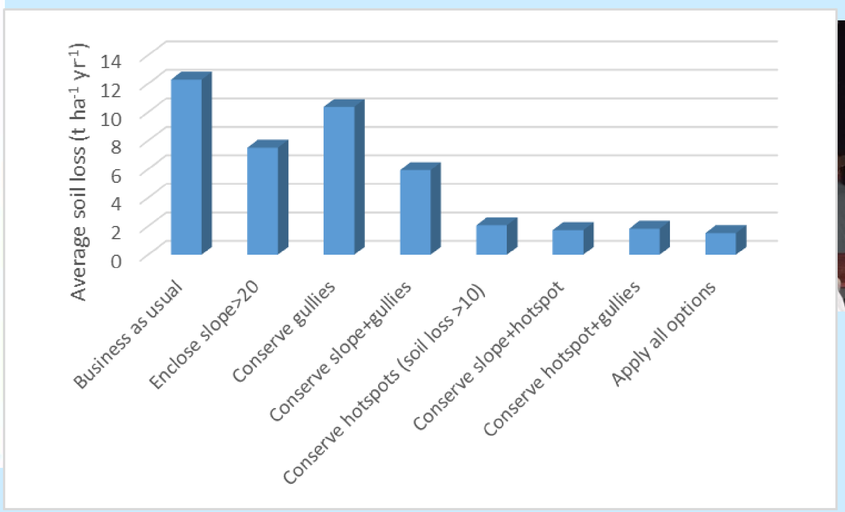

Fig 4. Participatory model evolution (above) and sediment yield estimate based on different management options (left). The communities identified areas of concern and suggested possible interventions, which were also tested using the tool.

- Annual soil loss rate of about 19 t ha^{-1} year^{-1} was observed for a watershed size of 15249.8 ha.
- Protecting (afforestation, enclosures, etc.) steep slope areas of more than 20 degrees, can reduce sediment yield reduces by about 39%.
- Through targeting gullies, net soil loss can be reduced by about 16%. This improved when we include managing gully buzzer zones.
- Conserving/enclosing soil loss areas of more than 10 t ha^{-1} year^{-1} can reduce sediment yield by 83%.
- When all the three options are combined, net soil loss will reduce to about 1.5 t ha^{-1} year^{-1} (88%), which is well below the tolerable limit of 2- 12 t ha^{-1} year^{-1}.

Conclusion

Simple tools that can easily be used by local planners and extension workers to evaluate the sediment yield reduction potentials of different land management options helps understand the impacts of conservation practices. This can raise awareness and facilitate technology out-scaling.

Acknowledgement

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