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## Choice between spate and other rainwater harvesting irrigation technologies

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Moisture stress weakens the use of modern inputs such as fertilizer and this undermines yields. In a growing population, low yields often cause food shortage. Investing in irrigation could mitigate moisture stress though it is expensive for smallholder farmers. Spate irrigation, a sudden flood diverting, could be cheaper to invest than other irrigation technologies. This study investigates factors deriving the choice of spate irrigation, compares the crop-choice in spate irrigation with other irrigation methods and measure yields in Ethiopia. For the investigation of the technology choice, a probit model is estimated using data collected from Ethiopia in 2005. Analysis of secondary data is used to look into crop-choice and yields. The findings show (1) farmers with more irrigation capital, family-labour and expectation of lower operation and maintenance costs tend to choose spate irrigation. In addition, among others, high aridity, long-period rainfall-shortage being in low and mid agro-ecology increases the probability to choose spate irrigation. 2) Market is not a factor driving choice. 3) Users of spate irrigation grow cereals and pulses than farmers using other irrigation methods which could enhance food security. 4) Spate irrigation increases grain supplies by increasing yields. The findings suggest that encouraging irrigation capital creating opportunities and introducing low-cost operating and maintenance methods, meteorological service and considering agro-ecological and regional diversities could increase the probability to use and flood modernize spate irrigation and help users decide crop choice effectively. With these measures, farmers in marginalized and remote areas using spate irrigation could improve their livelihood.

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## Percolation description of the global topography and the water level on Earth

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Remarkable global correlations exist between geometrical features of terrestrial surfaces on Earth, current mean sea level, and its geological internal processes whose origins have remained an essential goal in the earth sciences. Theoretical modeling of the ubiquitous self-similar fractal patterns observed on Earth and their underlying rules is indeed of great importance. Here the author presents a percolation description of the global topography of Earth in which the present mean sea level is automatically singled out as a critical level in the model. This finding elucidates the origins of the appearance of scale invariant patterns on Earth. The criticality is shown to be accompanied by a continental aggregation, unraveling an important correlation between the water and long-range topographic evolutions. To have a comparison point in hand, the author applies such an analysis to the lunar topography which reveals various characteristic features of the Moon.

### Biography

Abbas Ali Saberi has completed his PhD at the age of 27 years from Sharif University of Technology and Postdoctoral studies from IPM School of Physics, and University of Cologne, Institute for theoretical Physics. He was also awarded Alexander von Humboldt fellowship (Germany) as well as ICTP Associate Research (Italy). He is an active referee of many high impact journals in physics like those by APS, AIP and IOP. He has published more than 25 papers in reputed journals.

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